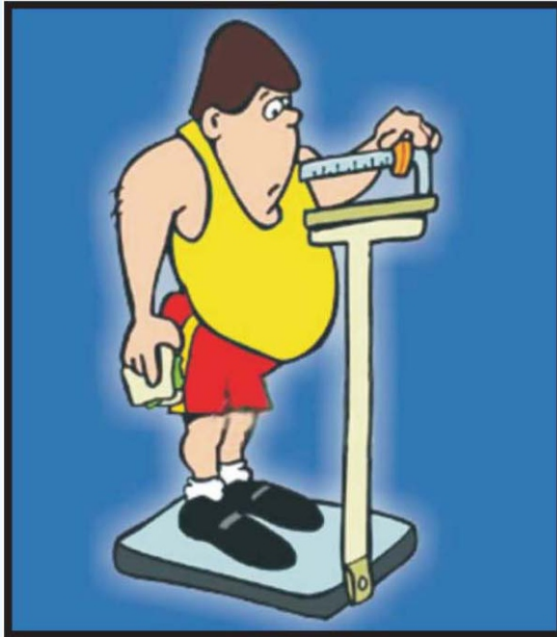


# Management of Childhood Obesity

Education booklet for Children and Parents



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## Preface

This booklet is meant for free distribution to obese/overweight children. The aim of writing this booklet is to increase awareness and motivate children and their parents in the management of obesity.

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## Contents

## Page No.

Preface	
1. Introduction	.. 4
2. What is Obesity?	.. 4
3. Causes of Obesity in Children	.. 6
4. Complications of Childhood Obesity	.. 7
5. How to Control Obesity?	.. 7
5.1 What is Balanced Diet?	.. 8
5.2 Importance of Fibre in the Diet	.. 10
5.3 Avoid Junk Food/Fast Food	.. 10
5.4 Ways to Modify Diet	.. 11
5.5 Regular Exercise or Sports	.. 12
6. Important Points to Remember	.. 14
7. One Day's Sample Diet Chart	.. 15
8. Frequently Asked Questions	.. 16

## 1. Introduction

Increasing prevalence of obesity in children has become a major cause of concern worldwide. School based studies from Delhi have shown that 20% of children are obese. Importantly 50-80% of obese children become obese adults and all complications of adult obesity are made worse if the onset of obesity is in childhood.

## 2. What is Obesity?

Obesity is a condition of excess fat deposition in the body which leads to impaired health.

### How do we measure obesity?

Body mass index (BMI) is a useful index to assess overweight and obesity in children.

Formula for BMI = Weight (Kg)  $\div$  Height (m)<sup>2</sup>

### For example:

**If you want to assess the weight of your 8-year old (male) child**

Step 1 : Measure boy's height

If the height is 120 cm (i.e. 1.20 m)

