

# OBESITY EPIDEMIC: A GROWING CONCERN- CAUSES, IMPACT AND STRATEGIES FOR MANAGEMENT

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## **Current Guidelines for Obesity**

**International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) & World Gastroenterology Organization (WGO) Guidelines On Obesity, 2022**

**American Association Of Clinical Endocrinologists (AACE) and American College of Endocrinology (ACE) Comprehensive Clinical Practice Guidelines For Medical Care Of Patients With Obesity, 2016**

**Obesus:** The Latin word obesus means "having eaten until fat".



## DEFINITION OF OBESITY

IFSO/WGO: Obesity is a disease characterized by the accumulation of subcutaneous and/or visceral fat to a degree that can lead to **organ dysfunction** and other forms of pathology. It is typically associated with weight that exceeds a level considered within normal limits for a person of given stature.



# OBESITY : DISEASE OR CHOICE?

World Health Organization (**WHO**) and the American Medical Association (**AMA**): **Obesity** is considered a disease, **not just a lifestyle choice**; it is a **complex chronic condition** with multiple contributing factors including genetics and environment, which can lead to serious health complications if left unmanaged



Is Obesity a  
Disease or a Choice?

# Obesity is recognised as a disease and a health issue

 <p>WORLD OBESITY</p> <p>"obesity is a <b>chronic</b>, relapsing, <b>progressive</b> disease process ....need for immediate action for prevention and control of this global epidemic"</p> <p>World Obesity Federation<sup>1</sup></p>	 <p>obesity canada</p> <p>"Obesity is a progressive chronic disease, <b>similar to diabetes or high blood pressure</b>, ..."</p> <p>Obesity Canada<sup>2</sup></p>	 <p>EASO</p> <p>"A progressive disease, impacting severely on individuals and society alike,... obesity is the <b>gateway</b> to many other disease areas..."</p> <p>European Association for the Study of Obesity<sup>4</sup></p>	 <p>AMA</p> <p>"obesity and overweight as a chronic medical condition (de facto disease state) and <b>urgent</b> public health problem..."</p> <p>American Medical Association<sup>5</sup></p>
 <p>Royal College of Physicians</p> <p>"It (obesity) <b>is not a lifestyle choice</b> caused by individual greed but a disease caused by health inequalities, genetic influences and social factors..."</p> <p>Royal College of Physicians UK<sup>3</sup></p>	 <p>Academy of Nutrition and Dietetics</p> <p>"The Treat and Reduce Obesity Act would allow a variety of qualified practitioners, including registered dietitian nutritionists, to more effectively treat this disease, which impacts more than one-third of our nation."</p> <p>Academy of nutrition and dietetics<sup>6</sup></p>	 <p>AOASO</p> <p>"A pathological state (<b>obesity disease</b>) in which a person suffers health problems caused by or related to obesity thus making weight loss clinically desirable ..."</p> <p>Asia Oceania Association for the Study of Obesity<sup>7</sup></p>	

WHAT ARE THE BEST ANTHROPOMORPHIC CRITERIA FOR DEFINING EXCESS ADIPOSITY IN THE DIAGNOSIS OF OVERWEIGHT AND OBESITY IN THE CLINICAL SETTING?

- 1. BMI** should be used to confirm an excessive degree of adiposity and to classify individuals as having **overweight (BMI 25 to 29.9 kg/m<sup>2</sup>)** or **obesity (BMI  $\geq$ 30 kg/m<sup>2</sup>)**, after taking into account age, gender, ethnicity, fluid status, and muscularity.
- 2.** Therefore, clinical evaluation and judgment must be used when BMI is employed as the anthropometric indicator of excess adiposity, particularly in athletes and those with sarcopenia.

**Q. DOES WAIST CIRCUMFERENCE PROVIDE INFORMATION IN ADDITION TO BMI TO INDICATE ADIPOSITY RISK?**

When evaluating patients **for adiposity related disease risk, waist circumference** should be measured in all patients with BMI <35 kg/m<sup>2</sup> (**Grade A; BEL 2**).

In many populations, a waist circumference cutoff point of  $\geq 94$  cm in men and  $\geq 80$  cm in women should be considered at risk and consistent with abdominal obesity; in the United States (U.S.) and Canada, cutoff points that can be used to indicate increased risk are  $\geq 102$  cm for men and  $\geq 88$  cm for women. (**Grade A; BEL 2**).



## Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks

Diagnosis	BMI (kg/m <sup>2</sup> )		Comorbidity Risk	Risk of T2D, HTN, CVD	
	Non-Asian	Asian		WC <102 cm (men), <88 cm (women)*	WC ≥102 cm (men), ≥88 cm (women)*
Underweight	<18.5	<17.5	Low but other problems		
Normal weight	18.5–24.9	15.5–22.9	Average		
Overweight	25–29.9	23.0–27.9	Increased	Increased	High
Obese class I	30–34.9	>28	Moderate	High	Very high
Obese class II	35–39.9		Severe	Very high	Very high
Obese class III	≥40		Very severe	Extremely high	Extremely high

Abbreviations: BMI = body mass index; CVD = cardiovascular disease; HTN = hypertension; T2D = type 2 diabetes; WC = waist circumference.

\*88 cm = 35 in; 102 cm = 40 in.

Definition of **Central adiposity** in **Asian** adults using WC was as follows:

- Men: 94 cm or more
- Women: 80 cm or more



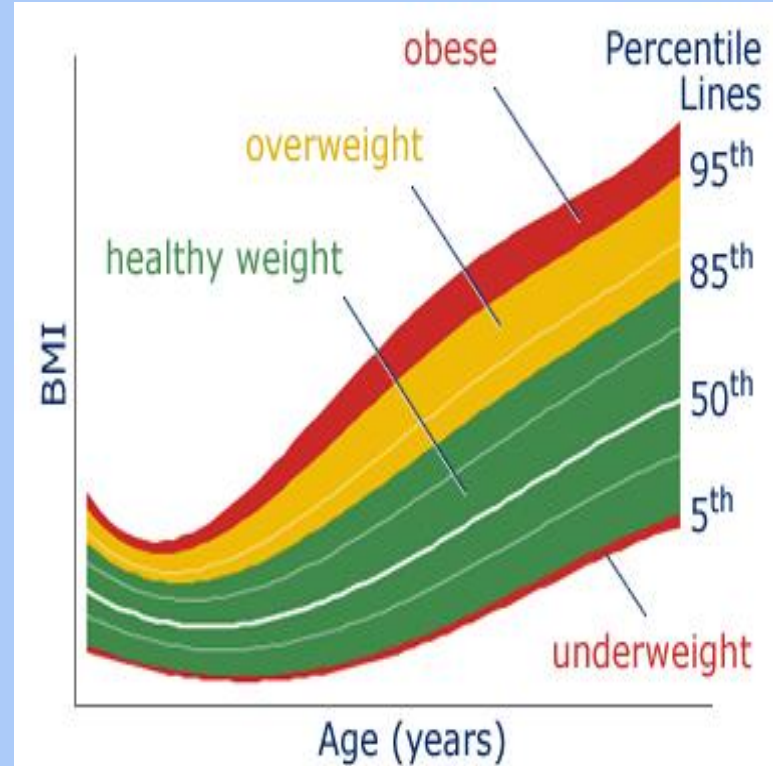
## Waist Girth and Health Risk

	Men	Women
Normal	78-94cm	64-80cm
Overweight (Elevated Risk)	94-102cm	80-88cm
Obese (High Risk)	>102cm	>88cm

# CHILDHOOD OBESITY

The World Health Organization defines nutritional status for children and adolescents based on growth curves for age and sex as follows:

- BMI +1 standard deviation for age and sex = “Overweight”
- BMI +2 standard deviations for age and sex = “Obese”



