OBESITY IN YOUNG: THE RISING CRISIS

Obesity is now a global epidemic affecting individuals of all age groups. But, ‘obesity in young’ has particularly become the centre of worldwide concern, as it is rising at a dramatic rate across the globe. In last 30 years, obesity prevalence among children and adolescents has more than tripled. In USA, the number of obese children aged 6–11 years increased from 7% in 1980 to nearly 20% in 2008, while in adolescents aged 12–19 years, it became 18% from 5% during the same period. More than 32% of the children and adolescents were overweight in 2008, three times higher than what it was just one generation ago.1

The problem of obesity in young age groups is worsening at a striking rate not only in the economically developed countries, but also in most developing nations, which are undergoing rapid nutritional and lifestyle transition, resulting in over-nutrition, co-existing with under-nutrition. Among the urban children in New Delhi, overall prevalence of overweight/obesity increased abruptly from 16% in 2002 to about 24% in 2006; and in private schools it was 29% among the adolescents, aged 14–17 years, in 2006-2007.2 Another study among the school children from Ernakulam District, Kerala, also showed similar steep rise in the proportion of overweight/obese children across all age groups in both sexes during a short span of just 2 years from 2003 to 2005 and hypertension was seen in high percentages of these overweight/obese children compared to those who were neither overweight nor obese.3 The epidemic of obesity in young is a serious and growing health problem that deserves more attention of the physicians.

OBESITY IS AN ‘ECTOPIC FAT’ SYNDROME

Obesity is a chronic medical disease due to abnormal or excessive body fat accumulation resulting in detrimental health outcomes. Only adipocytes are dedicated fat-storing cells. They can store surplus energy as triglyceride for use during prolonged fasting and protect lean tissue from lipo-toxicity and lipo-apoptosis, as lean tissue lack storage capacity. During over-nutrition, excess lipid cannot be limited into subcutaneous tissue; triglyceride accumulates in lean tissues and organs, resulting in insulin resistance and organ dysfunction. All serious health consequences of obesity are due to this excess ectopic fat accumulation.4

OBESITY IN YOUNG: DEFINITIONS

Obesity in young may be divided into two broad groups – the first group consists of children of 2 to 12 years and adolescents above 12 to 18 years; and the second group consisting of young adults above 18 years up to 40 years.

BMI is the most widely accepted screening measure of obesity. Though it is not a direct measure of adiposity, practically it correlates and is a reasonable indicator of body fatness for most individuals. But, as the body composition of growing children and adolescents till 18 years varies with their age, and between boys and girls, their weight status is determined using an age- and sex-specific BMI percentile, which is standard for the population, rather than the BMI categories, used for adults.5 For children and adolescents, aged 2–18 years, overweight is defined as a BMI at or above the
Adiposity is a state of chronic inflammation. Obese / overweight children and young adults are exposed to this inflammatory insult and the excess risk of atherosclerotic cardio-vascular disease (ASCVD) since their young age and over a longer period of time. This translates into increased risk of fatal and non-fatal cardiac events not only in adulthood but also in childhood. In one study among obese American Indians, incidence of premature death below 55 years of age was more than double in the highest quartile of childhood BMI than in the lowest quartile and childhood hypertension increased this risk of premature death by 57%.12

Childhood obesity is a strong predictor of adult overweight and obesity. About 80% of children who were overweight at age 10–15 years became obese at the age of 25 years.13 Obesity in adulthood is more severe if the person was overweight since childhood.14 This is associated with a number of serious health consequences, like earlier onset of type 2 diabetes, heart disease and some cancers.15 Onset of diabetes in early years has been strongly linked to early death and renal failure. Predictive power of developing type-2 diabetes in children is almost entirely dependent on abdominal obesity.16

Obesity in young age exposes the individuals to many other chronic illnesses like NAFLD, chronic liver disease, gallstones, gastro-esophageal reflux, PCOS, infertility, greater chance of developing GDM, chronic kidney disease, vitamin D deficiency and a multitude of musculo-skeletal problems.

