

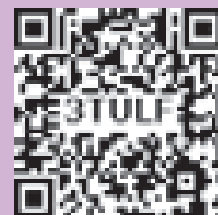


DIET IN OBESITY AND UNDERWEIGHT

Unit 7

OBJECTIVES

- Describe the causative factors of obesity.
- Explain importance of maintaining a desirable weight throughout life.
- Enumerate the guidelines for calculating ideal body weight. prevention and treatment for various conditions related to weight management.
- Learns the importance of maintaining a desirable weight throughout life.

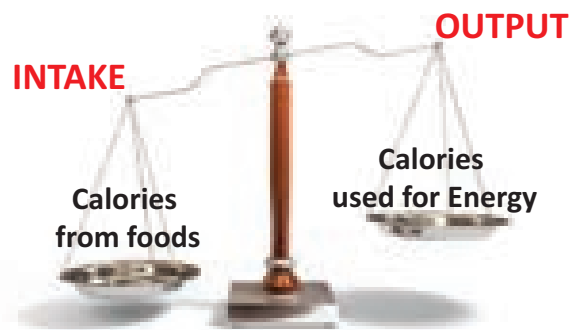


Body weight is the sum of bones, muscles, organs, body fluids and adipose tissue. All these components are subjected to normal changes as a reflection of growth, reproductive status, variation in exercise levels and the effects of aging. Maintaining a constant body weight is a complex system of neural, hormonal and chemical mechanism that keeps the balance between energy intake and energy expenditure within limits. In

order to maintain an ideal body weight the calorie burnt out should be greater than the calorie consumption.

GAIN WEIGHT

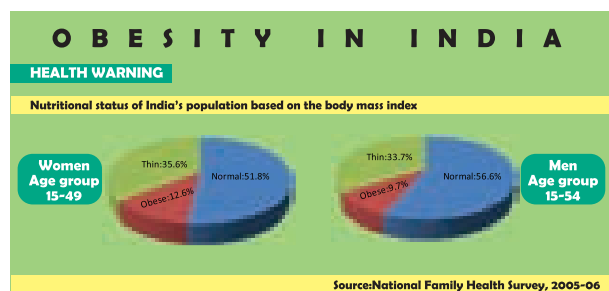
LOSE WEIGHT



Nearly 40-50 million Indians belonging to upper middle class are overweight. With increasing numbers every years, obesity could become a public health problem in adults.

Obesity is a condition of excessive fatness either generalized or localized, resulting in an increase of more than 20 percent of the desirable body weight. WHO defines obesity

as “abnormal or excessive fat accumulation that may impair health”. B



7.1.1 Aetiology

The factors causing obesity are given below:

Heredity: Heredity has a major role to play in obesity, as genes contribute to it. The involvement of genetic factors in the development of obesity is estimated to be 40-70%.

Physical Activity: Sedentary life style with lack of an exercise schedule tends to make one obese. Obesity is more common after the age of 35, when physical activity generally

decreases without a corresponding decrease in food consumption.

Dietary Habits: Consuming high calorie food without burning off the calories leads to positive energy balance, which is one of the major contributory factor for obesity. Eating food at a very fast rate tend to chew less and lands up eating more food. Nibbling between meals may contribute extra calories leads to obesity.

Endocrine Factors: Endocrine abnormalities in conditions like hypothyroidism, Cushing's syndrome, polycystic ovarian syndrome is often associated with obesity.

Psychological Factors: Lonely, bored and depressed individuals find solace in piling on fast food and junk foods.

Affluence and Abundant availability of food: Eating out has become fashionable leading to an increased consumption of junk food which is rich in calories and short on essential nutrients.

