Discussion on -

Obesity and it's impact on health

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Learning Objectives

- Definition and types of obesity
- Causes of obesity
- Assessment of obesity
- Complications of obesity
- Management of obesity

Obesity

Obesity is an **abnormal increase** in the **body weight** due to **excessive accumulation** of **body fat**.

The **body weight** of an individual
is **20%** or **more**
above the **standard body weight**
in obesity.

Current Global Statistics:

Adults:

- **Overweight: 2.5 billion**
- **Obese: 890 million (16% of global adult population)**

(According to the Global Obesity Statistics of WHO, 2022)

Children & adolescents:

- **Individuals aged 5-19:**

  Over **390 million** are overweight

  160 million living with obesity

- **Children under the age of 5:**

  37 million are overweight

(According to the Global Obesity Statistics of WHO, 2022)

Prevalence of obesity in Bangladesh

- **Overweight or Obese: 26.5%**

(National overview report of DGHS, 2022)

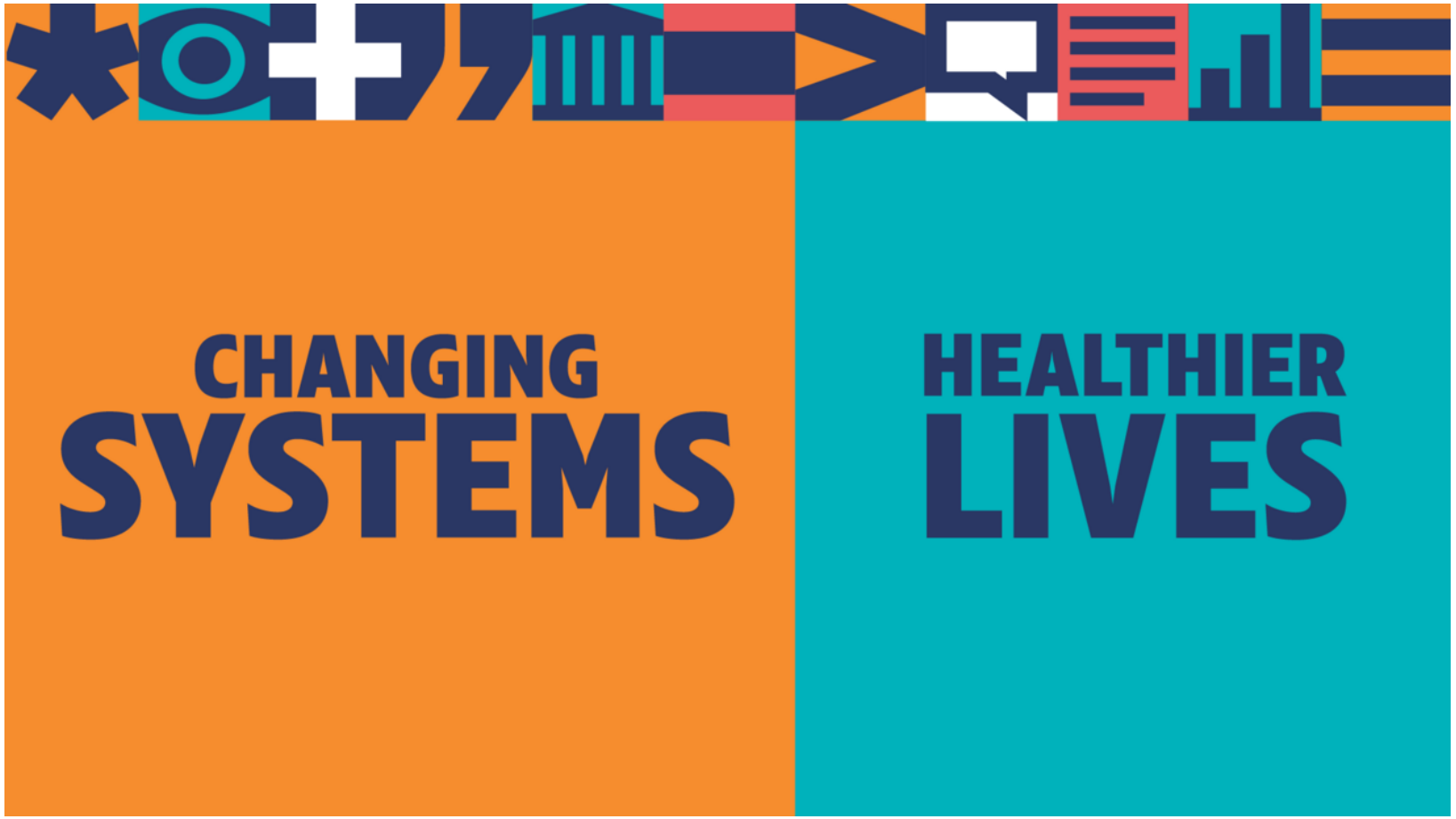
Prevalence of obesity in Bangladesh

- **Female:** 6.2%
- **Male:** 3%

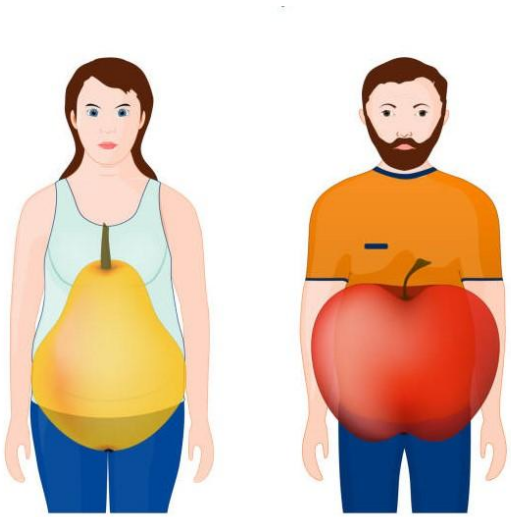
(According to the Global Nutrition Report 2022)

World obesity day

World obesity day 2025



Types of obesity



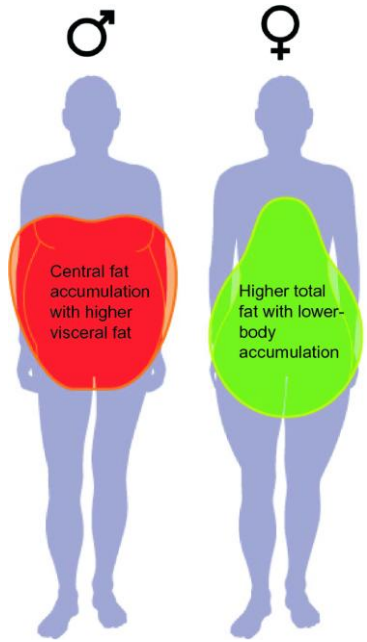
Types of obesity

1. Upper body obesity

(central obesity)

2. Lower body obesity

(generalized obesity)



Upper body obesity (Central obesity)

Excess fat deposited in **central abdominal area**.

It is called **visceral**,
android or
apple-shaped fat distribution.

Commonly found in **males.**

Here,

WHR is **> 0.85** for **female**

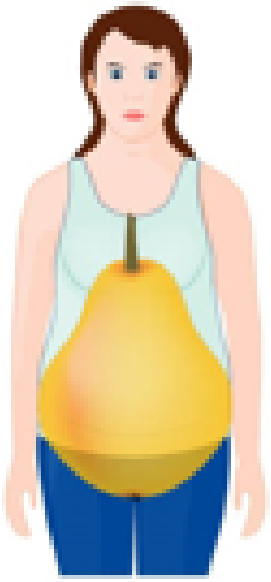
& **> 1.0** for **male**

Upper body obesity is
related to
increased **risk** of
HTN, DM, CAD.

Lower body obesity (Generalized obesity)

Excess fat deposited in the **lower extremities** around the hips or gluteal region.

It is called **gynoid** or **pear-shaped** fat distribution.