The psychological burden of being obese on a young individual is immense, and greater than that in older individuals. This has a bearing on their confidence, behaviour and mental health. They are prone to face more stigmatization and low self-esteem.

Hence, the importance of identifying and rectifying the problem in childhood years is immense. This will protect the child from exposure to cardio-vascular risk factors associated with obesity from an earlier age and thereby improve health and decrease mortality.

Moreover, the most effective long-term treatment of obesity is lifestyle intervention. If the young individuals adopt the principles of healthy lifestyle at early age, it will be their ‘second nature’ which they will possess throughout the life and will be the ultimate ‘mantra’ of their good health and longevity.

### OBESITY IN YOUNG: CAUSES (TABLE 1)

Whatever be the underlying cause, the basic abnormality responsible for any obesity is always an imbalance between calorie intake and expenditure. In young individuals, overwhelming majority of obesity is due to simple or exogenous imbalance between food and activity pattern, without any underlying endogenous endocrine, genetic or organic causes. Short stature, growth failure and very early

### Table 1: Causes of Obesity in Young

<table>
<thead>
<tr>
<th>1. Exogenous or simple obesity (Most common)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Endocrine disorders (short stature and growth failure prominent)</td>
</tr>
<tr>
<td>a. Hypothyroidism</td>
</tr>
<tr>
<td>b. Cushing’s syndrome</td>
</tr>
<tr>
<td>c. Growth hormone deficiency</td>
</tr>
<tr>
<td>d. Pseudo-hypoparathyroidism</td>
</tr>
<tr>
<td>3. Syndromic disorders</td>
</tr>
<tr>
<td>a. Prader-Willi syndrome</td>
</tr>
<tr>
<td>b. Bardet-Biedl syndrome</td>
</tr>
<tr>
<td>c. Forssmann-Lehman syndrome</td>
</tr>
<tr>
<td>d. Carpenter syndrome</td>
</tr>
<tr>
<td>e. Cohen syndrome</td>
</tr>
<tr>
<td>f. Ahlstrom syndrome</td>
</tr>
<tr>
<td>4. Monogenetic disorders of energy balance</td>
</tr>
<tr>
<td>a. Leptin deficiency</td>
</tr>
<tr>
<td>b. Leptin receptor deficiency</td>
</tr>
<tr>
<td>c. POMC mutation</td>
</tr>
<tr>
<td>d. Prohormone convertase-1 deficiency</td>
</tr>
<tr>
<td>e. MC3R and MC4R mutation</td>
</tr>
<tr>
<td>5. Insulin dynamic disorders</td>
</tr>
<tr>
<td>a. Hypothalamic obesity</td>
</tr>
<tr>
<td>b. Insulin resistance</td>
</tr>
<tr>
<td>c. Leptin resistance</td>
</tr>
</tbody>
</table>

85th percentile, but less than 95th percentile (≥85th to <95th percentile); and obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex.4 Thus, a 14 year old boy with a BMI of 22 kg/m² is healthy (>5th to <85th percentile), while a 9 year old boy with a BMI of 22 kg/m² is obese (≥95th percentile).

In adults of more than 18 years of age, the WHO classifies increased body weight as overweight, if BMI is between 25–29.9 kg/m², and obese for BMI ≥ 30 kg/m². But as the Asian Indians have less muscle mass and are more susceptible to the ill-effects of increased body fat at a lower BMI, Asian-Indian consensus definitions of overweight and obesity are different for this age group. When the BMI is 23 to less than 25, it is overweight; and when the BMI is at or above 25, it is defined as obesity.7

