



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIO PULMONARY PERFUSION CARE
TECHNOLOGY

COURSE NAME : GASTROENTEROLOGY

3RD YEAR

TOPIC : OBESITY



DEFNITION



- Obesity is an abnormal growth of the adipose tissue due to an **enlargement of fat cell size** (hypertrophic obesity) or an **increase in fat cell number** (hyperplasic obesity) or a **combination of both**.
- Obesity is an abnormal increase in the proportion of fat cells characterized predominantly by adipocyte hypertrophy.





ETIOLOGY



- **Age**
Can occur at any age.
- **Sex**
 - Women are more likely to gain weight than men with the same calorie intake.
 - Menopause contribute in weight gain.
 - Pregnancy also contribute to the development of obesity in women
- **Genetic**
Family history
- **Biologic Basis**
 - Change in regulation of eating behavior, energy metabolism, body fat metabolism by hypothalamus.
 - Increased circulating plasma levels of leptin, insulin, and ghrelin, and decreased levels of peptide YY.
 - Interaction of these hormones and peptides at the level of the hypothalamus.
 - Alterations of adipokines (hormones secreted by adipocytes and cytokines)



ETIOLOGY (CONT)



- **Environmental Factors**

- Greater access to pre-packed food, fast food and soft drinks.
- Increased portion size of meals
- Eating outside home
- Lack of physical exercise
- Low Socioeconomic status
- Lack of sleep

- **Psychosocial Factors**

- Tendency to overeat
- Social gatherings or parties

- **Eating Habits**

Excessive calorie intake

- **Alcoholism**

- **Smoking**





ETIOLOGY (CONT)



- **Drugs**

- Corticosteroids
- Contraceptives
- Insulin
- Beta-adrenergic blockers
- Antidepressants
- Anti-seizure drugs
- Antipsychotic drugs

- **Disorders**

- Endocrine disorders
- Congenital anomalies
- Metabolic problems
- Chromosomal anomalies
- CNS disorders.



PATHOPHYSIOLOGY

Long-term sedentary lifestyle and/or excessive calorie intake



Imbalance between energy expenditure & energy intake



Adipocyte hypertrophy



Increases adipocyte volume & increases lipid storage



Visceral and subcutaneous fat accumulation



Alterations of adipokines



Overweight or Obesity



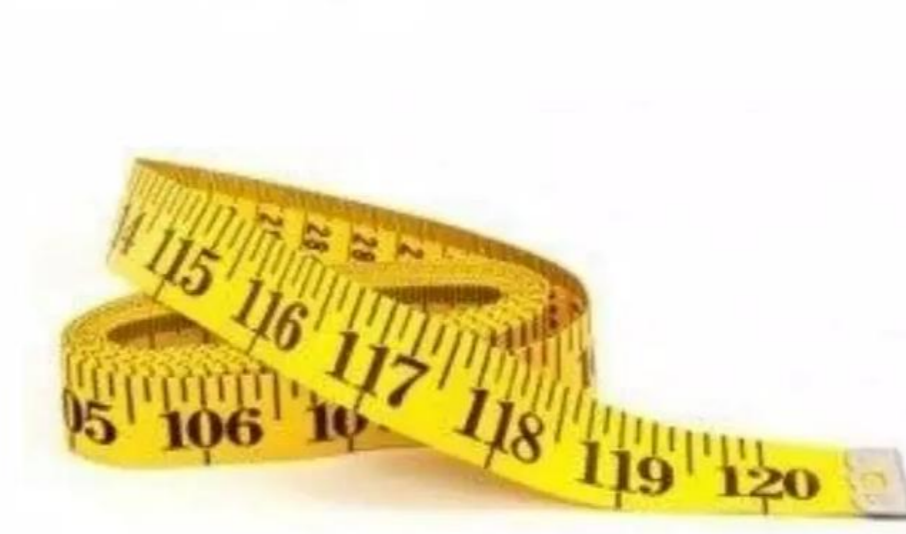
Increases risk for diseases



Measurements of obesity



- Height-weight chart
- Body mass index (BMI)
- Waist circumference
- Waist-to-hip ratio
- Skinfold Thickness





Height-weight chart



- Weight 10% to 20% above ideal body weight is overweight;
- 20% or more above ideal body weight is obesity.