Step 2 : Multiply 1.20 m with 1.20 m to square it

$1.20 \times 1.20 = 1.44$  m

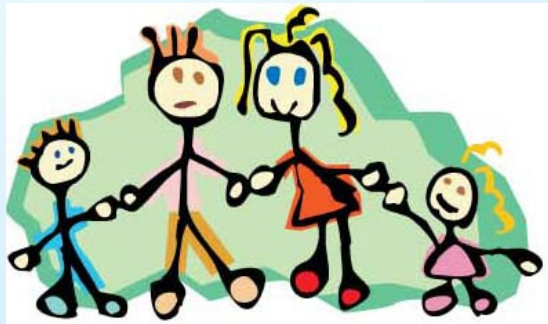
Step 3 : Measure child's weight

If the weight is = 30 kg

Step 4 : Insert both numbers in the formula

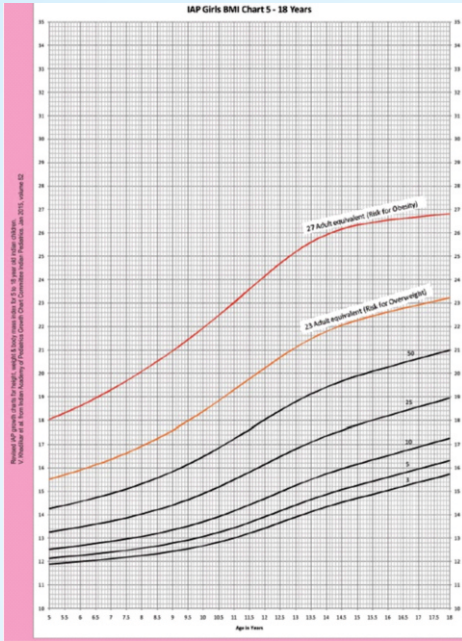
BMI =  $30 \div 1.44$

= 20.8



Step 5: Now see the BMI cut-offs for boys and girls of different ages from the charts given below (blue for boys and pink for girls). If the BMI is above the orange line, child is overweight, and if above the red line, he or she is obese.

IAP Girls BMI Chart 5-18 Years



IAP Boys BMI Chart 5-18 Years

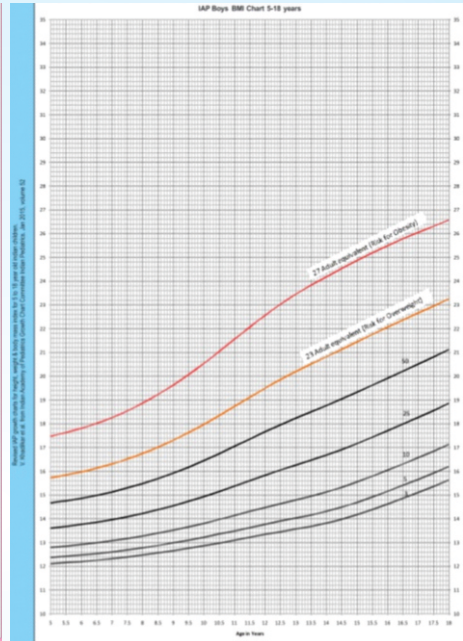


Figure : BMI charts for girls (pink) and boys (blue).

Reference : IAP 2015 BMI charts

Step 6: You can see from the chart that an 8 year old boy with BMI of 20.8 is obese.

If the BMI had been between 16.8 to 19, then the boy would have been categorized as overweight. BMI below 16.8 will be considered normal for him.

Like wise, by using BMI formula and the above charts, obesity in children can be measured.

An easy way to recognize obesity in children as well as adults is to measure their waist circumference (girth). If it is  $> \frac{1}{2}$  of the person's height, this denotes obesity. For example in a child with height of 120 cm (4 feet), waist circumference should be less than 60 cm (24 inches).

### 3. Causes of Obesity in Children

Obesity has many causes. One of the important reasons for increasing prevalence of obesity among children is the **change in lifestyle and eating habits** that has occurred over the past 10-15 years.

- **Unhealthy eating patterns** - Traditional nutritious foods are being replaced by energy dense, fat and sugar rich processed foods with greatly increased portions.
- **Sedentary habits** - Television and movie watching, video games, internet browsing and use of mobile phones for social networking are now important activities of children.
- **Inadequate physical activity**
- **Burden of studies**
- **Safety** - Due to increasing number of vehicles and unsafe roads children are discouraged from walking or cycling to schools.
- **Working parents** - Both working parents and lack of parental time to supervise play are all part of a new lifestyle which promotes obesity.
- **Reward & punishment** - While food items (e.g. chocolates, ice creams) are offered as reward, exercise is often meted out as punishment (e.g. running ten rounds in the ground) which is a wrong reward-punishment strategy.
- **Family history of obesity** puts the child at risk of becoming obese.
- **Hormonal imbalance** - Lack of thyroid hormone or excess of cortisol hormone in children may also cause obesity. Hormonal imbalances also lead to decrease in height potential.
- Many **genetic reasons** may also be the cause of obesity.
- **Psychological reasons** - Many affected children suffer from poor self-esteem and frequent mood swings. Lack of parental love and affection can also lead children to obesity.
- **Low birth weight with rapid catch-up growth** - Overfeeding of babies who are born with low birth weight, leading to vary rapid gain in weight in infancy and childhood is associated with higher chances of developing obesity and its complications like diabetes and heart disease.