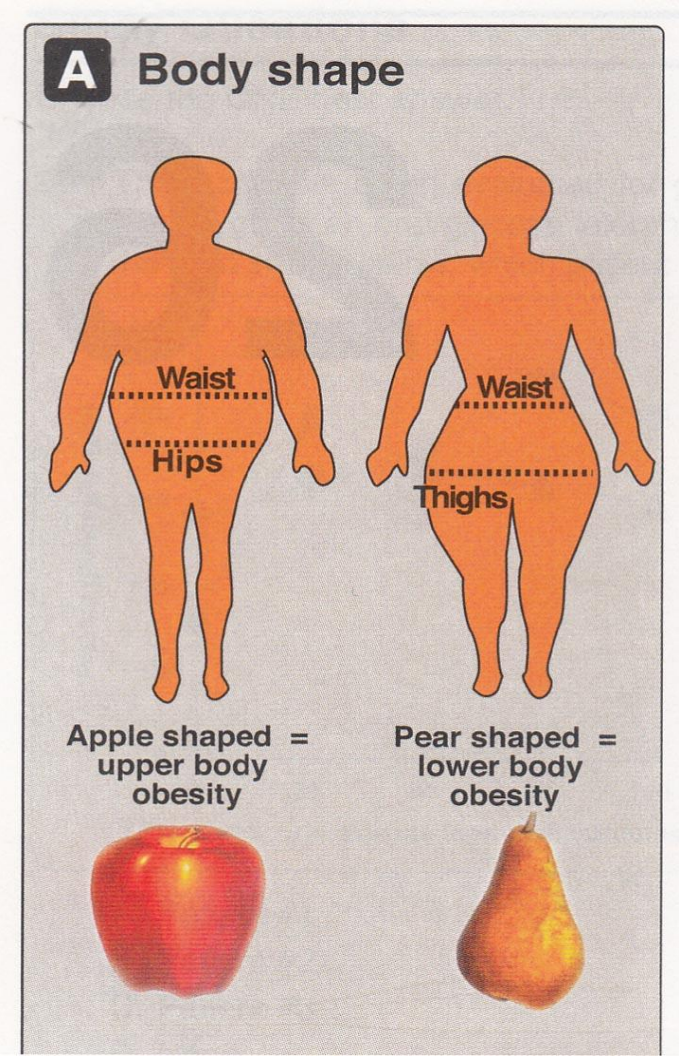


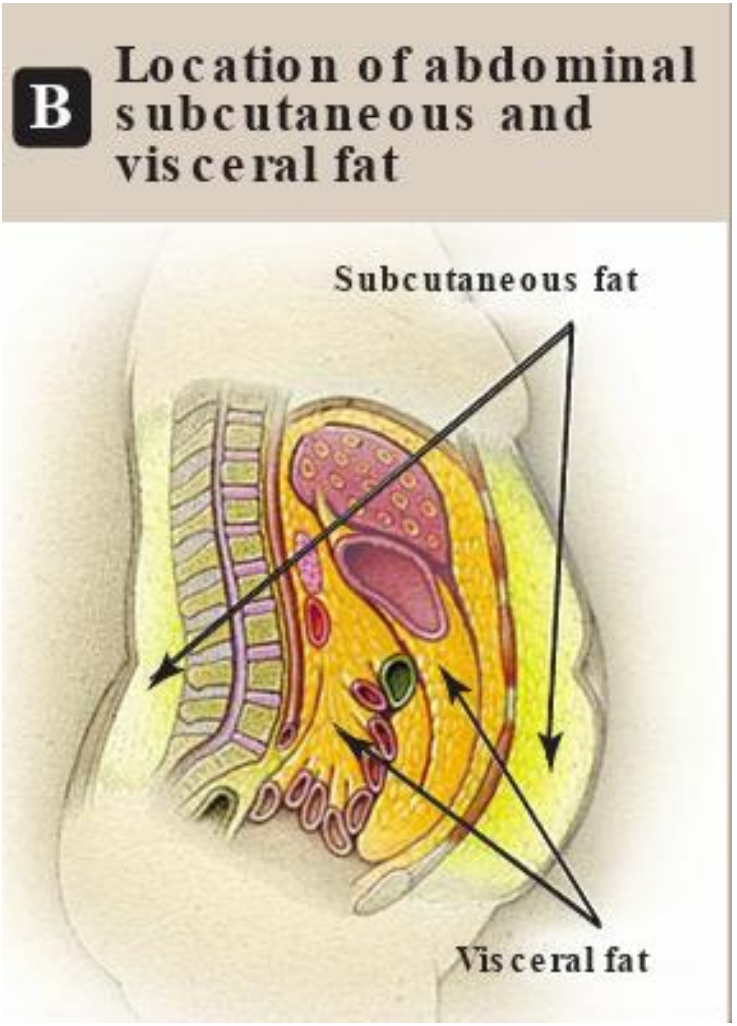
Commonly found in **females.**

Here,

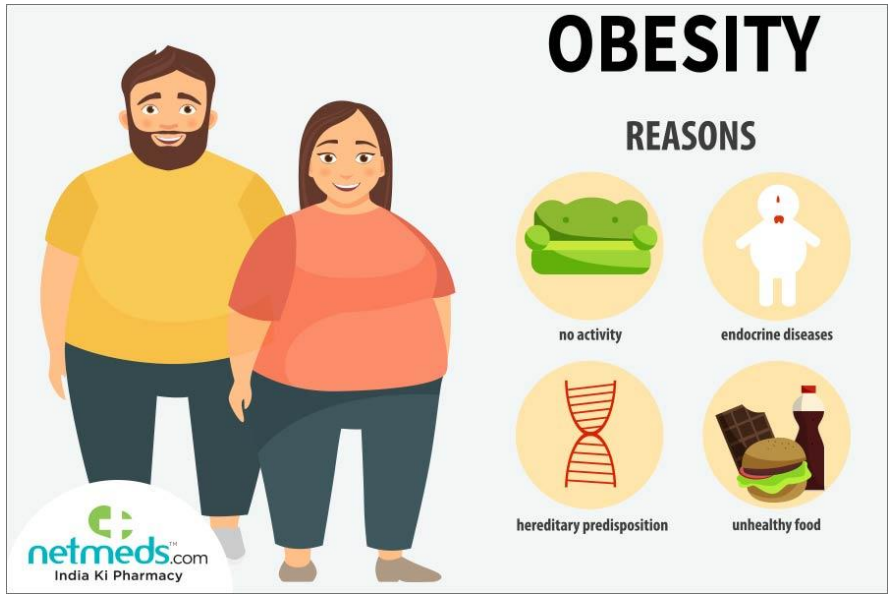
WHR is **normal** but **BMI** is **≥30**

Obesity


A Body shape
Waist
Hips
Waist
Thighs
Apple shaped = upper body obesity
Pear shaped = lower body obesity

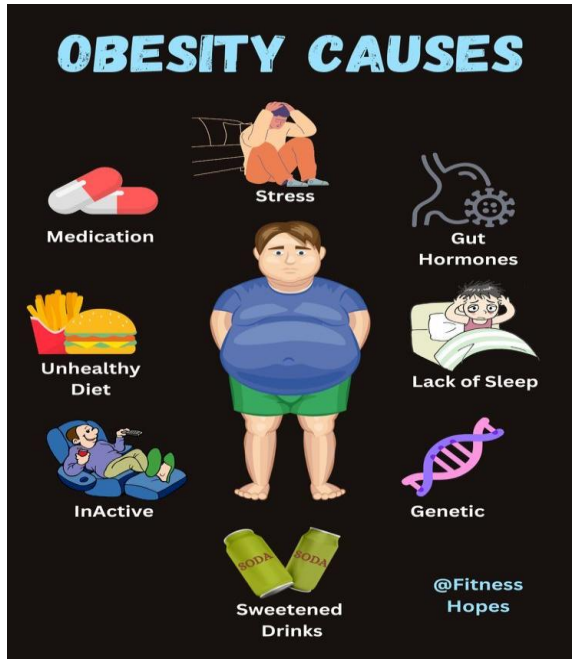

B Location of abdominal subcutaneous and visceral fat
Subcutaneous fat
Visceral fat

Causes of obesity



Causes of obesity

A. Genetic factors
B. Environmental & behavioural factors
C. Endocrine disorders
D. Certain drugs



A. Genetic factors:

1. **Mutation** of body weight regulatory hormone **leptin**.

2. Parental obesity:
   If **both parents** are obese, there is **70-80%** chance of the **children** to be obese.

Identical twins with obesity

Fig. Lippincott's Illustrated Reviews (7th edition)

B. Environmental & behavioural factors:

1. **High energy intake** than **energy expenditure**.
2. Lack of physical activity- **sedentary life style**.
3. Snacking.
4. Increased use of **automobiles**, **energy saving appliances**, **televisions** & **computers**.