**OBESITY IN YOUNG: MORE SERIOUS PROBLEM THAN OBESITY IN LATER AGE**

Childhood obesity leads to a series of detrimental health effects in a variety of ways. Cardiovascular risk factors, like hypertension, dyslipidemia, fatty liver, hyper-insulinemia and impaired glucose tolerance are highly prevalent in obese and overweight children. In Bogalusa Heart Study among overweight children and adolescents, 58% overweight schoolchildren (≥85th percentile) had at least one and 19% had at least two cardiovascular risk factors, while 70% of obese children (≥95th percentile) had at least one and 39% had two or more risk factors.89 Autopsy studies have shown the presence of fatty streaks and fibrous plaques in the aorta and coronary arteries of obese teen-agers.10,11

Autopsy studies have shown the presence of fatty streaks and fibrous plaques in the aorta and coronary arteries of obese teen-agers.10,11
onset before 7 years of age may be the important pointers to monogenetic or syndromic disorders.

**OBESITY IN YOUNG: FACTORS RESPONSIBLE**

Genetic, developmental, environmental and lifestyle factors – all play important roles behind this massive surge of obesity in young individuals.

a. **Genetic factor:** - At the beginning of civilization, when food supply was intermittent, individuals with ‘thrifty genotype’ designed for metabolic economy, were the natural selection for survival of the fittest.\(^\text{18}\) When such individuals are exposed to positive energy balance, obesity results.

b. **Gestational factor:** - Small for gestational age individuals have a ‘thrifty phenotype’. Poor intra-uterine and early-life nutrition produces permanent changes in muscle mass, BMR, energy metabolism pattern, glucose and free fatty acid utilisation pattern, resulting in insulin resistance, hyper-insulinemia and obesity.\(^\text{19}\) Large for gestational age babies are hyper-insulinemic at birth and most are due to GDM or maternal diabetes. They frequently develop obesity and diabetes in later life.

c. **Lifestyle factor:** - There can be no denying that lifestyle changes with increased calorie intake and decreased physical activity are the most important factors responsible for this unprecedented and massive epidemic.

**10 MOST IMPORTANT LIFESTYLE FACTORS RESPONSIBLE FOR THE EPIDEMIC**

Dietary factors and changes in the dietary pattern have played the most important role in this life threatening epidemic.

1. **Increased dietary fat** is associated with weight gain, as fat provides more calories per gram, compared to protein and carbohydrate. Fat intake has increased proportionately with rampant fast food culture.

2. **Trans fat**, used rampantly to improve the taste, consistency and shelf-life of food items, is especially responsible for the present scenario. Trans fat is not metabolised in our body and behaves like plastics. Once deposited, it cannot be mobilised by any metabolic manoeuvre, resulting in insulin resistance and innumerable ill-effects.

3. **Refined carbohydrate** in diet is also playing an equally important or a bigger role in this epidemic. It produces more energy per serving of food, causes hyper-insulinemia and results in weight gain.

4. **Low fiber** diet is playing havoc. Fiber in diet decreases the post-prandial insulin surge and lipogenesis. Fiber consumption has markedly decreased from yesteryears to approximately 12 gm/day by children and adolescents to approximately 12 gm/day by children and adolescents\(^\text{20}\), whereas our ancestors used to consume 100–300 gm fiber daily.

5. **Fructose** has a big role to play in this present epidemic of obesity. It is present in fruit-drinks and soft drinks as high-fructose corn syrup, and in sugar as sucrose (fructose + glucose). Unlike glucose, fructose does not suppress the ‘hunger hormone’ ghrelin; therefore does not cause satiety. Metabolism of fructose is also different from glucose. Fructose enters the liver via an insulin independent mechanism\(^\text{21}\) and is converted to fructose-1-phosphate without regulation, finally resulting in 100% de novo lipogenesis, fatty liver, insulin resistance and its diverse ill-effects. This problem with fructose is not seen with fresh fruits. High fiber and water content of fruits decreases the glycemic load and induces satiety by adding bulk to the food. Formula-fed infants develop more obesity during childhood compared to breast-fed infants because of the high sucrose or fructose content in formula feeds; while in breast milk there is high concentration of leptin\(^\text{22}\) causing self-regulation of feeding.