## 4. Complications of Childhood Obesity



Obesity can cause a host of problems for affected children. Some of the important ones are:

1. **Diabetes**
2. **Heart disease**
3. **Hypertension**
4. **Weak bones and joints**
5. **Physical weakness and fatigue**
6. **Mental, psychological stress and low self esteem**
7. **Hormonal imbalance:** Some overweight adolescent girls become affected by a condition known as polycystic ovary disease characterized by increased growth of facial hair, acne and infrequent menstruation. If untreated, this can lead to infertility later.
8. **Metabolic syndrome:** Up to 30% of overweight adolescents are affected by this condition which includes high blood pressure, high blood glucose, high level of triglycerides, and low levels of high density lipoprotein (good cholesterol) in the blood. All these factors put the individual at increased type 2 diabetes and heart disease.
9. **Fatty liver :** Excess fat in the liver is present in more than 50% of overweight/obese children and can lead to problems with the normal functioning of liver.

## 5. How to Control Obesity?

### Balance your diet and activity

1. Offer balanced and home made nutritious diet to your child which is essential for ensuring proper growth. Keep your child away from burger, chowmein, pizza (**Junk food**).
2. Encourage your child to exercise and play outdoor games regularly. Discipline the entire family so that your child also gets disciplined. Make a time schedule for various activities e.g., time slot for outdoor games, homework, studies, eating, watching T.V., sleeping, etc.

- Children learn by seeing their parents, rather than just being told by them to do something. Parents need to set the example of healthy diet and lifestyle.

## 5.1 What is Balanced Diet?

### Diet is called “balanced” when

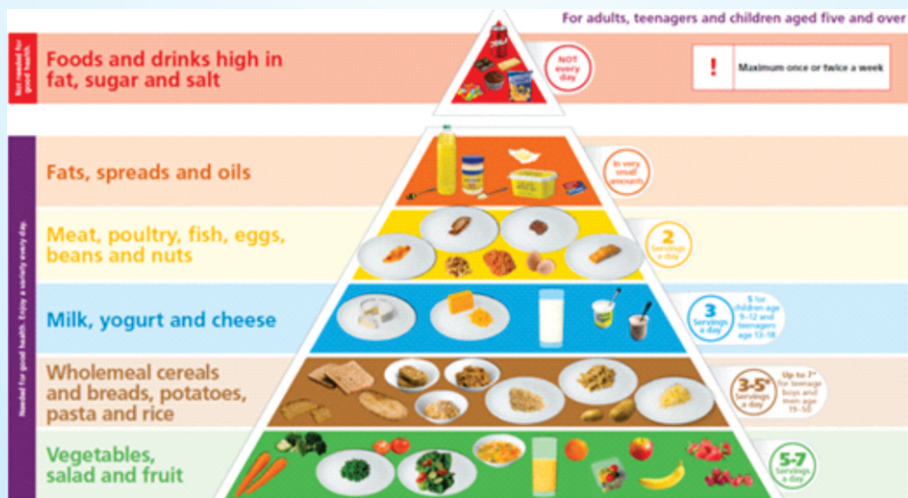
- All the nutrients such as carbohydrates, protein, fat, vitamins & minerals are present in required amounts.
- At least one or more food items are included from each of the food groups.
- All food items are included in the diet in correct amount.

### Food is divided into 6 major groups:

- Milk and milk products like paneer, curd etc.
- Meat, fish, chicken, egg and pulses
- Cereals and root vegetables
- Seasonal vegetables and fruits
- Oil/Ghee/Butter
- Sugar/Jaggery

Note: Drink 8-10 glasses of water per day.  
Use less salt while cooking.

Method to include all the six food groups in your daily diet can be easily understood by **Healthy Food Pyramid**





## One serving means .....

### Cereals

2 small phulkas or 1 big chapati or 1 katori Upma  
1 katori cooked rice or poha or 2 small idlis or 1 dosa

### Fruits and Vegetables

1 medium size apple/guava/chickoo /  $\frac{1}{2}$  banana  
1 katori green leafy vegetables or  $\frac{3}{4}$  katori of seasonal vegetables  
 $\frac{1}{2}$  katori potato

### Milk and its products

1 glass (250 ml) or 1 katori curd or 2 small pieces of paneer

### Pulses and Nuts

1 katori dal/10-12 almonds

### Meat/Fish/Poultry

1 egg or 1 small piece of fish or chicken

### Fats and sugars

1 tsp (5 gm) : Not more than 15-20 g fat (<3-4 tsps) and 10-15 g sugar (<2-3 tsps) is recommended for one person in a day.