# CLASSIFICATION OF OBESITY PHENOTYPES

**Table 2-1: The five phenotypes of obesity**

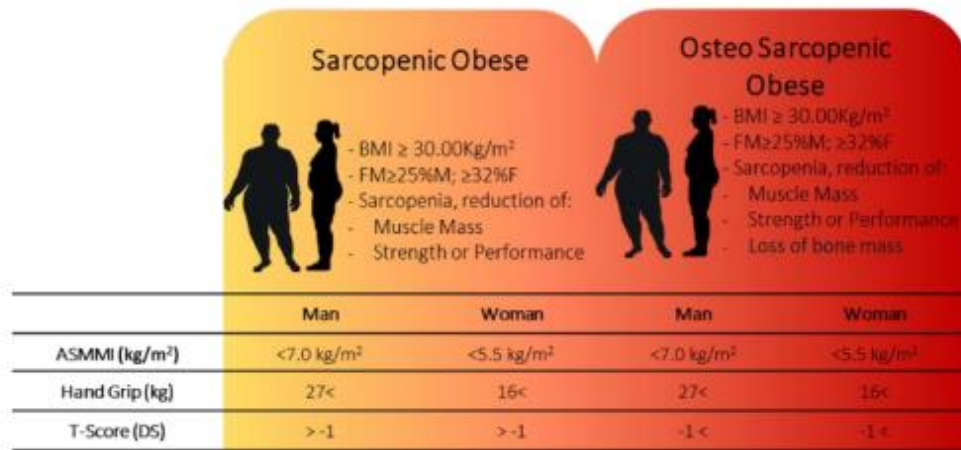
Obesity Phenotypes	BMI		FM%		MS	
	-	+	-	+	-	+
1. Normal Weight Lean	✓		✓		✓	
2. Normal Weight Obese Syndrome	✓			✓	✓	
3. Metabolically Obese Normal Weight	✓			✓		✓
4. Metabolically Healthy Obese		✓		✓	✓	
5. Metabolically Unhealthy Obese		✓		✓		✓

BMI = body mass index; FM% = fat mass percentage; MS = metabolic syndrome

**Figure 2-1: Classification of obesity phenotypes, including sarcopenic and osteo-sarcopenic obesity**



## Classification of Obesity Phenotypes

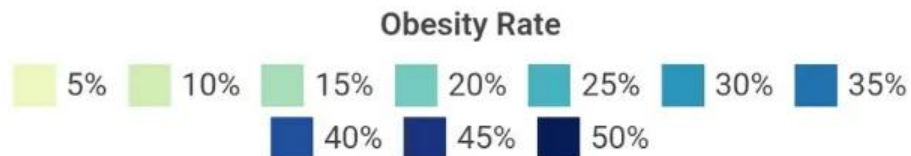
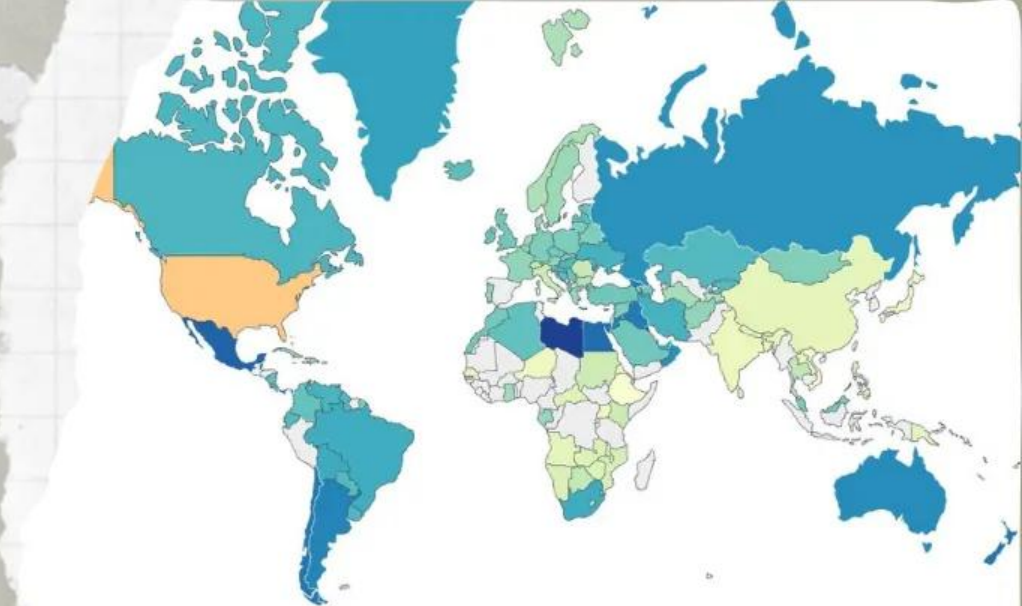


# PREVALENCE OF OBESITY

- Obesity has been termed a **21st century global epidemic**.
- In 2022, **1 in 8 people** in **the world** were living with **obesity**.
- Worldwide **adult obesity** has more than **doubled** since 1990, and **adolescent obesity** has **quadrupled**.
- In 2022, **43% of adults** aged 18 years and over were **overweight** and **16%** were living with **obesity**.
- Worldwide, **2.2 billion people** are living with **overweight or obesity**.