C. Endocrine disorders:

1. Hypothyroidism
2. Cushing's syndrome
3. Insulinoma
4. Growth hormone deficiency
5. Hypothalamic tumours or injury

Myxedema

D. Certain drugs:

1. Steroids
2. Oral contraceptives
3. Anticonvulsants
4. Antidepressants

Childhood Obesity

Childhood Obesity

Excessive amount of **body fat**
negatively impact on
their **health**.

It's typically diagnosed
when a child's **BMI**
is **above** the **95th percentile**
for their **age** & **gender**.

Causes of Childhood obesity

1. Improper diet:

Diets **high in calories**, **sugar**, **unhealthy fats** & **processed foods**.

Processed foods

Ice cream

Foods High in Trans Fats

French fries

Cheeseburger

Pies

Chicken nuggets

Vanaspati ghee

Donuts

2. Lack of physical activity:

Sedentary lifestyles including excessive **screen time (TV, computers, smartphones)** & not getting **enough exercise & outdoor games**.

Assessment of obesity

Assessment of obesity

1. Anthropometric measurement

2. Measurement of body fat content

Assessment of obesity

Obesity can be assessed by-

1. **Anthropometric measurement: WHO criteria**

    a. Body mass index (BMI) of an individual
    b. Waist circumference (WC)
    c. Waist-hip ratio (WHR)
    d. Mid upper arm circumference (MUAC)
    e. Skin fold thickness

2. Measurement of body fat content:

a. Computed axial tomography scan (CAT scan)

b. Magnetic resonance imaging (MRI)

c. Dual energy X-ray absorptiometry (DEXA)

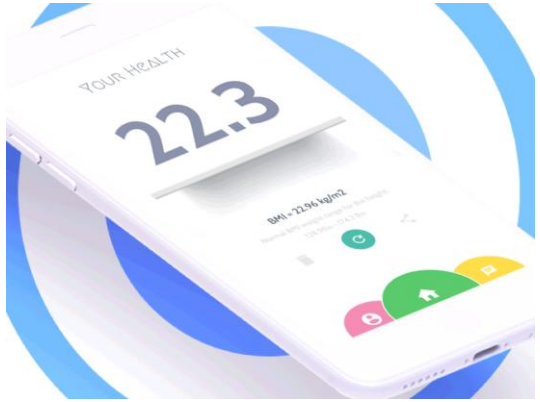
a. Body mass index

(BMI)

Body mass index (BMI):

The **body mass index** is a **measure** of relative **weight** adjusted for **height**.

This allows **comparisons**
both **within** &
between populations.



The BMI is calculated as follows-

BMI = (Weight in Kg) / (Height in meters)^2

Categories of BMI

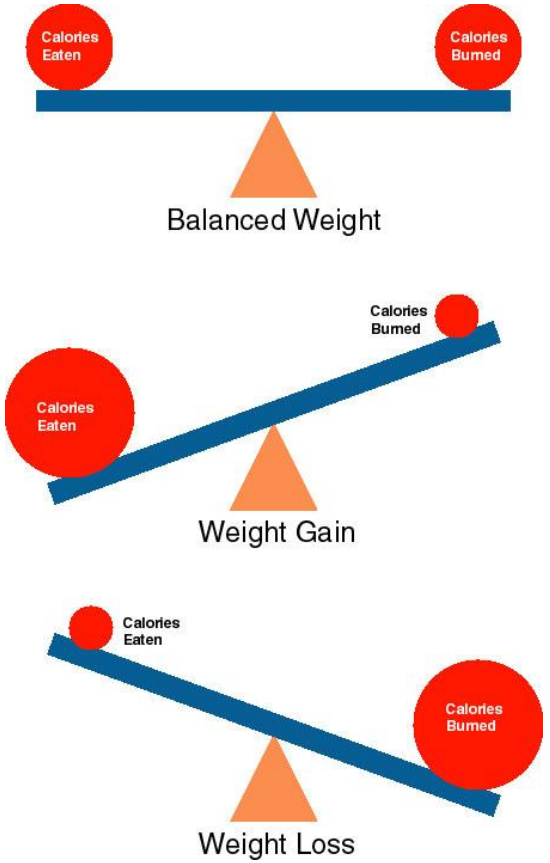
Body mass index… cont.

Categories of BMI

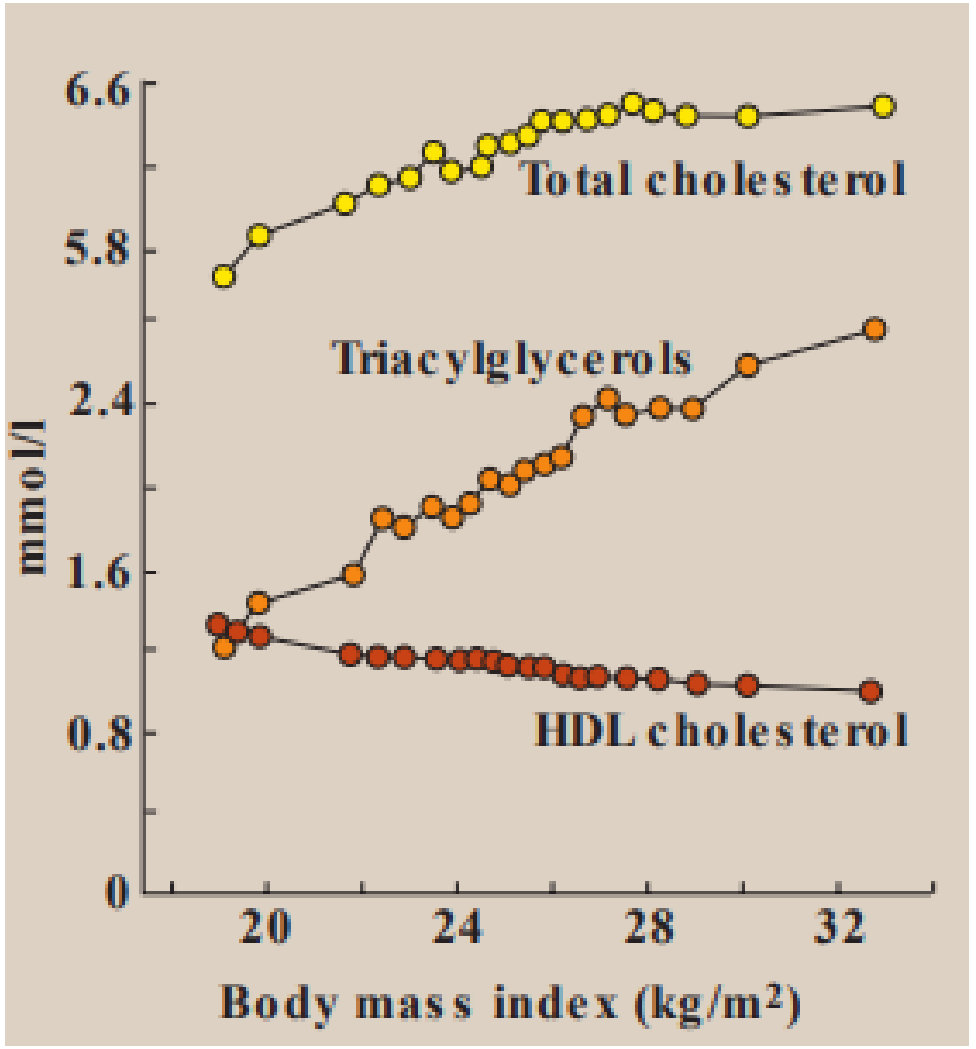
Status	Under Nutrition	Normal	Over weight	Obese	Extreme obese
BMI	< 18.5	18.5 - 24.9	25-29.9	≥ 30	> 40