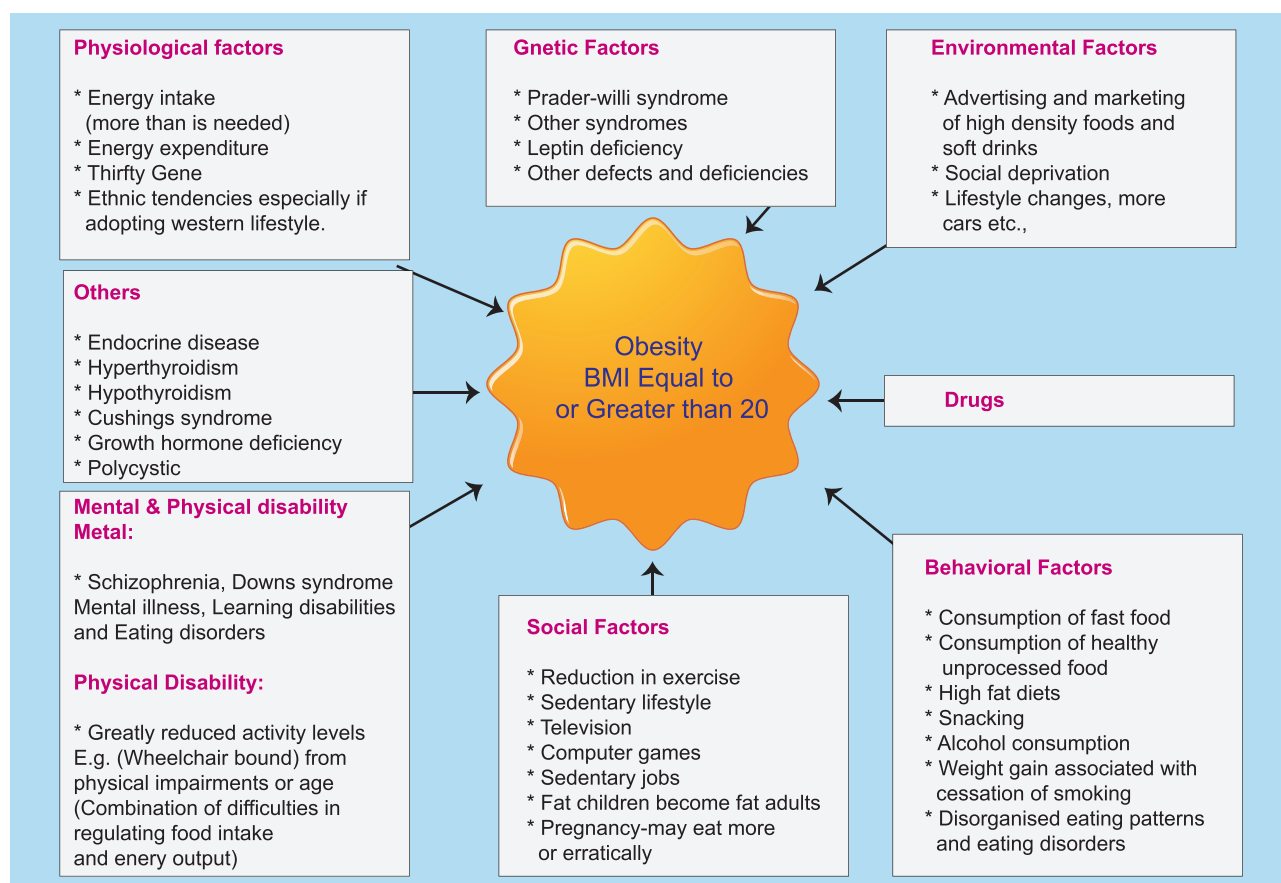


Fig 7.3 Factors causing obesity

7.1.2 Assessment of Obesity

Standard height and weight for Indian men and women is given in Table below

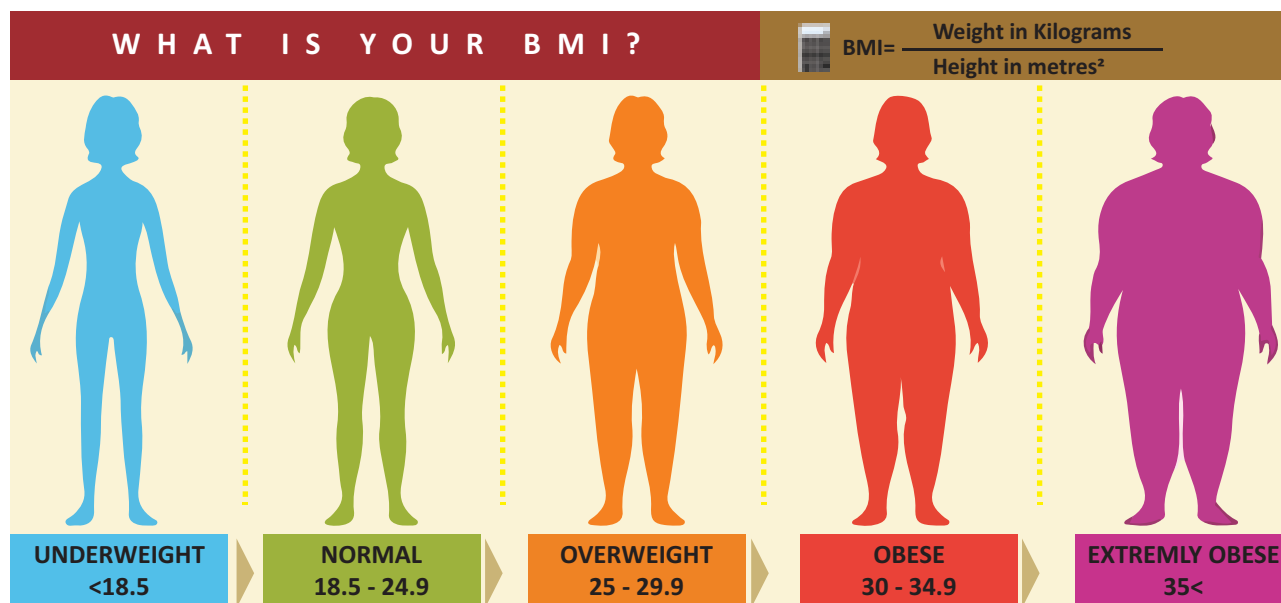
| Height | Men | | women | |
|----------------|-------------|-------------|-------------|-------------|
| | Weight (kg) | Weight (lb) | Weight (kg) | Weight (lb) |
| 1.52M (5' 0") | — | — | 50-54 | 112 -120 |
| 1.54M (5' 1") | — | — | 51-55 | 114 -122 |
| 1.57M (5' 2") | 56-60 | 124 -133 | 53-56 | 117 -125 |
| 1.59M (5' 3") | 57-61 | 127 -136 | 54-58 | 120 -128 |
| 1.62M (5' 4") | 59-63 | 130 -140 | 56-60 | 124 -132 |
| 1.65M (5' 5") | 61-65 | 134 -144 | 58-61 | 127 -135 |
| 1.67M (5' 6") | 62-67 | 137 -147 | 59-64 | 130 -140 |
| 1.70M (5' 7") | 64-68 | 141-151 | 61-65 | 134 -144 |
| 1.72M (5' 8") | 66-71 | 145 -156 | 62-67 | 137 -147 |
| 1.75M (5' 9") | 68- 73 | 149-160 | 64-69 | 141 -151 |
| 1.77M (5' 10") | 69-74 | 153 -164 | 66-70 | 145 -155 |
| 1.80M (5' 11") | 71-76 | 157 -168 | 67-72 | 148 -158 |
| 1.82M (6' 0") | 73- 78 | 161 -173 | 69-74 | 151 -163 |
| 1.85M (6' 1") | 75-81 | 166 -178 | — | — |
| 1.87M (6' 2") | 77- 84 | 171 -184 | — | — |

Source: Life Insurance Corporation of India

Body Weight: If a person weighs 10% more than the standard body weight for the specific age, sex and height of the person is termed as overweight. If a person weighs 20% more, he is termed 'obese' B.

Body Mass Index: BMI is calculated from a person's weight and height and it provides an indicator of body fat and is used to indicate weight categories.