# 1 BILLION +

THAT IS THE  
ESTIMATED  
NUMBER OF  
OBESE PEOPLE IN  
THE WORLD



## United States

Obesity Rate	Female Obesity Rate	Male Obesity Rate
42.7	41.8	42.2

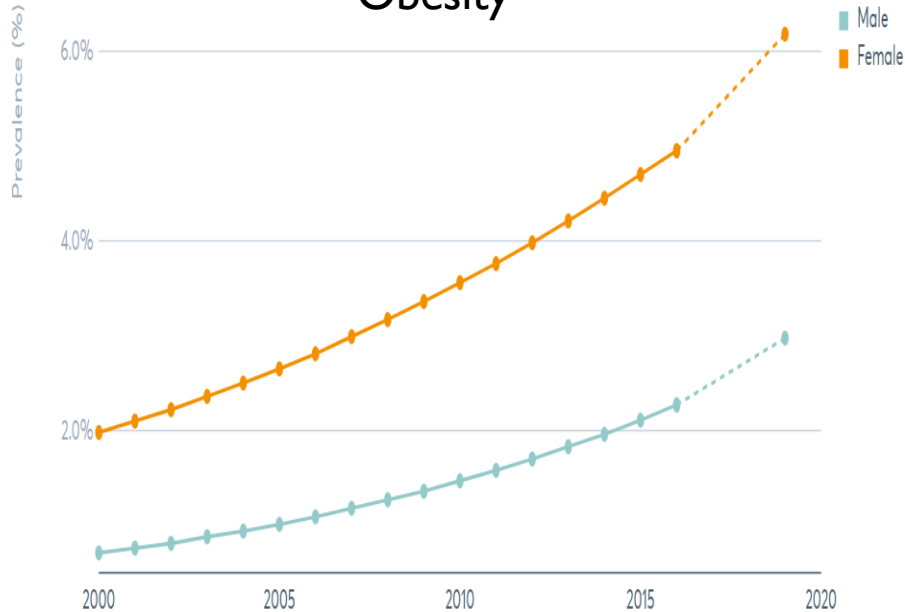
# OBESITY TRENDS IN BANGLADESH

- Bangladesh Demographic and Health Survey (BDHS) 2022 survey, the overall prevalence of **obesity in Bangladesh is around 10.9%**, with a **combined rate of overweight and obesity at approximately 24.3%**.
- The **highest prevalence of overweight and obesity** is seen in the age group between **30-39 years** old.
- **Higher education and wealth status** are associated with a higher prevalence of obesity
- **Urban areas** tend to have a **higher rate** of obesity compared to rural areas.