The significance of BMI-

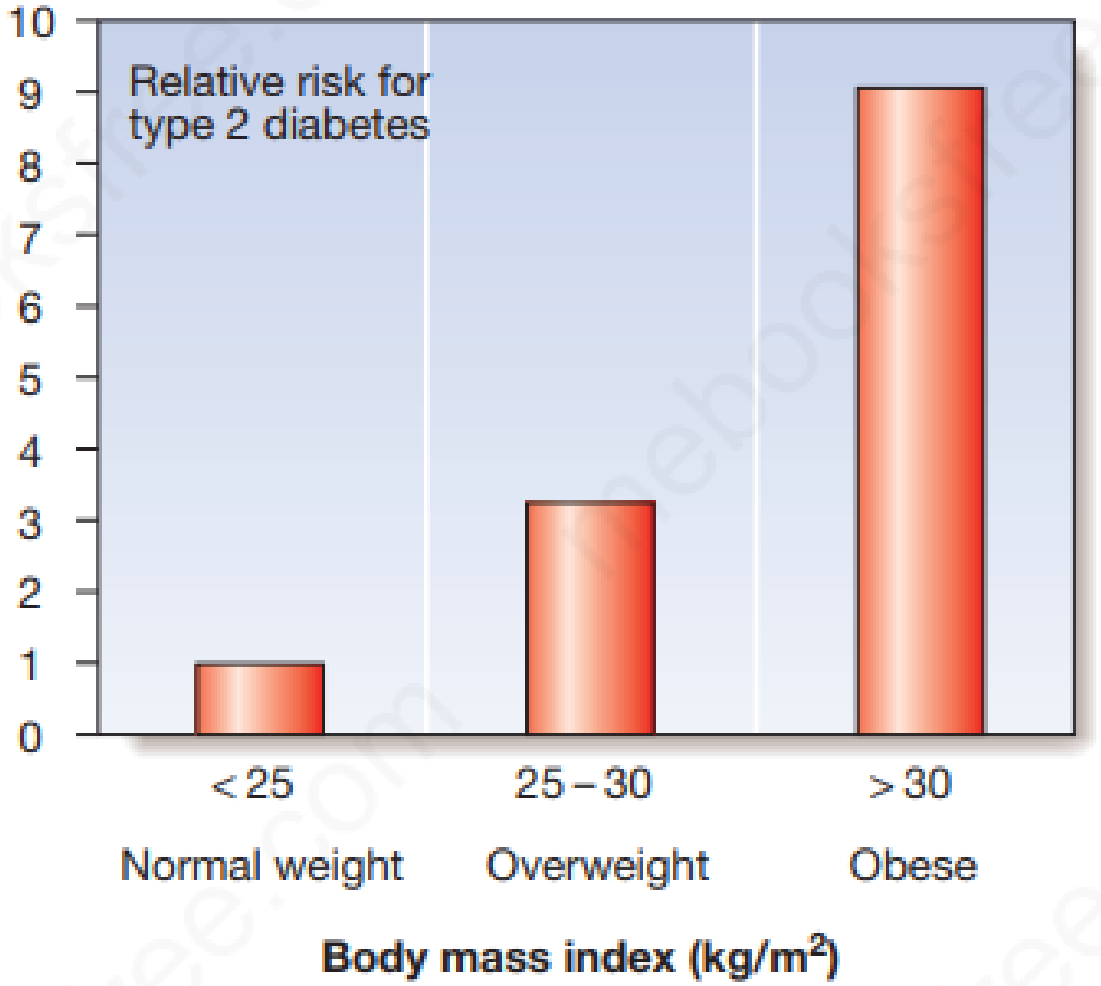
BMI can help to **determine** probable **health risks** if it's outside of the **healthy range**.



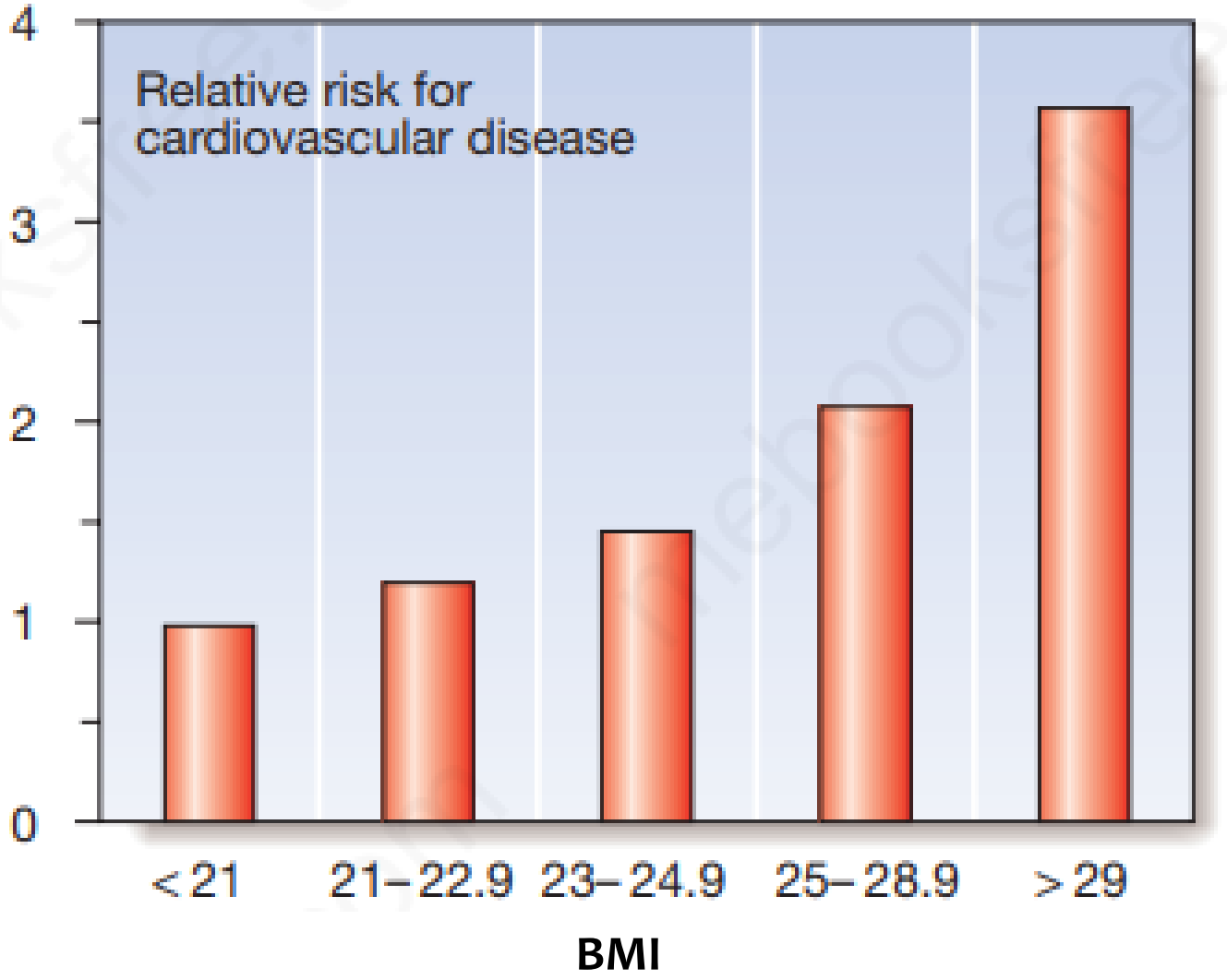
BMI and lipid profile



Body mass index and the relation of risk of type 2 DM



Body mass index and the relation of risk of cardiovascular disease



b. Waist circumference(WC)