$$\text{BMI} = \text{Weight (Kg)} / \text{Height}^2 \text{ (m)}$$



Weight status according to BMI range

| Weight status | BMI range |
|-------------------|--------------|
| Underweight | < 18.5 |
| Normal | 18.5 to 24.9 |
| Overweight | 25 to 29.9 |
| Obesity (Grade 1) | 30 to 34.9 |
| Obesity (Grade 2) | 35 to 39.9 |
| Obesity (Grade 3) | 40 and above |

Grade 1 obesity - It is a self manageable condition and does not interfere with day to day activities. The person leads a healthy normal life.

Grade 2 obesity – Medical and dietetic intervention is needed to manage the situation. The person appear obese and have poor stamina. They are predisposed to diabetes, hypertension, heart ailments, fatty liver, arthritis and varicose vein. This excess weight reduces life expectancy and increases the mortality rate .

Grade 3 obesity– Excess fat interferes with day to day activities. They are susceptible to atherosclerosis and have serious psychological disturbances.



Activity : 1

Calculate your BMI from your weight and height.

$$\text{BMI} = \text{Wt (kg)} / \text{Ht}^2 \text{ (m)}$$

Categorise yourself as: Normal / overweight / grade 1 obesity/ grade 2 obesity/ grade 3 obesity.

Waist Circumference:B

The circumference of the waist is used to evaluate a person's abdominal fat.

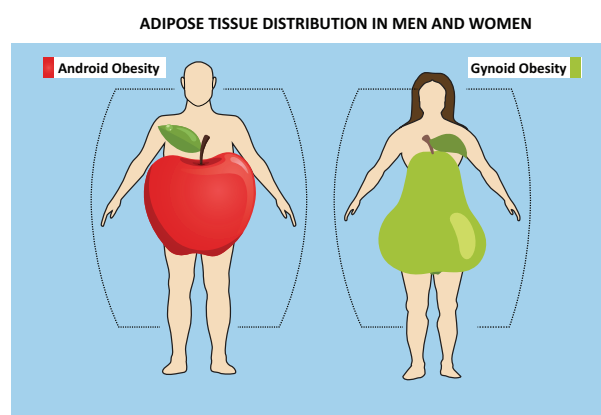
High risk of health problem is indicated as given below:

- Men ≥ 94 cms and Women ≥ 80 cms of waist circumference.