6. **Mono-Sodium Glutamate** is a commonly used food additive, which enhances taste and flavour. It stimulates the hypothalamus to increase appetite and food intake, suppresses satiety by causing leptin resistance, and thus adds to obesity in a significant way. It can be considered as a form of slow poisoning by the food industry.

7. **Sedentaryism:** Television and computers are the major contributors to energy imbalance leading to obesity in young individuals by increasing sedentary behaviour. Children and adolescents spend many hours a day watching television and videos, working on computers and playing computer games. Increased screen time ‘invades’ into time meant for physical activity resulting in decreased energy expenditure and decreased muscle mass, which lowers their metabolic rate. At the same time, this increased screen time enhances their energy intake by excess snacking, munching, consuming calorie rich beverages, eating meals in front of the television and influences unhealthy food choices by continuous exposure to fast food / junk food advertisements.\(^\text{23}\) Computer games can increase stress level and cortisol, thereby promoting obesity.

8. **Defective schooling** with a sole focus on academic performance, and with little concern for physical fitness and health education, is vigorously amplifying this epidemic to produce obese, inactive and unhealthy children. Scant regard is being given to physical activity inside the school and outside school hours. With a series of ‘tuitions’ beyond school hours, students become too tired to exercise; instead of playing, their only recreation becomes television, computer and calorie-dense food.
9. **Stress and Sleep-deprivation:** Stress increases cortisol level and thus is linked with obesity, especially visceral obesity. The stresses of school education and nuclear family are important factors. Sleep deprivation also increases obesity. Analysis of NHANES-I data revealed that individuals who slept less than 7 hours/day were more likely to become obese than those who slept more than 7 hours/day. Relationship between sleep deprivation and obesity may be due to altered activity of hormones like leptin, cortisol and ghrelin. Children may be sleep-deprived because of academic pressures, overindulgence in television and computer games.

10. **Un-affordability of healthy lifestyle.** ‘Affluenza’ is not the sole responsible factor for this epidemic. In developed country it is mostly the urban poor who are obese as they get to eat cheap, calorie-dense, nutrient-poor, fast food only and have no time and adequate space for physical activity. In developing countries like ours, mostly the people of higher socio-economic strata who have adopted the western lifestyle are obese. But this trend is changing very fast affecting both the rich and the poor, with a high prevalence of obesity in the urban poor. This is because of the easy availability of calorie-rich, cheap junk foods and non-affordability of healthy items. One would rather spend his 15 rupees to buy an egg-roll that will fill his stomach than spending it on half-an-apple! Hence, affordability is a big issue in the fight against obesity.

**ISSUES RELATED TO THE YOUNG ADULTS**

Young adulthood is a continuum of the adolescent years. Weight gained during childhood years continues to accumulate in young adults. Even if the weight was normal during their childhood and adolescence, they can gain weight in this major period in life stage, which is full of changes – from school to college to being in a job; from pressures of college life to pressures of getting a job to the comfort of being in a job and ‘not having to struggle’. It is therefore the period with a high risk of adopting an unhealthy lifestyle if active efforts are not given to ensure a healthy one.

The link between obesity/overweight over a longer period and the risk of metabolic syndrome, excess CV risk, fatal and non-fatal vascular events, diabetes, cancers and many other chronic diseases are obvious. Importantly, it constitutes the active reproductive years in one’s life. Obesity can lead to PCOS, infertility and GDM. GDM is a definite risk for future GDM and diabetes mellitus to the mother, and exposes the offspring to the risk of future obesity, PCOS, metabolic syndrome, GDM and DM. So, even a single young parent suffering from obesity can have metabolic effects for generations and generations to come. Such is the scale of the problem!