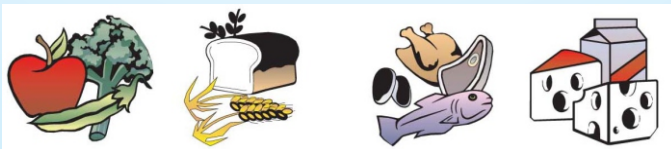
## Calculate fat allowance for your family

For one person, maximum 500 ml of fat (oil, ghee, butter) should be used for one month. If there are 5 family members, 2.5 Kg of fat should be used for the entire family in one month.

Not more than  $\frac{1}{4}$ <sup>th</sup> part of 2.5 Kg (600 ml) should be in the form of ghee/butter and  $\frac{3}{4}$ <sup>th</sup> part of 2.5 Kg (1900 ml or 1.9 Kg) should be in form of refined oil for one month for a family of 5 members.

## Fat content of the diet can be further reduced by these methods:

- Use non-sticking pans for cooking.
- Prefer-boiled, roasted, steamed, grilled food instead of fried foods
- Use toned or double toned milk.
- Either one egg or 50 to 100 gm of meat, fish or chicken, 2 to 3 times in a week is sufficient for one person. For vegetarians, 25-30 gm (handful) of dry nuts such as almonds, pistachios and walnuts can be offered.



## 5.2 Importance of Fibre in the Diet

Fibre is that portion of vegetables and fruits which cannot be digested by the enzymes produced in our gut but fibre is important to keep us healthy. Fibre absorbs water, stays in the intestine for a long time and provides satiety. Fibre also helps to maintain our blood sugar, blood cholesterol and weight.

### Improve your fibre intake

Food groups	Choose-fibre rich food items	Restrict
<b>Cereals</b>	Wheat, wheat flour with husk (chokkar), maize, bajra etc. Avoid sieving the flour. Whole wheat bread/brown bread, Unpolished rice.	Refined flour (maida), White bread, Polished rice
<b>Pulses</b>	Whole pulses (sabut dal). Dal with chilka such as chana, sabut, moong, rajma, lobhia, etc. Sprouted dal.	Washed pulses (Dhuli dal)
<b>Vegetables</b>	All seasonal vegetables (beans, peas, bhindi etc.) All green leafy vegetables (palak, methi, bathua, sarson etc). Raw vegetables (salad)	Root vegetables (potato, arbi)
<b>Fruits</b>	Fresh fruits which can be eaten with seeds, skin and pulp such as anar, guava, apple, pear etc.	Banana, mango, chiku lichi, grapes. Fruits juice. Tinned/canned fruits.

## 5.3 Avoid Junk Food/Fast Food

Foods rich in fat, sugar, salt and empty calories are called **Junk foods or fast foods**. Children get attracted to tempting advertisements of chips, chocolates, burgers, soft drinks etc on TV and magazines but they should be strongly discouraged to eat these foods, and provided nutritious snacks like sprouts, fruit chat & salads.

### How can we ensure good quality in our diet?

Quality of food or diet defines its nutritive value. For example:

Food groups	Food of good quality	Food of poor quality
Milk and milk products	Toned milk	Full cream milk, Buffalo's milk
Meat and meat products	Fish, Chicken without skin, egg white	Egg-yolk, red meats such as liver, kidney etc.
Cereals	Whole (sabut) cereals such as atta, atta with husk (chokkar), maize, bajra etc. Chapati without oil/ghee	Refined wheat flour (maida) or foods made out of maida such as bread, bhatura etc.
Pulses	Sabut dal, dal with chilka and sprouted dals.	Washed pulses (dhuli dal)
Vegetables	All seasonal vegetables	Excess consumption of root vegetables such as potato, arbi, jimikand etc.
Fruits	All fresh fruits, fruits which can be eaten with their skin (apple, guava pear) and seeds (anar, guava)	Sweet fruits such as mango, chiku, lichi, banana and grapes. Fruit juices (fresh as well as preserved)
Sugar	Gur, honey	Glucose, sugar
Fat	Refined vegetable oils such as soyabean oil, ground nut oil, mustard oil, rice bran oil	Ghee, butter, vanaspati. Coconut oil, palm oil