- Very high risk of health problem is indicated as in
- Men ≥ 102 cms and Women ≥ 88 cms of waist circumference.

Waist to Hip Ratio (WHR):

The normal waist to hip ratio should be 0.7 In upper body obesity ratio for: Women is 0.85 and Men is > 1.0 A WHR of 1.0 or greater in men and 0.8 or greater in women is indicative of android obesity and increased risk of obesity related disease. Fat is deposited in males and females which cause difference in types of obesity apple or android or male pattern and pear or gynoid or female pattern of fat distribution.



Broka's Index: This is by far the simplest formula to calculate.

$$(\text{IBW}) = \text{Height (cm)} - 100 = \text{Ideal Body Weight}$$

7.1.3. Complications of Obesity:

General Mortality and Morbidity: Obese are more prone to chronic diseases like cardiovascular disease, including hypertension and dyslipidaemia, non-insulin dependent diabetes, gall bladder disease and gout

Cardiovascular disease and stroke: Obesity may be independent risk factor for coronary heart disease. A reduction in weight leads to improvement in cardiovascular risk factors like hypertension and abnormal lipid levels. When the blood vessels of the brain are

diseased, they may rupture or there may be inadequate blood supply to brain resulting in stroke. This may be due to hypertension or fatty deposits in blood vessels of obese.

Type II Diabetes: It is an important contributor to morbidity and mortality in obese people. It is associated with insulin resistance and hyperinsulinaemia. A balanced diet, physical activity and drugs can control blood sugars.

Gall bladder disease: Obesity is one of the risk factors for formation of gallstones. The excess adipose tissue contain large amount of cholesterol. The super saturation of bile with cholesterol in obese makes them prone to formation of gallstones.

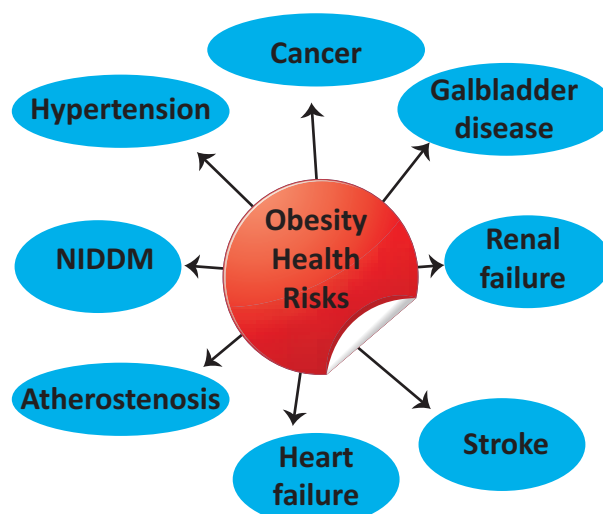
Cancer: Risk of cancers of colon, rectum and prostate increases in obese men, whereas obese women likely to develop cancer of breast, ovary, endometrial and cervix.

Infertility: Obese women are reported to suffer more from menstrual disorder, infertility and PCOS (Polycystic Ovary Syndrome), all of which tend to improve on reduction of weight.

Sleep Disorder: Commonly known as sleep apnoea is one of the common problems in obese men and women. Obesity causes narrowing of the upper airway when the person is in supine position.

Back pain and Arthritis: Abdominal obesity increases risk of back pain because of extra load on spinal column. The extra stress on weight bearing joints contributes to the development of osteoarthritis.

Psychological Problems: Obese people may be exposed to ridicule and discrimination in areas like employment, promotions and social interactions. This results in low self-esteem and depression leading to over eating for consolations.



(NIDDM-Non Insulin Dependent diabetes Mellitus)

Management of Obesity: Comprises the Following Three Approaches.

1. Dietary modifications
2. Physical activity
3. Lifestyle modifications

7.1.4. Dietary Principles:

A low calorie, restricted carbohydrate, high protein, restricted fat, normal vitamins and minerals (except sodium), liberal fluid and high fibre diet is suggested.

Energy: A low calorie diet helps the body to go into negative energy balance. This promotes use of stored fat as opposed to calories from food. 20 Kcal/kg ideal body weight for sedentary lifestyle and 25 Kcal / kg ideal body weight for moderate lifestyle is prescribed.