- Ideal weight calculation

1. Broca's index = Height (cms) – 100

2. Corpulence index = $\frac{\text{Actual weight}}{\text{Desirable weight}}$

This should not exceed 1.2

3. Ponderal index = $\frac{\text{Height (cm)}}{\sqrt[3]{\text{weight (kg)}}$

4. Lorentz's formula = Height (cm) – 100 - $\frac{[\text{Height (cm) - 150}]}{2(\text{women}) \text{ or } 4(\text{men})}$



Body mass index (BMI)

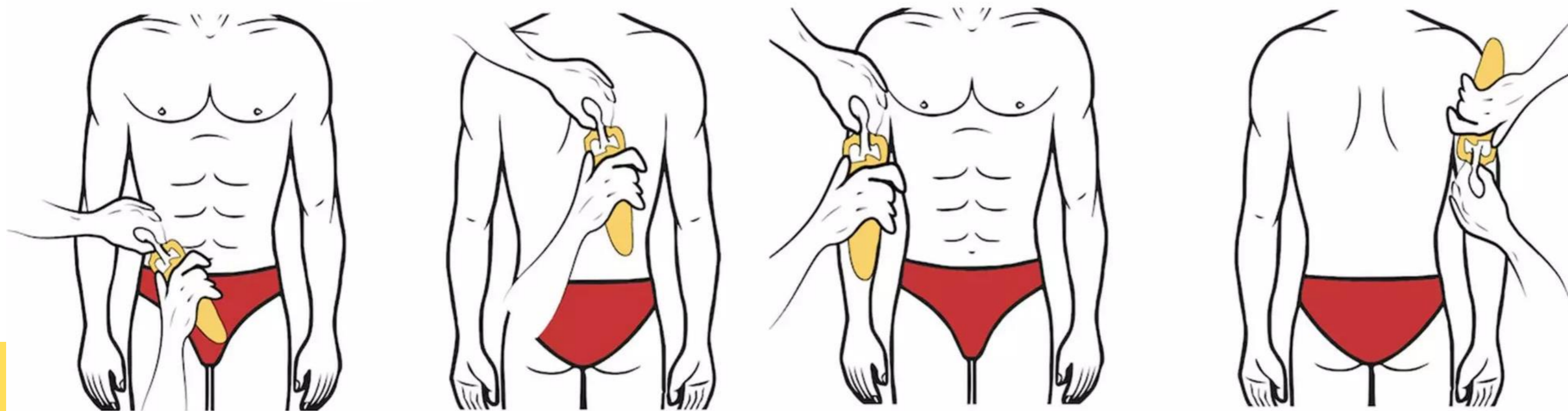


- Best methods for defining obesity.
- $BMI = \text{Weight (kg)} / \text{Height (m}^2\text{)}$
- Below 18.5 – Underweight
- 18.5-24.9 - Normal
- 25.0-29.9 - Overweight
- 30.0-34.9 - Obese class I
- 35.0-39.9 - Obese Class II
- > 40.0 - Obese Class III or Morbid obe



- Waist circumference:
 ≥ 102 cm in men and ≥ 88 cm in females is associated with an increased risk of metabolic complications.
- Waist-to-hip ratio
 - Preferred tool to measure for overweight and obesity when the patient is predominantly muscular.
 - The waist measurement is divided by the hip measurement to calculate the ratio.
 - WHR of < 0.80 is optimal.
 - WHR greater than 0.8 indicates greater risk for health complications.
 - A high WHR (> 1.0 in men and > 0.85 in women) indicates abdominal fat accumulation.