## 5.4 Ways to Modify Diet

There are a number of specific treatment approaches, one of which is the traffic light diet with its child friendly approach to categorizing food into **RED (Stop)**, **YELLOW (Slow Down)** & **GREEN (Go)**

### **RED (Avoid)**

- Fried foods– puri, parantha, samosa, pakora, potato chips, namkeen, bhujia, tikki, dalmoth, mathi, fried papad, patties, burger, pizza.
- Sweets– cake, pastry, toffees, honey, jam, jelly, chocolates, ice-cream, methai.
- Full cream milk, cream, processed cheese, butter, ghee.
- Red meats, butter chicken, fried fish, mutton, ham, egg yolk.
- Fruit juices, tinned and canned food products.

### **YELLOW (Eat in prescribed or limited quantity)**

- Milk and milk products (curd, paneer)
- Meat, egg
- Cereals and pulses
- Banana, chiku, lichi, mango, grapes
- Root vegetables (potato, arbi)
- Sugar and fat
- Biscuits, bhutta, popcorn, pickle, roasted papad

### **GREEN (Eat liberally)**

- All seasonal vegetables
- Green leafy vegetables (saag)
- Raw vegetables (salad)
- All whole fresh fruits, fruits with skin (apple, guava, pear) and seeds (anar, guava). Low sugar fruits (watermelon, papaya, muskmelon) and fruits with pulp and fiber (oranges, mausambi).
- Puffed rice, roasted chicken and fish
- Vegetable soups and plain fresh water

## **5.5 Regular Exercise or Sports**

It is difficult to reduce weight just by modifying your diet. Along with eating a balanced diet, it is also essential to do regular exercise. For children, it is advisable to spend at least 1-1.5 hours daily in exercise or some physical activity or sport. If the child is not used to exercising, start with 10-15 minutes of scheduled outdoor physical activity such as brisk walking and gradually increase.

### **Q. What type of exercises children can do?**

There are many types of exercises children can do, such as

- Brisk walking, Jogging, Jumping, Climbing, Skipping
- Cycling, Skating, Swimming, Aerobics, Dancing, Yoga
- Football, Tennis, Volleyball, Badminton, Hockey, Basket ball

Children can choose one or more exercises or physical activities of their choice and include in their daily routine. Not only children but all the family members should make conscious effort to change their lifestyles. This will motivate children to make daily exercise their habit.

**Children should be told about the benefits of physical activity:**

- Maintains weight
- Keeps you physically fit
- Makes your skin glow
- Keeps the bones strong
- Makes the muscles strong
- Increases concentration
- Prevents deadly diseases
- Helps sleep soundly

**Restrict sedentary behavior like watching T.V. or internet surfing for more than an hour daily.**

## 6. Important Points to Remember

- Children should be taught to eat homemade, balanced and nutritious food from initial years of life.
- All family members should eat same kind of food and try to sit together to eat at meal times. Your child's eating behavior can change, only if everybody in the family cooperates with him by changing their own food habits.
- Bring variety in homemade food especially snacks so that your child is not tempted to eat out.
- If your child refuses to eat nutritious food prepared at home, try and change the form, size or shape of the food e.g., if the child does not like saag (green leafy vegetables), then stuff green leafy vegetables in chapati to make nutritious roti.
- Keep a control on eating ready to cook food, preserved food and eating out.
- Daily schedule of your child should include three major meals i.e. breakfast, lunch and dinner and at least two-three nutritious snacks or small meals in between i.e. midmorning, evening snack and bedtime. It is better to eat small quantity of food each time divided into 5-6 meals over the day keeping a gap of 2½ to 3 hours between meals. Avoid eating just 3 meals and of huge portion size.
- Dinner should be eaten 2 hours before going to sleep.
- Create a balanced diet containing vegetables, fruits, whole grains, nuts, fiber, lean meat, fish and low fat dairy products. It is important to include food items from each of the food groups (refer food pyramid) to make the diet balanced and nutritious.
- Eat food rich in fiber. Eliminate all sugary drinks (including juice) and replace with water, non-caloric beverages and low fat or skimmed milk.
- Drink at least 8-10 glasses of water in a day.
- Do not allow your child to eat while watching TV. Encourage your child for outdoor activities rather than watching TV for long hours.