Carbohydrates: Milled and refined grains and foods made with refined grains like white rice, white bread, white pasta, processed breakfast cereals, potatoes and sugary drinks are rich in rapidly digested carbohydrate having high glycemic index and glycemic load. These kinds of carbohydrate increase the blood glucose and insulin levels rapidly, hence it causes hunger spikes leading to overeating and resulting in weight gain and consumption should be restricted.



| Food Groups | Examples | |
|--|--|---|
| Grains | Whole wheat bread and rolls, Whole wheat pasta, oatmeal, brown rice, unsalted popcorn |  |
| Fruits | Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries. |  |
| Vegetables | Broccoli, carrots, green beans, lima beans, potatoes, spinach, sweet potatoes, tomatoes |  |
| Fat - free or low - fat milk and milk products | Fat - free (skim) or low - fat (1%) milk or butter milk, fat - free, low - fat or reduced - fat cheese, fat - free or low fat regular or frozen yogurt |  |
| Lean meats, poultry and fish | Beef, poultry, pork, game meats, fish, shellfish select only lean;trim away visible fats; broil,roast or poach; remove skin from poultry |  |
| Nuts, seeds and legumes | Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas |  |

Whole grains, whole wheat, brown rice, barley, fruits and vegetables are digested more slowly than refined grains. So they have a slower effect on blood sugar and insulin, which may

keep hunger at bay. This results in controlled eating and weight management .

Proteins: Protein rich foods provide higher satiety, high specific dynamic action and





Simple tasty home made foods provide less calories. Knowing the calories in the food helps to maintain weight.

improved body composition. About 1g protein per kg body weight is suggested. Inclusion of plant proteins like nuts and beans are low in fat but high in dietary fibre and replacing red and processed meat with fish and poultry are emphasized.

Fats: Fat, being a concentrated source of energy need to be restricted. Include fat in the form of vegetable oils (rich in MUFA and PUFA) so that sufficient essential fatty acids are supplied and at the same time the risk of developing coronary artery disease can be minimized.

Vitamins: Inclusion of fruits and vegetables in the diet will avoid deficiency of water soluble vitamins due to restriction of fat.

Minerals: Sodium in common salt causes retention of fluid and therefore salt should be restricted in the diet .

Fluids: Liberal amounts of water and low calorie fluids may be included in the diet . A glass of water intake before meal will reduce food intake .

Fibre: Fibre provide satiety, bulk, slow digestion and increased transit time. High fibre foods such as fruits and green leafy vegetables are low in calorie density, help in regulating bowel movement, reduce blood cholesterol, promote chewing and decrease the rate of ingestion

Here are some weight loss friendly snack ideas:

1. Small handful of nuts.
2. Sliced fruit with unsweetened yogurt.
3. Vegetable chat.
4. Sprout salad.

5. Roasted pumpkin seeds.
6. Sliced fruit with nuts or nut butter.
7. Roasted chickpeas



Activity : 2

List FIVE foods to be included and FIVE foods to be avoided

7.1.5 Physical Activity:

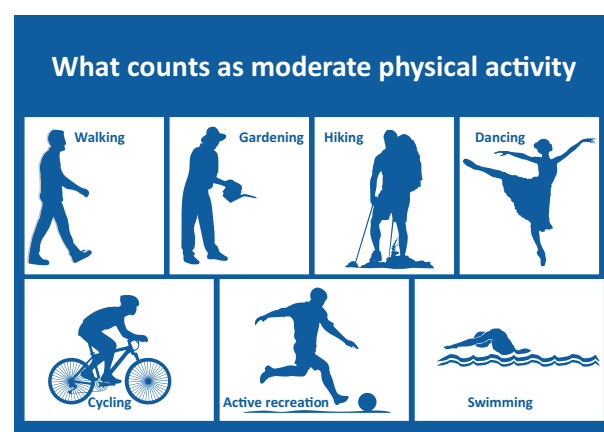
Higher levels of regular activity are associated with lower mortality.

Effect of Physical Activity On Health Reduces The Risk Of Following:

- Cardio vascular disease
- Non insulin dependent diabetes mellitus
- Obesity
- Osteoporosis
- Cancer

Although it is difficult to prescribe the optimum amount physical activity, it is important to note that any exercise programme has to be consistent for affecting some degree of weight loss.