- **Skinfold Thickness**
- For assessing body fat.
- Several varieties of callipers are used. (E.G., Harpenden skin callipers)
- Normal finding is mid triceps + mid biceps + sub scapular + supra iliac = 50mm in women or 40 mm in men.





Classification of obesity



1. Primary obesity and secondary obesity
2. According to BMI
3. According to body shape or fat distribution



- ***Primary obesity***

Due to excess calorie intake for the body's metabolic demands

- ***Secondary obesity***

Due to various congenital anomalies, metabolic problems, chromosomal anomalies, or CNS disorders.

- ***According to BMI***

Individuals with a BMI

- | | |
|-------------|-----------------------------------|
| • 25.0-29.9 | Overweight |
| • 30.0-34.9 | Obese class I |
| • 35.0-39.9 | Obese Class II |
| • > 40.0 | Obese Class III or Morbid obesity |

- **According to body shape or fat distribution**

1. Gynoid obesity

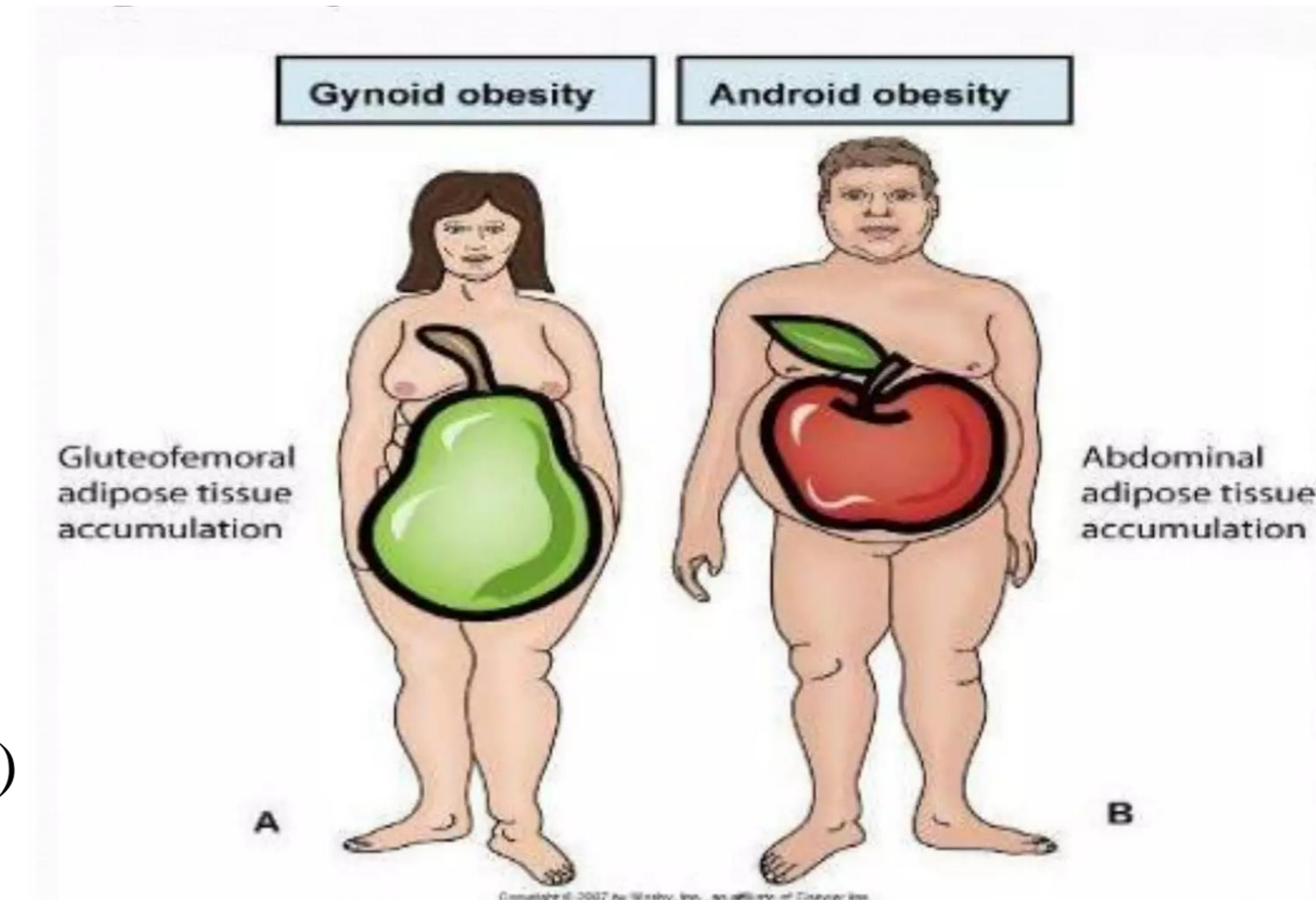
2. Android obesity

- Gynoid obesity:

- Pear-shaped body
- Fat is located in the buttocks and upper legs
- Gluteofemoral adipose tissue accumulation More subcutaneous fat
- Common in women
- Better prognosis but is more difficult to treat

- Android obesity:

- Apple-shaped body
- Fat is distributed over the abdomen and upper body (neck, arms, and shoulders)
- Abdominal adipose tissue accumulation
- More visceral fat
- Common in men
- Greater risk for obesity-related complications





CLINICAL FEATURES



Signs

- Clothes feeling tight and needing a larger size.
- Weight gain as compared to previous measurement
- Having extra fat around the waist.
- A higher than normal body mass index and waist circumference.



SYMPTOMS



- Breathlessness
- Increased sweating
- Snoring
- Back and joint pains
- Feeling tired even with routine activities
- Inability to cope with sudden physical activity
- Psychological problems such as low self esteem, low confidence level



Health risks associated with obesity



- Increased mortality
- Type 2 Diabetes
- Hypertension
- Coronary heart disease & stroke
- Metabolic syndrome
- Cancer - Colon cancer, breast cancer in postmenopausal women, endometrial cancer
- Gallstones
- Asthma
- Osteoarthritis
- Low back pain
- Reduced fertility
- Sleep apnoea (interrupted breathing during sleep)
- Liver disease
- Kidney disease
- Pregnancy complications
- Gestational diabetes
- Foetal defects
- Obesity reduces life expectancy by an average of 3 to 10 years according to its severity