It is also the stage in life when as parents one serves as role models to young children in their formative years. Hence, the habits and the body-habitus possessed by young parents will be reflected strongly in their offspring. It is economically the most productive years of life. Obesity with its harmful consequences on health will affect the individual, the family, the society and the country on all fronts – health, social and economic.

**OBESITY IN YOUNG: EVALUATION APPROACH**

Management of obesity in young begins with a detailed history and physical examination. History of birth weight, breastfeeding vs. formula feeding, developmental milestones, maternal diabetes or GDM, maternal nutrition, any intracranial infection/insult (that may result in hypothalamic obesity), family history of overweight/obesity/diabetes including in other siblings should be taken. Dietary history of the nature and amount of foods and snacks, skipping of breakfast, consumption of fast-foods, sugar-sweetened beverages, fruit-drinks, milk, fruits and vegetables must be taken in detail. Dietary behaviour like taking foods or snacks while watching TV, intermittent snacking, restaurant eating or impulsive eating should be evaluated. Level of physical activity and sedentarism, like time spent on walking, cycling, playing, exercises, watching television, on computer, electronic games and cell-phone must be assessed. History of any stress at school or at home, sleep deprivation, snoring and regular intake of any drugs like steroids or atypical antipsychotics must be taken. History of any osmotic symptom with recent weight loss (diabetes mellitus), history of pubarche (exogenous obesity may cause early pubarche and thelarche; endocrine causes mostly associated with delayed growth and puberty), history suggestive of PCOS, like menstrual abnormality, hirsutism and acne should be enquired.

Physical examination includes measurement of BMI, categorisation into normal, overweight or obese (using the BMI percentile chart for individuals aged 2–18 years and the standard BMI guidelines for above 18 years young adults), waist circumference, waist height ratio and skin fold thickness. Assessment of intelligence, developmental milestones, growth velocity should be done. A systematic search for the signs of insulin resistance (acanthosis nigricans, skin tags) and for the presence of co-morbidities associated with obesity, like the components of metabolic syndrome (hypertension, dyslipidemia, dysglycemia), NAFLD (hepatomegaly), gallstones, obstructive sleep apnea (hypertension, behavioral problems, poor school performance) and vitamin D deficiency should be made meticulously. Musculoskeletal problems like low back pain, osteoarthritis, genu valgus and flat foot
should also be checked. Psychological health assessment of the individual is often necessary.

Investigations include a Fasting and PP plasma glucose, fasting insulin, lipid profile, liver function test, thyroid function test, 25-OH Vitamin D assay, USG of the liver and ovaries and sometimes X-ray for bone age (normal or advanced in exogenous obesity). Evaluation of endocrine causes of obesity is not routinely required unless there is growth retardation, delayed puberty or short stature. Similarly, genetic assessment is considered only when it has a syndromic etiology, or is associated with a neuro-developmental abnormality. Other tests that may be done in select conditions include sleep study, ECG, echocardiography and tests for PCOS (LH, FSH, testosterone and 17-hydroxyprogesterone). Fasting insulin level helps calculate HOMA-IR index – a surrogate marker of insulin resistance. 46–52% obese adolescents and 11–16% overweight adolescents are insulin resistant.25

OBESITY IN YOUNG: MANAGEMENT APPROACH

A. Lifestyle Modification

Lifestyle modification is the most important and sometimes the only component of the treatment of obesity. Lifestyle modification should involve the children/adolescents and their entire family. Environment at home, at school and the society must be very conducive for such changes to take place. Lifestyle modification includes changes in diet habit, age-appropriate physical activity and behaviour pattern.