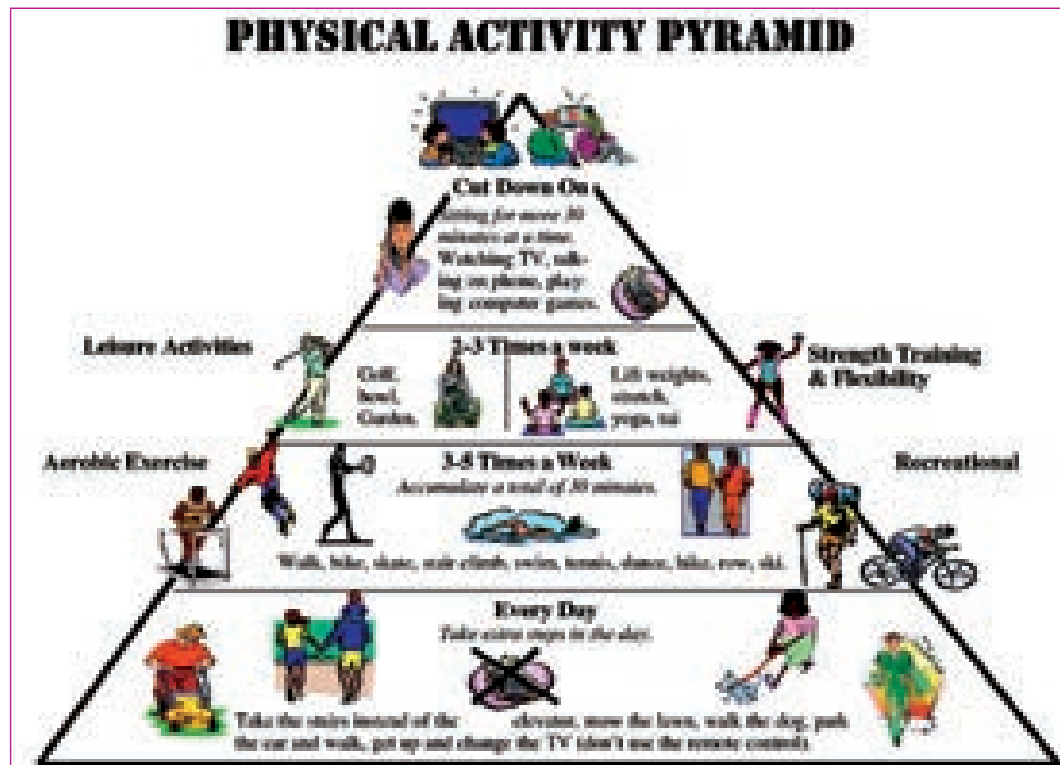
Types of Exercise to Loose Weight



The benefits of exercise as follows:

1. Reduces blood pressure
2. Helps lessen angina pain
3. Decreases body fat
4. Increases HDL cholesterol





5. Makes the heart stronger and more efficient
6. Helps in increasing bone density
7. Reduces risk of cancers
8. Increases longevity

9. Wake up early and sleep early. Sleep for at least 6-8 hours daily as poor sleep has been linked to weight gain

7.1.6 Life Style Modification:

The following strategies related to lifestyle modifications are helpful.

1. Have regular meal time. Irregular eating habits put a lot of strain on the body
2. Do not read or watch television while eating.
3. Keep healthy snacks at home like fruits, vegetables and sprouts.
4. Avoid nibbling between meals
5. Eat slowly, chewing the food properly.
6. Include a regimented exercise routine in the day.
7. Handle stress in a positive manner through exercises, yoga and meditation
8. Avoid drinking of alcohol and smoking



What are junk foods?

Foods that are pre - prepared are packed and the low nutritional value.

Junk Food varieties

- Chips
- Candy
- Soft drinks
- Gum
- Chocolates
- Cookies
- Cake
- Sugar
- Butter
- Fried fast food





How can stress be managed?

Stress management can be done by meditation, guided imagery, music therapy, dance therapy, aroma therapy, sleep, humour, touch and rearing a pet.

CONCLUSION

A balanced diet with adequate amounts of vegetables, proteins, and fruits is the key to managing weight. Do not Diet to lose weight but Eat Right.

- Include more fiber in the diet
- Reduce junk food and snacks
- Consume low-fat dairy products, lean meat and nuts
- Do not skip meals
- Eat small and frequent meals, follow 6 meal patterns a day.
- King size Breakfast. This indicates not the quantity, as misunderstood by many, instead indicate the quality of your Breakfast.
- Control or limit the intake of sugar, salt, spices and oil.



- Eat low-fat meals
- Exercise regularly 4–5 times a week
- Monitor weight regularly.

Case Study

A lady aged 30 is a rich housewife without much work. She is fond of eating sweets, fried foods, ice creams etc. She spends most of her time by watching T.V. Her height is 5.5” and weight is 100 kg. Her blood cholesterol level is 220 mg / dl. Her BP is 90mm/130mm. She thinks putting on weight is natural phenomena, Suggest her a diet and behavior modification to reduce her weight.



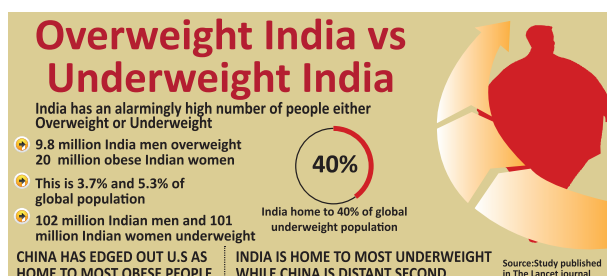
Anti obesity day is on 26th November

7.2. UNDERWEIGHT

Underweight is defined as people with a Body Mass Index (BMI) of less than 18.5 or a body weight 15% to 20 % below the normal for their age and height. Underweight results when the energy balance is negative.