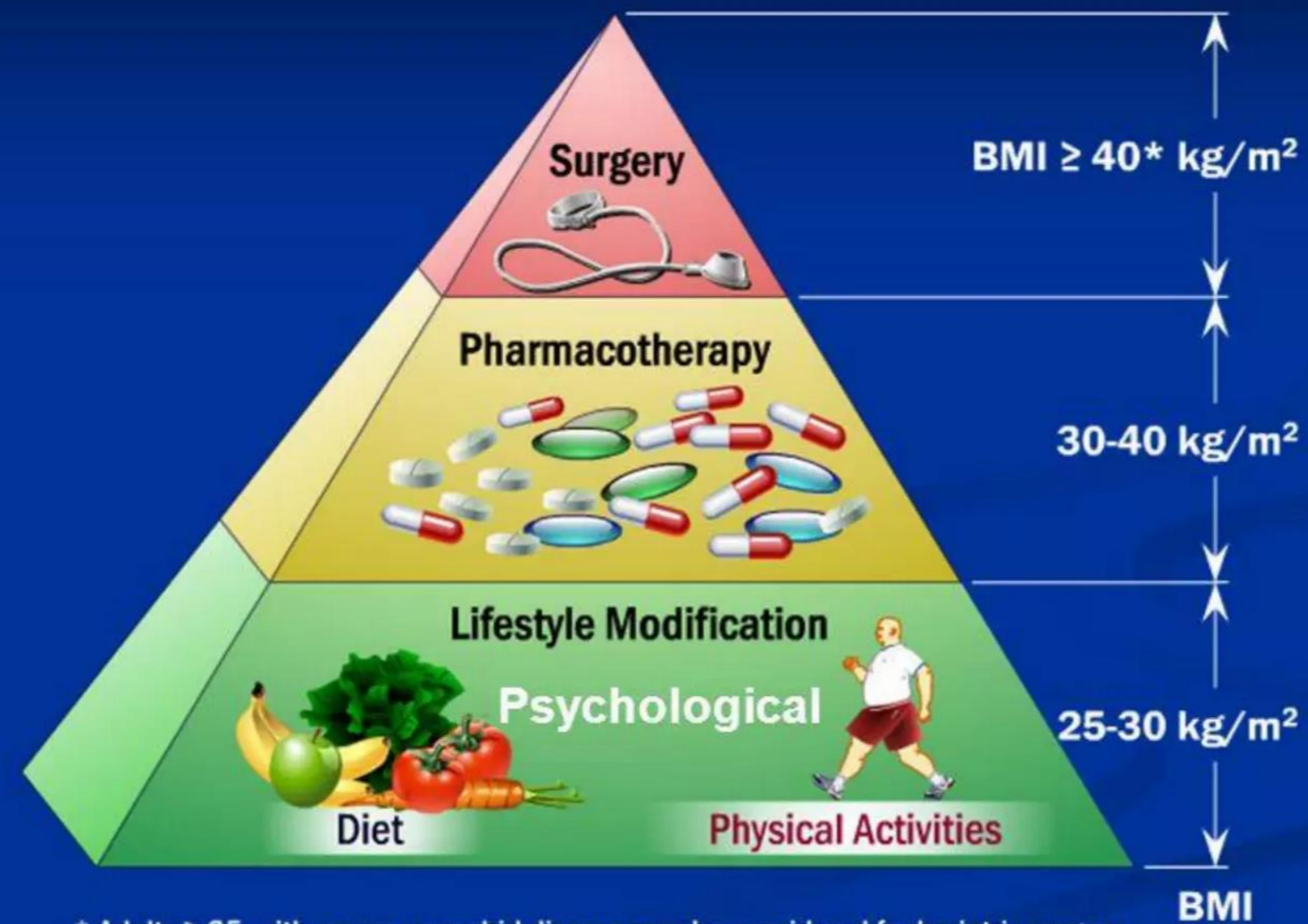
DIAGNOSTIC MEASURES



- History collection
- Physical examination
 - Full medical assessment
- Measurements of obesity
- Laboratory examination
 - Fasting lipid profile
 - Liver function tests
 - Thyroid function tests
 - Fasting glucose and haemoglobin A1c(HBA1c)

MANAGEMENT

Obesity Treatment Pyramid



* Adults ≥ 35 with severe comorbid disease may be considered for bariatric surgery



LIFE STYLE MODIFICATION





NUTRITIONAL THERAPY



Calorie-Restricted Weight-Reduction Diet

- Low calorie diet
800-1200 calories per day
- Very Low calorie diet
Less than 800 calories per day



PHYSICAL ACTIVITY



Regular physical exercise.

To increase energy expenditure.

Daily 30 minutes to 1 hour per day.



BEHAVIOUR MODIFICATION



- Changing behaviors or habits related to food and physical activity is important for losing weight.
- Change the habits promoting weight gain such as watching television for long hours.
- Self monitoring
Keep a record of weight loss.
- Reward the success for meeting weight-loss goals.



Pharmacotherapy



- Prescribed only when BMI is 28 kg/m² or more with other weight related conditions or BMI 30 kg/m² or more.
- Two categories of drugs:
 - 1) **Appetite-suppressing drugs**
 - 2) **Nutrient absorption blocking drugs**



Surgical management



- The field of obesity surgery is called **bariatric surgery**

Indications

- Morbid obesity.
- Gross obesity for 5 years
- Failure to reduce weight with other forms of therapy
- Body weight 100% above ideal weight
- Presence of a high-risk condition that weight loss would relieve.



THANK YOU