Dietary intervention is the cornerstone of therapy and includes a calorie-restricted diet and eating the right kind of food. Food should be nutrient-dense and not calorie-dense. Intake should be limited to the calorie need of the individual. It should be rich with vitamins and minerals, and balanced in calorie content and proportions. A balanced diet with 45-55% of the day’s calories coming from carbohydrates, 15-20% from proteins and less than 35% from fats should be followed. At least 50% of the total carbohydrate intake must come from whole grains. Refined grains, sugar and salt should be avoided as far as possible. Saturated fats should provide less than 7% of total calories and there should be absolutely no trans-fat. Diet should contain at least 30gm of fiber per day. Intake of plenty of green leafy vegetables and fruits must be ensured daily. Complete avoidance of low-nutrient calorie-dense snacks, junk foods, sugar-sweetened beverages, fruit-drinks and soda must be ensured. High-fructose corn syrup containing foods and drinks must be avoided completely, as like mono-sodium glutamate. It is necessary to avoid skipping the breakfast and munching throughout the day. It is better to eat the fruits as a whole than drinking the extracted fruit-juice only. Low-fat milk and yogurt should be consumed. There is growing evidence that increasing dairy intake by about two servings daily could reduce the risk of overweight by up to 70% and that calcium intake reduces the risk of development of insulin resistance among overweight and obese children.26

There may be challenges to implementation of these guidelines due to lack of awareness, lack of time or interest. Hence awareness must be created to develop a healthy dietary habit and behaviour pattern. People should be taught to limit portion sizes and to choose healthier items in the menu, while eating out. People usually consume a particular amount of food at meal-times regardless of the calorie content. Hence green leafy vegetables, fruits, salad, and other calorie-light food which creates bulk must be eaten. Reading labels on food-items, keeping only healthy items in fridge and kitchen store, eating slowly and together are some other ways of limiting calorie intake. Distraction like watching television while eating should be avoided.

Physical activity is the most important component of therapy, as an adjunct to dietary calorie restriction. Moderate physical activity alone may not produce much weight loss, but when added to diet control the results are excellent. Besides, physical activity is the most crucial factor for the maintenance of lost weight. Being physically active in general and enjoying physical activity are the real ways to bring permanent changes in lifestyle.

Children and adolescents should participate in moderate to vigorous physical activity (activity level above 3 METs), like brisk walking, jogging, dancing, swimming or cycling, for a minimum of 60 minutes per day.27 The most important factor to reduce sedentarism in children and adolescents is to decrease their television viewing; total screen time (watching television, playing video games, and using computers for recreation) should never exceed 1-2 hours per day.

Physical activity provides multiple health benefits irrespective of weight loss. It creates a sense of well-being and confidence. It improves the metabolic complications of obesity even without weight loss, improves insulin sensitivity, prevents cardiovascular disease, diabetes, cancer, weight regain and improves mood through many mechanisms.28 There may not be much change in the BMI in obese people engaging in physical activity, but there is a favourable shift in the body composition from fat to muscle. An individual’s fitness level may be a more important predictor of death than conventional risk factors like hypertension, dyslipidemia, smoking and diabetes.29
Managing Obesity in Young

Ten Step Approach to Management of Obesity
1. Assess obesity and adiposity
2. Assess and treat co-morbidities
3. Assess causative factors - WHY
4. Assess influencing factors - HOW
5. Assess patient’s readiness to lose weight and motivate the patient
6. Discuss treatment goals and strategies
7. Lifestyle modification
8. Medication
9. Bariatric surgery
10. Regular review, assistance and maintenance of weight loss

Ten Commandments of Healthy Lifestyle
1. Set a realistic and achievable target
2. Rely on dietary restriction for initiation
3. Read the label. Consider food as medicine, quantity limited to the need and safety
4. Avoid Trans-fat, Mono-sodium glutamate, High-fructose corn syrup, Empty-calories
5. Eat more fruits, vegetables, whole grains and fiber
6. Enjoy eating
7. Rely on physical activity for maintenance of lost weight
8. Rely more on abdominal exercises
9. Start early and adhere lifelong to healthy lifestyle habits
10. Self monitoring of body weight