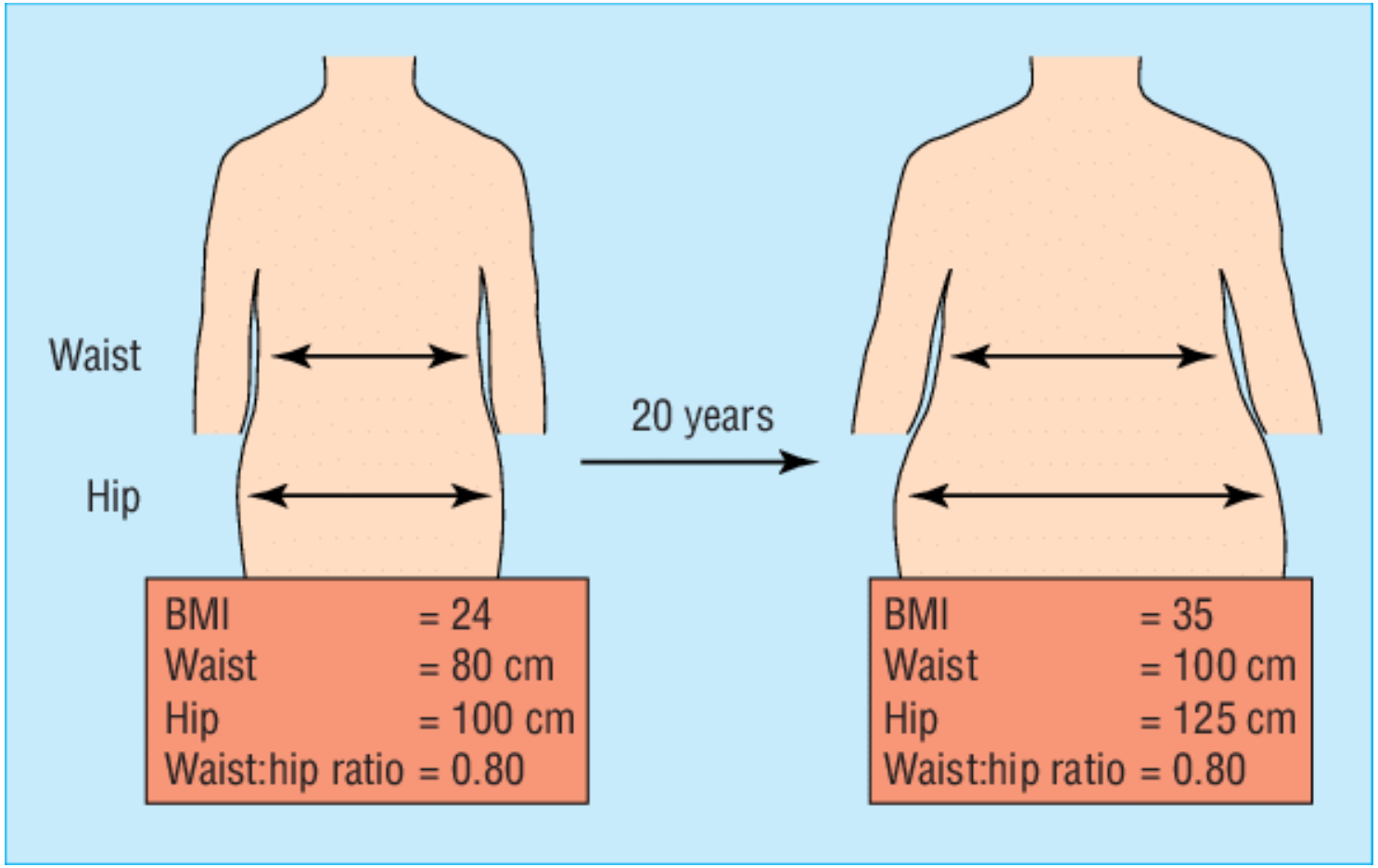
Waist circumference(WC)

Waist circumference (WC)

Normal		Moderate obesity		Severe obesity	
Male	Female	Male	Female	Male	Female
< 94 cm	< 80 cm	≥ 94 cm	≥ 80 cm	≥ 102 cm	≥ 88 cm

c. Waist hip ratio (WHR)

Waist hip ratio (WHR)



Waist hip ratio (WHR)

Normal		Obesity	
Male	Female	Male	Female
< 1.0	< 0.85	> 1.0	> 0.85

d. Mid upper arm circumference (MUAC)

Mid upper arm circumference (MUAC)

Typical Adult MUAC ranges

Normal		Obesity	
Male	Female	Male	Female
26-32 cm	24-30 cm	>34 cm	>32 cm

e. Skinfold thickness

Skinfold thickness

For adult:

Triceps

Biceps

Subscapular

Suprailiac

Abdomen

Thigh

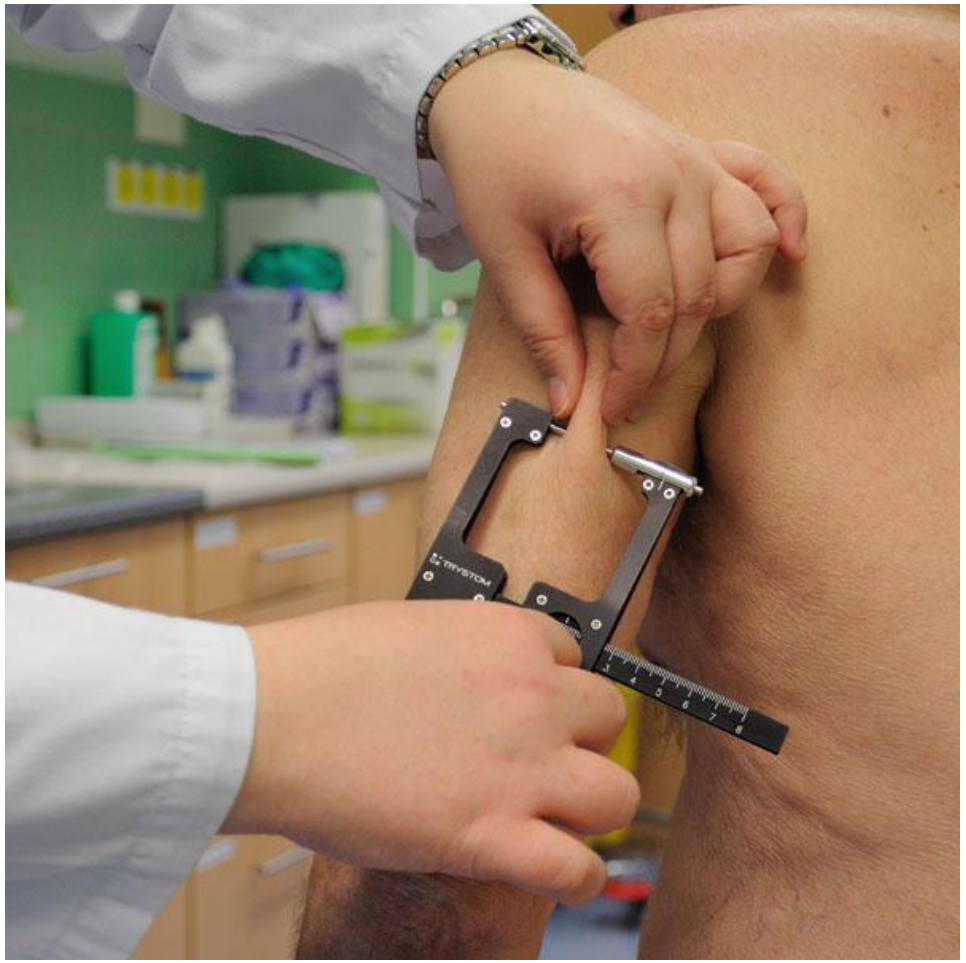
For children:

Triceps

Subscapular

Triceps skinfold thickness (TSF)

Triceps skinfold thickness ranges



Triceps skinfold thickness ranges

Normal		Obesity	
Male	Female	Male	Female
12-25 mm	16-30 mm	>25 mm	>30 mm

Biceps skinfold thickness

Biceps skinfold thickness ranges

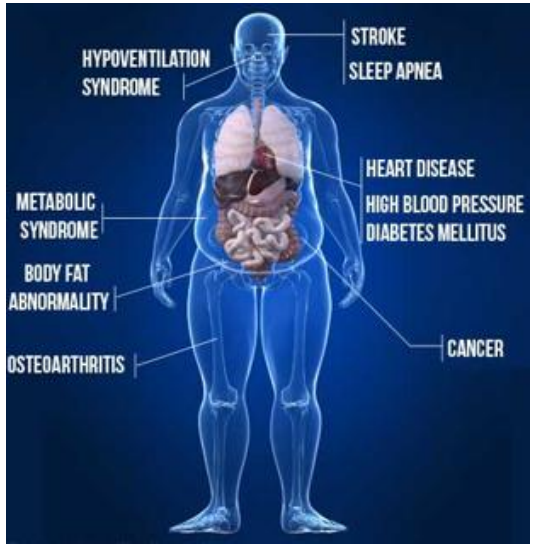
Normal		Obesity	
Male	Female	Male	Female
4-12 mm	6-16 mm	>15 mm	>20 mm

Subscapular skinfold thickness

Subscapular skinfold thickness

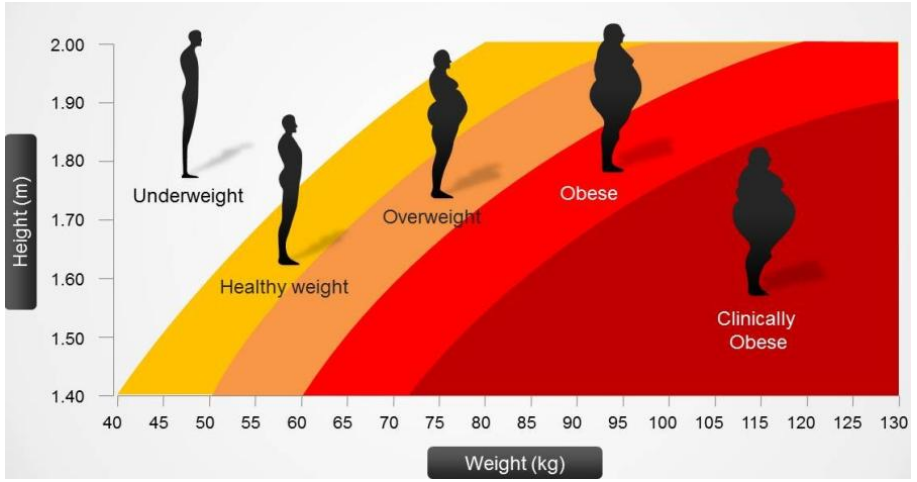
Normal		Obesity	
Male	Female	Male	Female
10-20 mm	12-25 mm	> 30-40 mm	> 30-40 mm