**Bring discipline in your lifestyle to maintain weight and to keep yourself healthy and disease free.**

## 7. One Day's Sample Diet Chart

Age : 14 years old boy

Weight : 65 kg

Height : 155 cm

### Our Assessment

- Ideal Body weight of this child is 50 kg for 155 cm height.
- This child is at the critical age when lots of changes are taking place in terms of his physical growth and development. Therefore, drastic reduction in calories is not advisable. Normally, 200-400 Kcal (10% to 20%) is reduced from child's ideal diet depending on his usual intake both in terms of quantity as well as quality of food i.e. 1970 Kcal which is 20% reduction from the normal requirement of 2450 Kcal/day at this age.
- Besides reduction in calories, quality of diet is also changed i.e. fiber is increased, fat is reduced and proteins are advised on slightly higher side. Child is encouraged to consume lot of fruits and vegetables.

### Meal Plan

Meal time	Distribution of food items
Breakfast	Milk - 125 ml; 1 chapati with vegetable ; 1 fruit OR Milk - 125 ml; 30 g cornflakes/daliya with vegetables; 1 fruit
Mid morning	2 chapatis stuffed with 15 g paneer; vegetables OR Sandwich/patty (3 bread pieces + 15 g paneer + vegetable) *use whole wheat bread
Lunch	2 chapatis; 1 katori boiled rice; 1 katori dal; 1 katori vegetable; salad
Teatime	Milk - 150 ml; sprouted or germinated food (e.g.; 1 plain dosa or 2 idlis or upma or poha or dhokla) *Use vegetables in the preparation or have salad along with the snack
Dinner	3 chapatis; 1 katori vegetable; salad; 1 fruit
Bedtime	Milk - 125 ml with 20 g daliya Or 3 salted biscuits

Note : Chapati = Wheat flour + kala chana with husk (3:1)

## 8. Frequently Asked Questions

### **My child is obese. What should I do?**

Management of established obesity in children needs a concerted and a sustained effort from a team of experienced health professionals. Your child needs guidance of the specialists - doctor, dietitian, physical activity instructor and psychologist. Keep in constant touch with them, follow up in the clinic regularly and comply with the instructions. Keep a record of diet, exercise and weight. In addition to the care of specialists, family support is very crucial in management of obesity.

### **Can some drugs be used to decrease obesity?**

In selected cases in which supervised lifestyle interventions fail, some drugs can be used. However, most anti-obesity drugs are as yet not approved in children below the age of 16 years.

### **Are there any investigations that my child should undergo?**

Some of the investigations that your doctor is likely to order are:

**Thyroid profile**

**Lipid profile**

**Blood sugar (fasting and post-prandial)**

**Liver function tests**

Other investigations like kidney function tests, serum cortisol, HbA1c, plasma insulin, oral glucose tolerance test, ultrasound examination of liver or ovaries may be ordered in selected cases.

### **My child has been trying since 2-3 months to lose weight but with little success. We are getting discouraged!**

Trends in weight loss and effects of intervention need to be followed up regularly with your specialists. Motivation of the child on an ongoing basis is essential. Even small successes matter and weight loss of as little as 5-10% results in significant improvement in cholesterol, BP and blood glucose. Continue your whole-hearted efforts to succeed.

### **How much weight should my child lose and how long is the management of obesity?**

Normally, child should lose 2-4 kg weight in a month. Management of obesity will continue till your child reaches his normal BMI for age. Healthy life-style should be followed by the entire family life long.