Ten Principles of Healthy Eating Behaviour
1. Never skip breakfast
2. Timely food (4 - 5 hourly). Small but frequent meals
3. No in-between food or snacking
5. Mindful eating. No distraction like watching television while eating
6. Half stomach eating. Portion control
7. Number of items reduction
8. Night food reduction
9. Stimulus control
10. Compensation techniques

B. Pharmacotherapy
Pharmacotherapy should only be considered in combination with lifestyle intervention, when a formal intensive lifestyle modification program alone has failed to limit weight gain or to mollify co-morbidities in obese children and adolescents. Overweight children should not be treated with pharmaco-therapeutic agents, unless significant, severe co-morbidities persist despite intensive lifestyle modification and there is a strong family history of T1DM or cardiovascular risk factors. Pharmacotherapy may produce only short term benefit. For weight loss and weight maintenance, permanent lifestyle changes are the key.

Indications of Pharmacotherapy
1. Obese children and adolescents who have not responded to lifestyle modification
2. Overweight children and adolescents, with significant severe co-morbidities, who have not responded to lifestyle intervention
3. Asian Indian adults with BMI more than 27 without co-morbidities; or BMI more than 25 with significant, severe co-morbidities

Drugs for obesity in young
1. Orlistat is the only FDA approved pharmaco-therapeutic agent for the treatment of obesity for children >12 years. It inhibits intestinal lipase and can reduce fat and cholesterol absorption by approximately 30%. Side effects include abdominal discomfort and steatorrhea, which may decrease with continued treatment, as patients learn to consume less dietary fat to avoid these side effects.
2. Metformin: Although approved for the treatment of T1DM in children above 10 years, it is not FDA approved for the treatment of obesity. Still, it has been used to combat weight gain in children taking atypical psychotropic drugs like olanzapine, risperidone, quetiapine and valproate.
3. Growth Hormone: Although not FDA-approved for the treatment of obesity, GH treatment may reduce body fat percentage in children with Prader-Willi syndrome, if started before 18 months of age.
4. Octreotide: Appears promising in the syndrome of hypothalamic obesity, where hypothalamic insult results in ‘functional leptin resistance’. It is not FDA approved.
5. Leptin: Useful only in leptin deficiency. It is not FDA approved.

C. Bariatric Surgery
Bariatric surgery is indicated, only under presence of all the following conditions
1. Adolescent, who has attained Tanner 4 or 5 pubertal development and final or near-final adult height
2. Adolescent with BMI more than 50 without co-morbidity; or BMI more than 40 with significant, severe co-morbidities
3. or, Asian Indian adults with BMI more than 37.5
without co-morbidity; or BMI more than 32.5 with significant, severe co-morbidities.

4. Severe obesity and co-morbidities persist despite a formal program of intensive lifestyle modification, with or without a trial of pharmacotherapy.

5. Patient demonstrates the ability to adhere to the principles of healthy dietary and physical activity habits.

6. Psychological evaluation confirms the stability and competence of the family unit.

Bariatric surgery is not indicated in the following patients:

1. Pre-adolescent children.
2. Adolescent women, who are pregnant or feeding breast, or planning to become pregnant within 2 years.
3. For any patients who have not mastered the principles of healthy dietary and physical activity habits.
4. For any patients with unresolved eating disorder or untreated psychiatric disorder.

ROLE OF PARENTS, SCHOOLS, FOOD INDUSTRY AND GOVERNMENT

Parents should be made aware about healthy rearing patterns related to diet and activity, as parents are mostly unaware of the fact or they refuse to accept that there is a weight problem with their child. Food should never be used as a reward or punishment. Parents should not be overtly strict about their children’s diet and behaviour; instead, they should set examples for their children by adopting healthy lifestyles, eating healthy and being physically active themselves. Family outings should not centre on food, which is mostly the case; rather it should focus on games, sports and other physical activities, and choosing healthy items on menu while eating out.