Complications of obesity

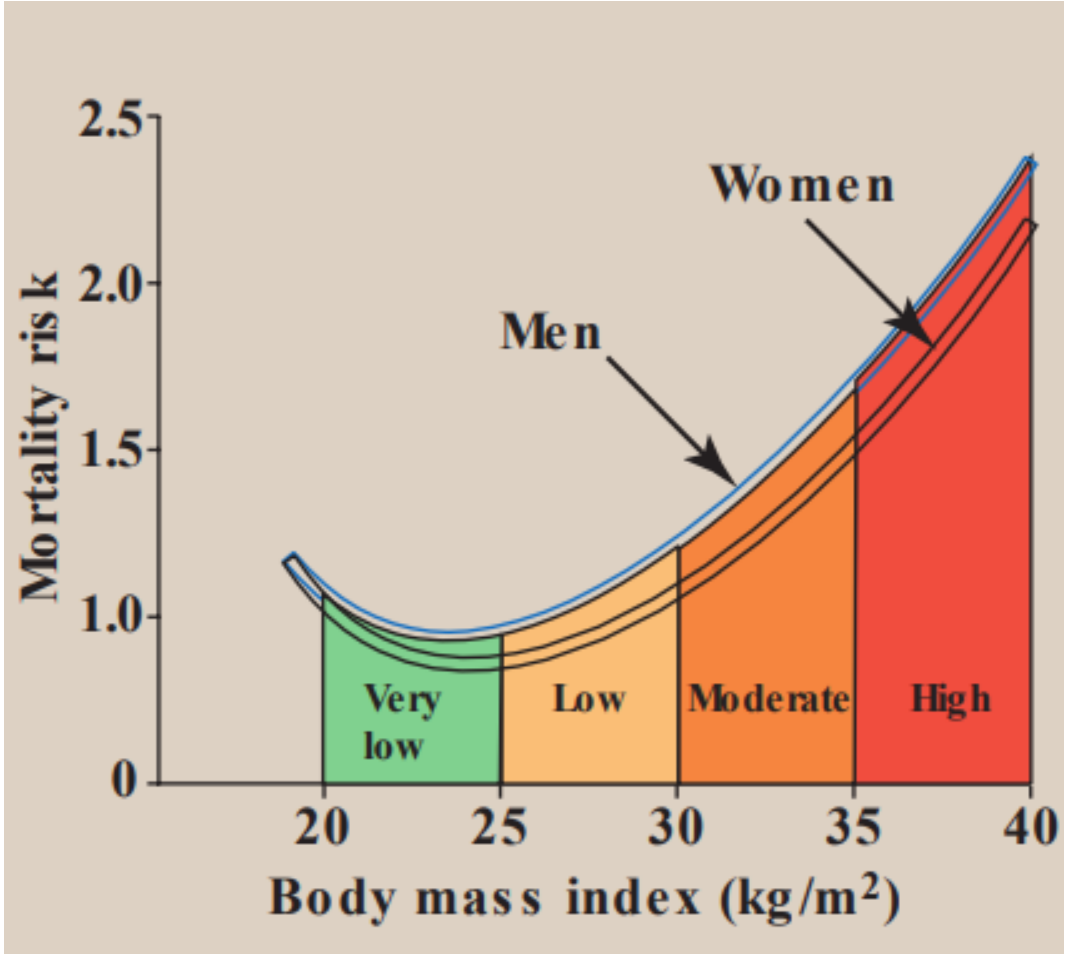


Higher BMI increases risk of:

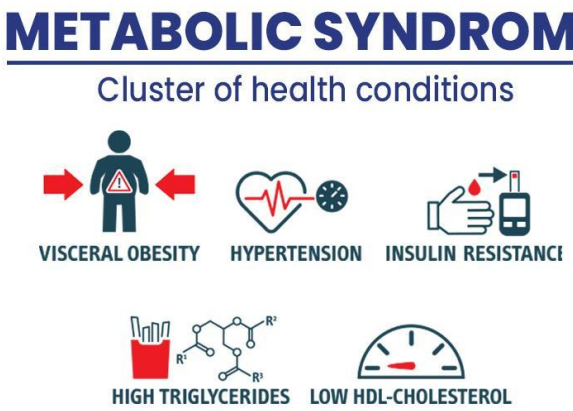
- Insulin resistance
- Type 2 diabetes
- Hypertension
- Stroke
- Dyslipidemia
- Coronary heart disease
- Pulmonary complications
- Gastrointestinal & gallbladder disease
- Gynecological & obstetrical complications
- Certain cancers



Body mass index and the relation of risk of death



Insulin resistance syndrome (IRS) or Metabolic syndrome (MetS) or (Syndrome X)



Type 2 diabetes and its **pre-diabetes** antecedents belong to a **cluster of conditions** thought to be caused by **resistance** to **insulin action**.

Type 2 DM is caused by
decreased sensitivity of **target tissues** to the
metabolic effect of **insulin**
termed as
insulin resistance.

National cholesterol education program, adult treatment panel III (NCEP-ATP III) criteria

Three or more of the followings five:

1. **Waist circumference: > 102 cm (Male)**
   > 88 cm (Female)
2. **Hypertension: SBP ≥ 130 mmHg or**
   DBP ≥ 85 mmHg
3. **Plasma Triglycerides: > 150 mg/dl**
4. **Plasma HDL cholesterol: < 40 mg/dl (Male)**
   < 50 mg/dl (Female)
5. **Fasting blood glucose: ≥ 100 mg/dl**

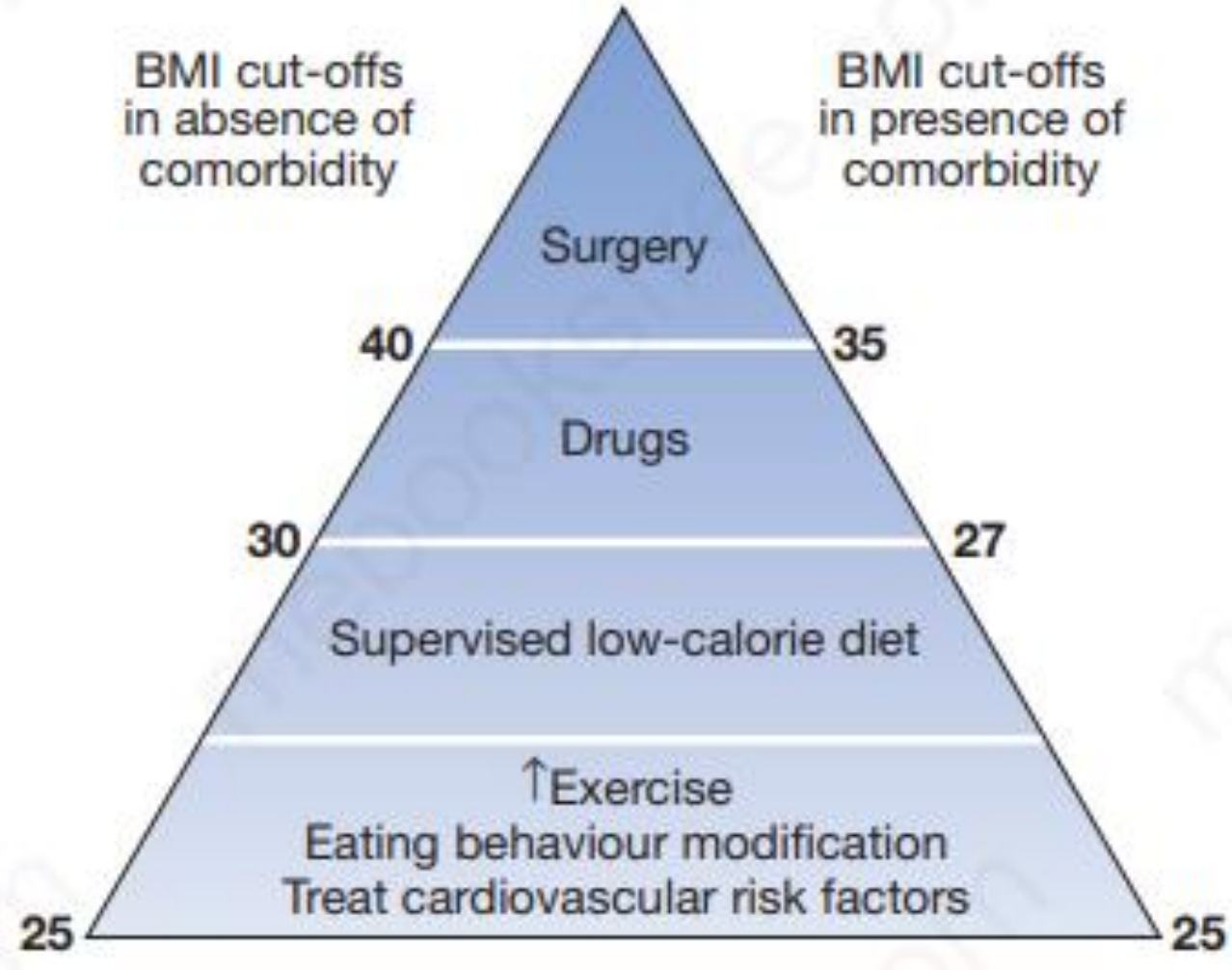
This **cluster** has been termed the
‘**Insulin resistance syndrome**’ or
‘**Metabolic syndrome**’ or
‘**Syndrome X**’ and
is much more **common** in individuals
who are **obese**.