An estimated 50 million adult women are classified as being severely underweight in developing countries.



7.2.1 Aetiology

Genes

There is a genetic cause associated with being under weight. The weight of an individual is inherited basically from his biological mother. If the biological mother being thin, there is 75% likelihood of the individual being thin also.

Dietary factors:

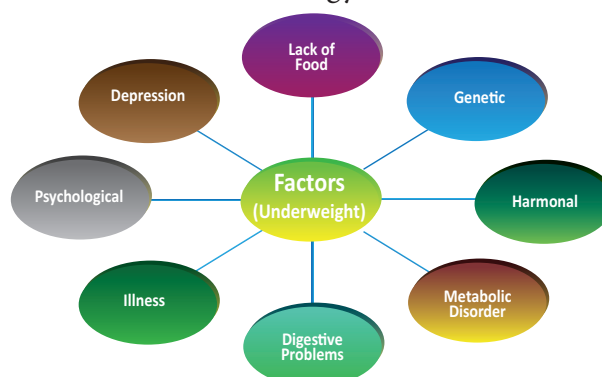
Poor selection of food along with irregular eating habits may be responsible for insufficient food intake and hence calorie intake. It may be due to ignorance or a lack of purchasing power of the family.

Physical activity and psychological factor:

Individuals who are tense, nervous and extremely active and who do not rest sufficiently tend to expend more energy than what they are able to eat. This can cause under nutrition.

Pathologic condition:

Fever and infections, increase the demand for energy, if not met because of poor appetite, lead to loss of weight. Food intake may be severely limited by nausea, vomiting or diarrhoea in gastrointestinal disturbances. Metabolic rate may be greatly increased in hyperthyroidism resulting in underweight. Drug therapy may also alter taste or reduce appetite, leading to weight loss. Wasting diseases such as tuberculosis, diabetes, cancer and malabsorption syndrome increases the metabolic rate and energy needs.



7.2.2 Complications:

Poor immunity:

Low body weight puts a person at increased risk for infections and disease. Due to less consumption of protein, fat and other nutrients, such as antioxidants which help support a strong, functioning immune system.

Gynaecological problems:

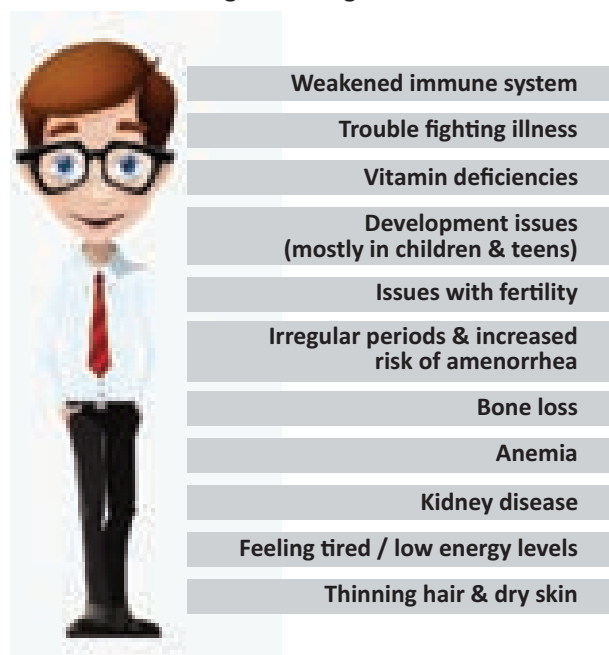
Amenorrhoea, infertility and pregnancy related complications and low birth weight babies are common in underweight mothers.

Osteoporosis:

Drastic weight loss impairs the nutrient absorption capabilities of the individual. When calcium is not consumed and absorbed in proper amounts may lead to weak and fragile bones causing osteoporosis.

RISKS OF BEING UNDERWEIGHT

The most common health risks associated with being underweight include:



UNDERWEIGHT

7.2.3 Dietary Principles:

Any underlying cause of underweight must be dealt with as a first priority. Nutrition support and dietary changes are

effective along with or after treatment of the underlying disorder. Then a balanced diet should be planned based on the requirement.

A high calorie, high protein, high fat, diet liberal vitamin intake is recommended.

Energy:

The total calorie intake should be 500 to 1000 Kcal in excess of the daily needs in order to result a gain in weight by half to one kilogram in a week. The person may be given 30 – 35 Kcal per Kg body weight per day. The calorie should be increased gradually over a period of one or two weeks to avoid digestive disturbances.