Children spend more than half of their waking hours in school. Academics and physical activity should be balanced. Every school must have safe, clean and sufficient space in playground for every child. Games and sports in school should be made enjoyable, rather than a series of competition, so that every child participates. School canteens and food outlets near school should be banned from selling unhealthy items. A strict law to this effect is the need of the hour.

Food industry should refrain from misguiding the public and should act responsibly by providing healthy items, reducing portion sizes, and stopping unnoticed, unethical and unhealthy malpractices. They should stop slogans like ‘zero-cholesterol’ for selling vegetable oils; ‘no saturated fat’ and yet replace with more dangerous ‘trans-fat’; ‘zero trans-fat’ and yet adding trans-fat; ‘no fat’ and yet adding sugar; and ‘no sugar’ by replacing with fat. ‘No added sugar’ artificial fruit-drinks contain more harmful ‘high-fructose corn syrup’. They should not promote junk foods containing lots of empty calories and mono-sodium glutamate.

Providing safe and clean parks, instituting strict laws against the malpractices of food industry which mislead the public, performing surveillance and creating awareness among the general population for obesity and related complications, increasing accessibility of healthy foods to the poor, and creating a robust and functioning public health program on non-communicable diseases, are few of the many responsibilities of the Government.

OBESITY IN YOUNG: PREVENTION IS THE KEY

Treatment of obesity should begin with its prevention. Prevention is easier, cheaper and does not involve any health risk. Four major facets of prevention can really reverse this obesity epidemic.

1. Maternal care:
   i. Proper antenatal care and adequate nutrition to prevent low birth weight.
   ii. Timely detection of GDM and prevention of large for gestational age babies.
   iii. Exclusive breast-feeding for at least 6 months.

2. Healthy Schooling:
   i. To ban junk foods inside and around school premises and to ensure the practice of healthy dietary habits inside school.
   ii. To ensure recommended physical activity during school hours and.
   iii. To encourage physical fitness by allocating some marks for it.

3. Healthy family environment:
   i. To set an example by parents by adopting healthy lifestyle.
   ii. To limit screen-time, to avoid fast food and to increase physical activity.
   iii. Not to use food as a reward or punishment.

4. Awareness and/or Legislation:
   i. To ban trans fat, mono-sodium glutamate and high-fructose corn syrup for the use in any foods and beverages, and to ensure the limitation of ‘empty-calories’ consumption as snacks and fast-foods, by a strong ‘food-legislation’.
ii. To encourage physical activity at every level and to provide facilities for the same

iii. To create awareness about the dangers of obesity and importance of lifestyle modification through public health programs, involvement of doctors, nutritionists and other responsible individuals.

CONCLUSION: PREVENT DEATH OF CHILDREN BEFORE THEIR PARENTS

The management of obesity in the young has certain differences from managing in someone older. Approach to the diagnosis in children and adolescents is different and the diagnostic criteria do not rely solely on BMI, but on age- and sex-specific BMI percentile of the particular population. This is because they are growing both in height and weight. As in older adults, the most common cause of obesity in young is due to exogenous cause. Certain features of exogenous obesity easily help us identify and differentiate it from the various endogenous causes. When children, adolescents and young adults become obese, they are exposed to its metabolic and inflammatory ill-effects earlier and longer; thereby, markedly increasing the risk of disease and death compared to obesity that develops later. Recognising the problem in younger years helps us fight this epidemic with time and years in our hands. Adopting lifestyle measures in childhood is the most appropriate time because it is the time when all habits are formed.

Obesity in young is a serious problem that should be managed ‘today’. The improvement in life expectancy due to improved health care in the last decades will be reversed in a matter of years if this epidemic of obesity is not curtailed. If we do not intervene now when the population is still young, it could translate into a very ‘cruel’ epidemic where children die before their parents. Prevention and early recognition are the two most important steps. Fighting ‘obesity in young’ is the most powerful ‘weapon’ we have in our ‘war’ against ‘the obesity epidemic’.

REFERENCES