Management of obesity

Management of obesity

1. Non-pharmacological
2. Pharmacological
3. Surgical treatment

Therapeutic options for obesity



1. Non-pharmacological

Life style change through:

i. Regular physical exercise
ii. Weight loss diets (calorie restriction)

Weight loss diets

Very low energy diets (**under 800 kcal/day**)

or

Low energy diets of **800–1000 kcal/day**

Both the **dietary plans** are

similarly effective for

rapid weight loss of **1.5–2.5 kg/week**.

2. Pharmacological

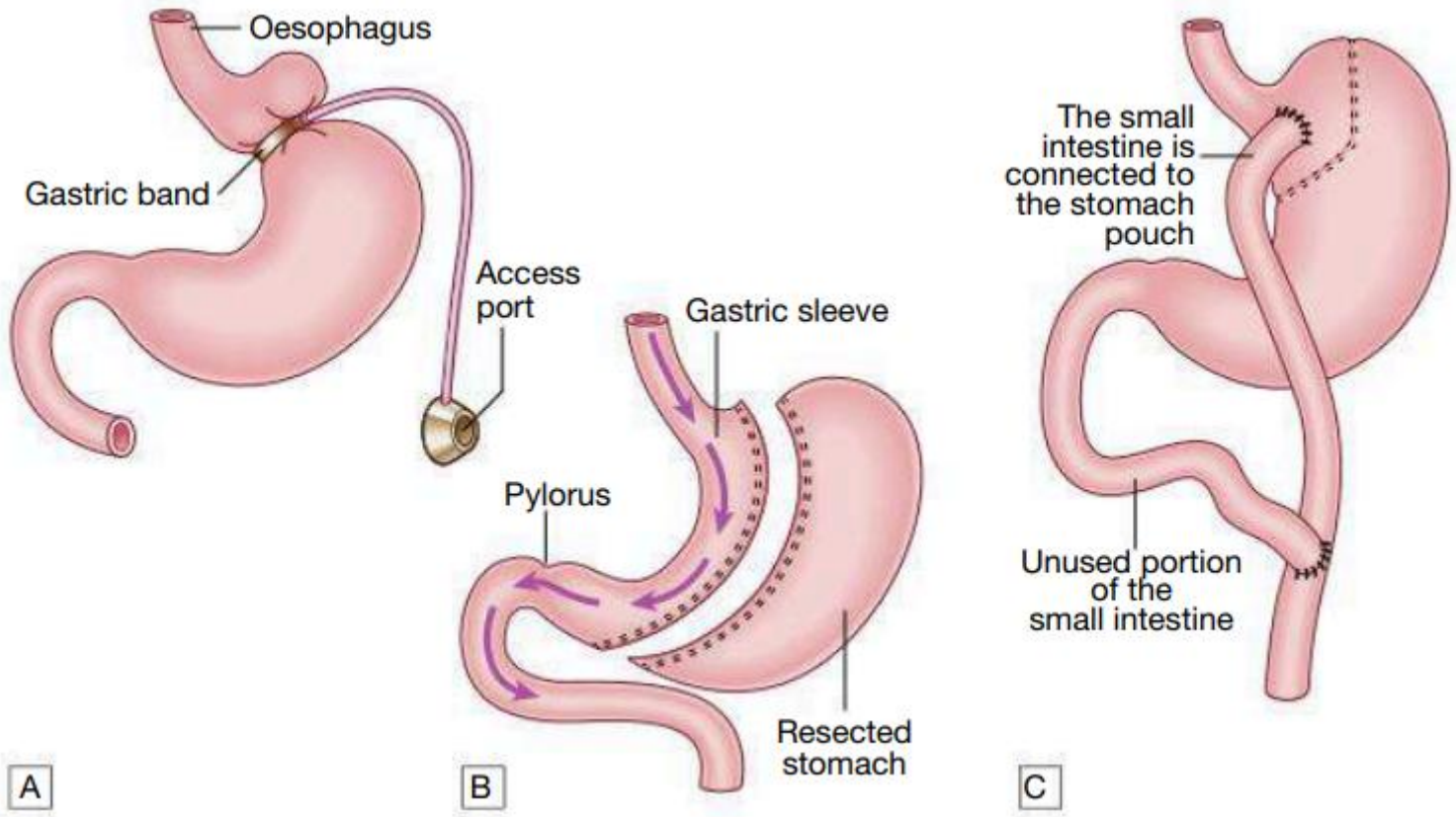
i. **Orlistat- 120 mg 3 times daily** (With 3 main meals)