Carbohydrates:

Gradual amounts of easy to digest carbohydrates should be included in the diet. The intake of dietary fibre should be minimized so as to prepare meals which are nutrient dense and have a small volume. Include more of high calorie vegetables like potatoes, colocasia and yam instead of raddish, cucumber, leafy vegetables which are low in carbohydrate content.

Proteins:

Underweight individuals generally have lean body mass and may benefit by consuming around 1.2 g per kg body weight of protein per day. A combination of both animal and plant proteins should be incorporated.

Fats:

Fats are capable of increasing energy value of diet without adding much bulk to it. Add extra fat gradually, a sudden increase in fatty foods like butter, cream and oil may produce diarrhoea. About 30 % of calories should come from unsaturated sources of fat.

Vitamins and minerals:

If the diet provides good amount of fresh fruits and vegetables, vitamin or mineral supplements are usually not required.



Health Risks of Being...

Under Weight

- Heart irregularities
- Lowered resistance to infection
- Reduced ability to fight disease
- Chronic fatigue (tired!)
- Anemia = low iron
- Diarrhea
- Osteoporosis later in life (weak bones)
- Psychological distress, depression (from low confidence and low self-esteem)
- Eating disorders
- Distorted body image

Over weight

- Heart disease
- Depression
- Poor self - esteem
- Hypertension (High Bp)
- Complications in pregnancy
- Maturity Onset diabetes (Type 2)
- Respiratory illness
- High blood cholesterol levels
- Some cancers
- Gallbladder disease
- Arthritis (Sore joints)
- Eating disorders
- Distorted body image
- The above risks become more prevalent among those who are obese for a long period of time.

Fluids:

Take fluids only after a meal instead of taking before meals so that food intake is not reduced. High calorie nourishing beverages such as milk shakes, egg not over low nutrient beverages such as cold – drinks, barley water etc., should be taken.

Exercise:

Regular outdoor exercise helps to stimulate appetite. Emotional well- being is essential to have good appetite. Constipation may reduce the appetite so the bowel movements should be regulated with adequate fluids, exercise and fruits.

A-Z

GLOSSARY

| | |
|-------------------------------|---|
| Android fat deposition | deposition of fat around the waist and upper abdomen, apple shape fat distribution |
| Body Mass Index | A mathematical formula that correlates with body fat, expressed as weight in kilogram divided by height in meters squared |
| Cushing's syndrome | A glandular disorder caused by excessive steroid hormone resulting in greater than normal functioning of adrenal gland, due to obesity. |
| Essential fat | Fat that is present in the internal organs, bone marrow and nerve tissue that is necessary for survival. |



| | |
|--------------------------------|---|
| Gynoid fat distribution | pear shape fat distribution deposition of fat in the thighs and buttocks. |
| Hypercholesterolaemia | Elevated blood cholesterol levels. |
| Lifestyle modification | change in the behaviour, eating habits, exercise and thinking pattern. |
| Lipogenesis | Fat formation. |
| Obesity | A state of adiposity in which body fatness is above the ideal, BMI of 30 -39.9. |
| Osteoporosis | loss of bony tissue resulting in bones that are brittle and liable to fracture. |



Evaluation

I. Choose the correct answer (1 mark)

- Which of the following should be restricted the most by an obese person?
a. soups b. tea
c. cakes d. fruit juices
- The principle of diet for underweight people is
a. high calorie, high protein,
b. high calorie, low protein
c. low calorie, high protein
d. high calorie, low fat
- State whether the following statements are true or false
a. When people are offered variety of foods, their intake is likely to be less than when a single food is available.
b. Obesity predisposes to hypoinsulinemia and decreased glucagon levels
- Match the following :
i) WHR a) <18.5
ii) underweight b) >0.85 for women
iii) ideal BMI c) 30 to 34.9
iv) obesity grade 1 d) 18.5 to 24.9

II. Write short answers (2 marks)

- Define obesity.
- What is BMI?

- What is Broka's index?
- Define underweight.
- List the physical activity to reduce weight
- List the causes of a person being underweight.
- What are the complications of underweight?
- What are the methods of managing stress.
- What is android obesity?
- What is gynoid obesity?



III. Answer in brief (3 marks)

- List out the causes of obesity.
- What are the complications of obesity?
- How will you assess obesity?
- Mention the advantages of doing exercise.
- Bring out the difference between obesity and underweight.

IV. Answer in detail (5 marks)

- Explain the factors causing obesity.
- Describe the complications of obesity.
- Plan a days diet for obesity
- What are the causes and effects of underweight ?
- Explain the dietary modifications in the treatment of underweight .