ii. The combination of low dose **phentermine** and **topiramate**

iii. **Glucagon like peptide - 1 (GLP - 1)** receptor agonists-

Liraglutide: 3 mg /day subcutaneously
Semaglutide: 2.4 mg/day subcutaneously

3. Surgical treatment:
Bariatric surgical procedures



Gastric banding

Sleeve gastrectomy

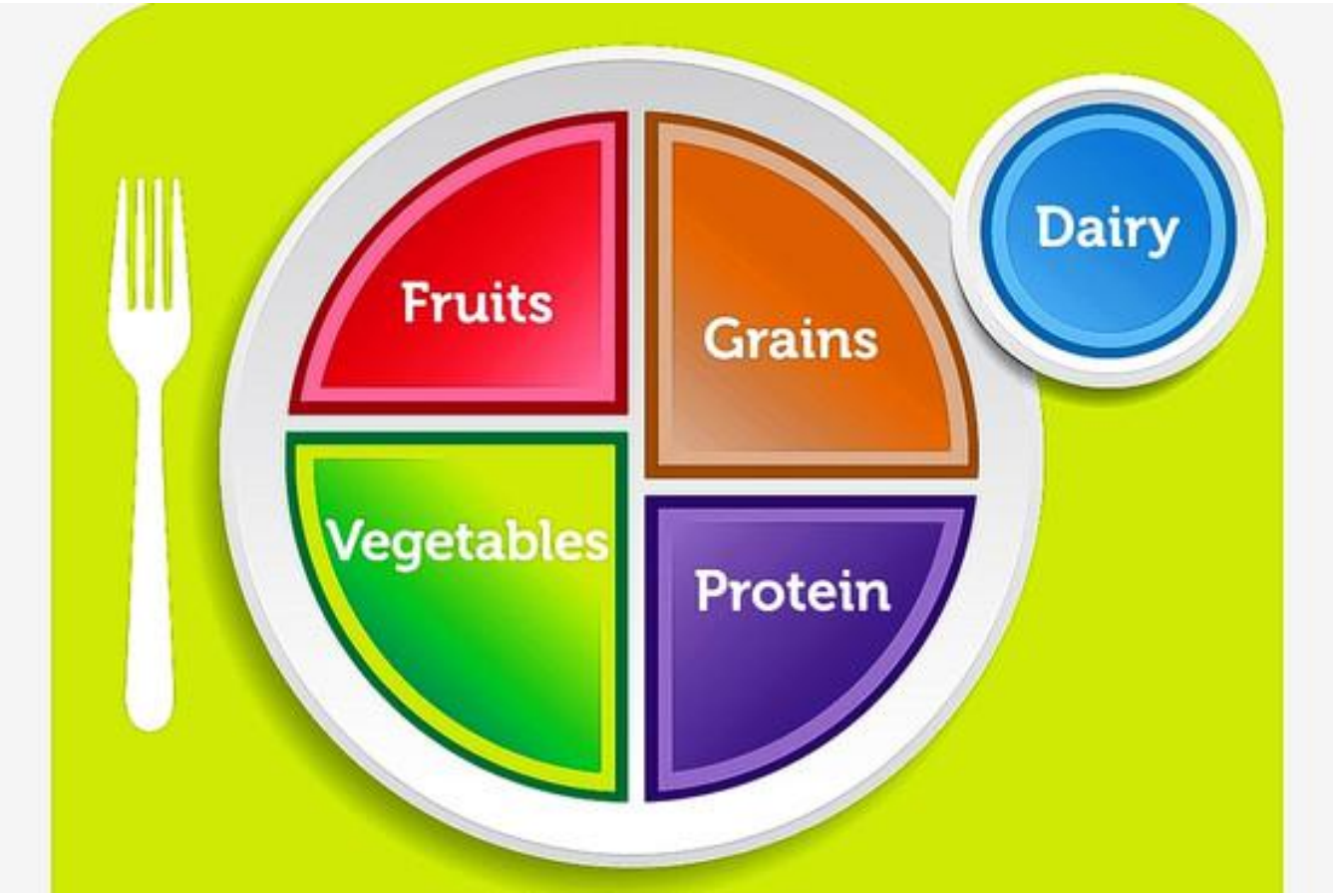
Roux-en-Y gastric bypass

Effectiveness and adverse effects of laparoscopic bariatric surgical procedures

Procedure	Expected 2-year weight loss (kg)	Adverse effects
Gastric banding	19–25	Band slippage, erosion, stricture Port site infection Mortality <0.2% in experienced centres
Sleeve gastrectomy	20–30	Iron deficiency Vitamin B_{12} deficiency Mortality <0.2% in experienced centres
Roux-en-Y gastric bypass	20–40	Internal hernia Stomal ulcer Dumping syndrome Hypoglycaemia Iron deficiency Vitamin B_{12} deficiency Vitamin D deficiency Mortality 0.5%

Transition of morbid obesity to normal

Take home message



Take home message

Take home message

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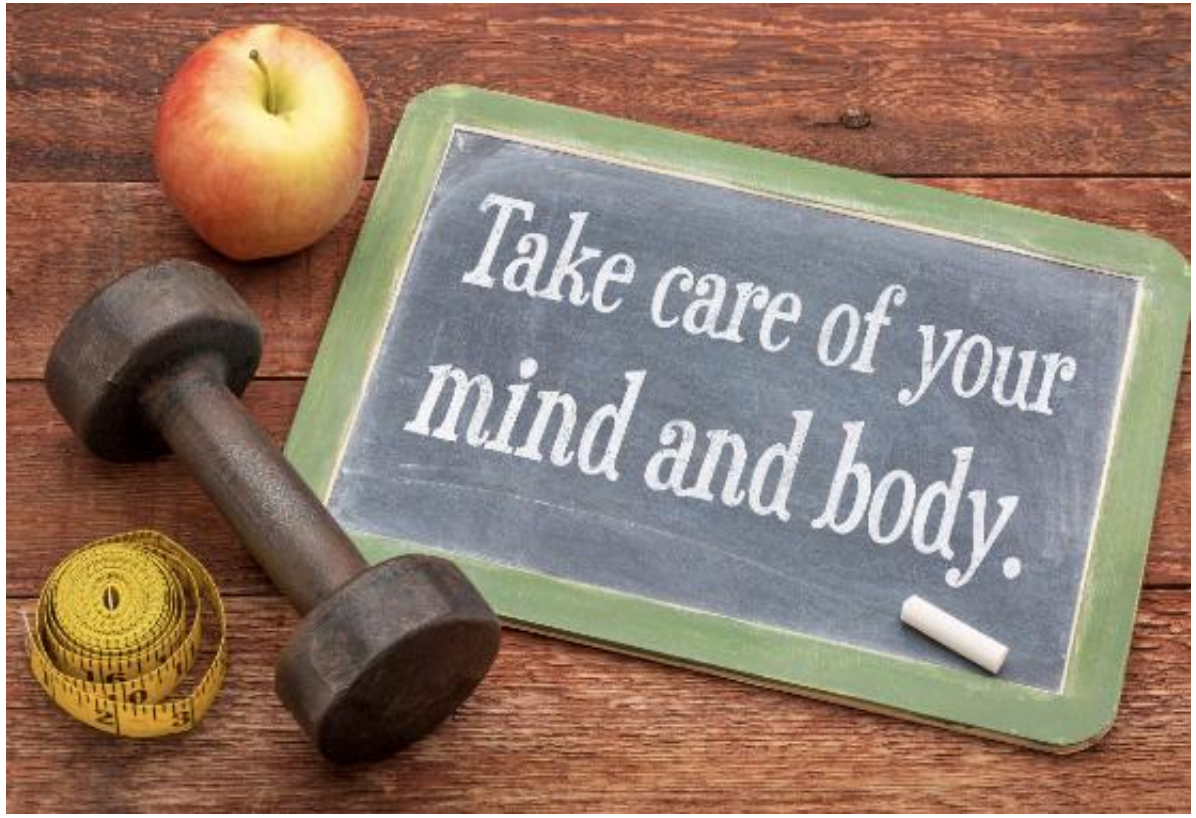
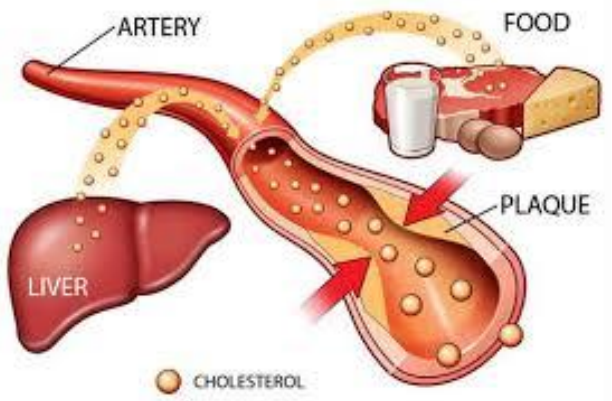



Thank
you!

Complications of obesity

1. Cardio vascular complications:

- Hypertension
- Heart failure
- IHD
- Myocardial infarction
- Stroke
- Dyslipidemia
- Coagulopathy
- Chronic inflammation



2. Pulmonary complications:

- Dyspnea
- Asthma
- Obstructive sleep apnoea
- Exercise intolerance

3. Gastrointestinal:

- Gall stone
- Gastro-esophageal reflux disease
- Non alcoholic fatty liver disease

4. Renal:

- Glomerulosclerosis

5. Endocrine complications:

- Insulin resistance
- Impaired fasting glucose (IFG)
- Type 2 Diabetes Mellitus
- Metabolic syndrome
- Hypothyroidism
- Precocious puberty
- Menstrual irregularities
- Polycystic ovarian syndrome
- Infertility

6. Musculoskeletal complications:

- Osteoarthritis, gout, back pain
- Ankle sprains, flat feet

7. Neurological:

- Pseudotumor cerebri (idiopathic intracranial hypertension)

8. Obstetrical complications:

- Pre-eclampsia, eclampsia, GDM

9. Psychosocial:

- Eating disorder
- Poor self-esteem
- Body image disorder
- Social isolation & stigmatisation
- Depression

10. Malignancy:

- **Endometrial** & **cervical** carcinoma
- **Esophageal** adenocarcinoma
- **Colorectal** cancer
- **Breast** carcinoma
- **Renal** carcinoma
- **Pancreatic** carcinoma
- **Hepatic** carcinoma
- Cancer of **gallbladder, biliary tract**
- Carcinoma of **ovary**
- **Thyroid** cancer