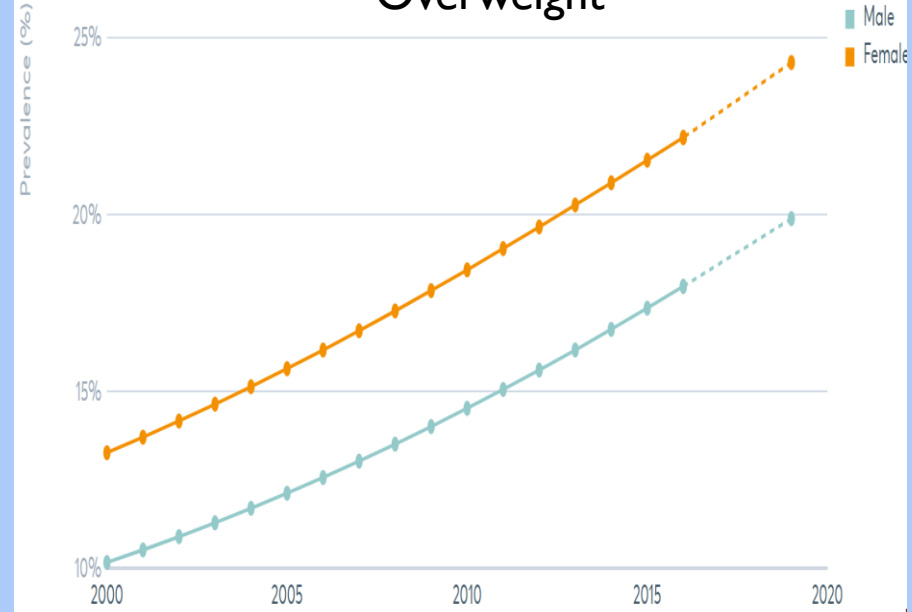


# OBESITY TREND IN BANGLADESH

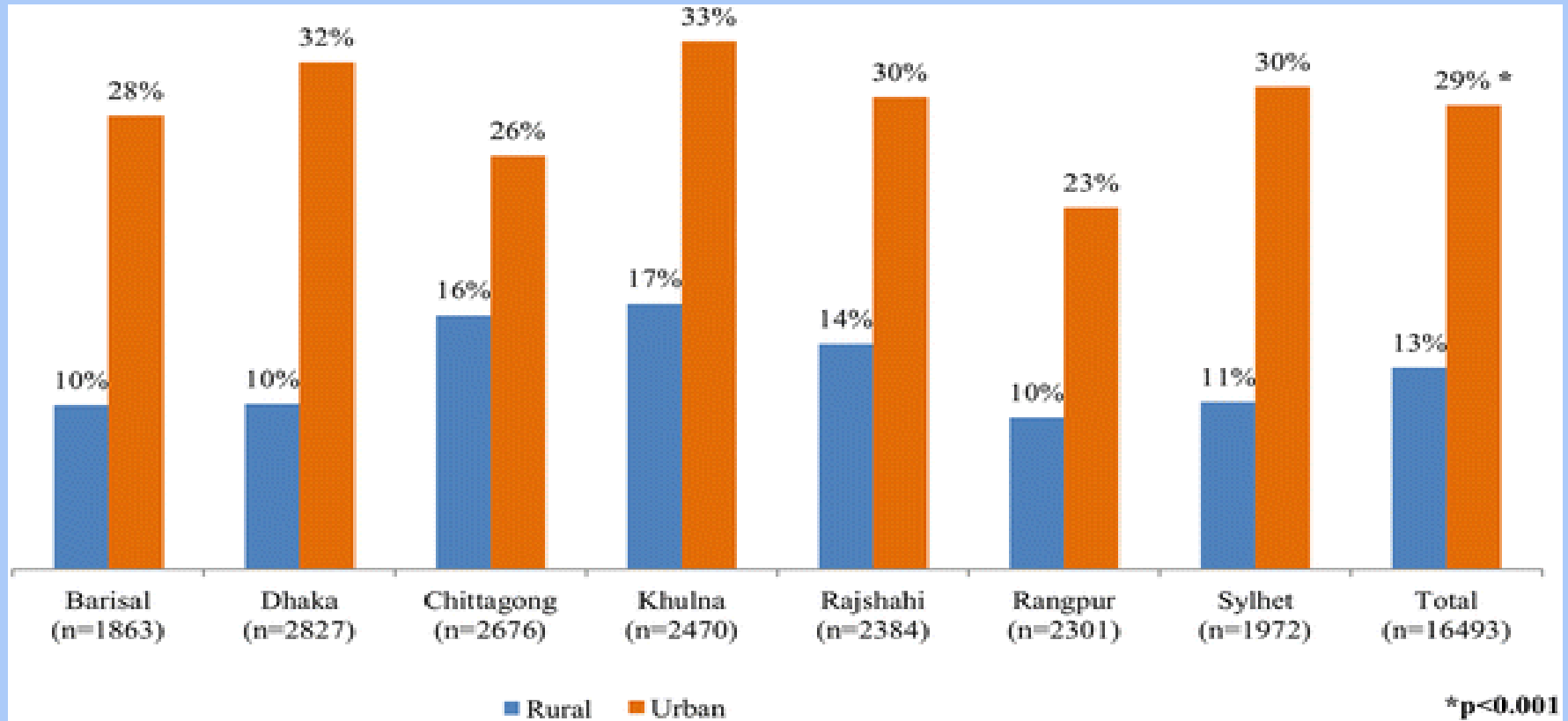
## Obesity



## Overweight



<https://globalnutritionreport.org/resources/nutrition-profiles/asia/southern-asia/bangladesh/>



Prevalence of overweight or obesity among **rural and urban women** of different geographical divisions in Bangladesh

## CHILDHOOD OBESITY

- **Globally**, there were **38.9 million children** who were **overweight** in **2020**, an increase of nearly 6 million since 2000.
- In **2020**, an **estimated 2.1% or 0.30 million children** in the country were overweight in **Bangladesh** while it was **0.7% or 0.11 million** in **2000**.



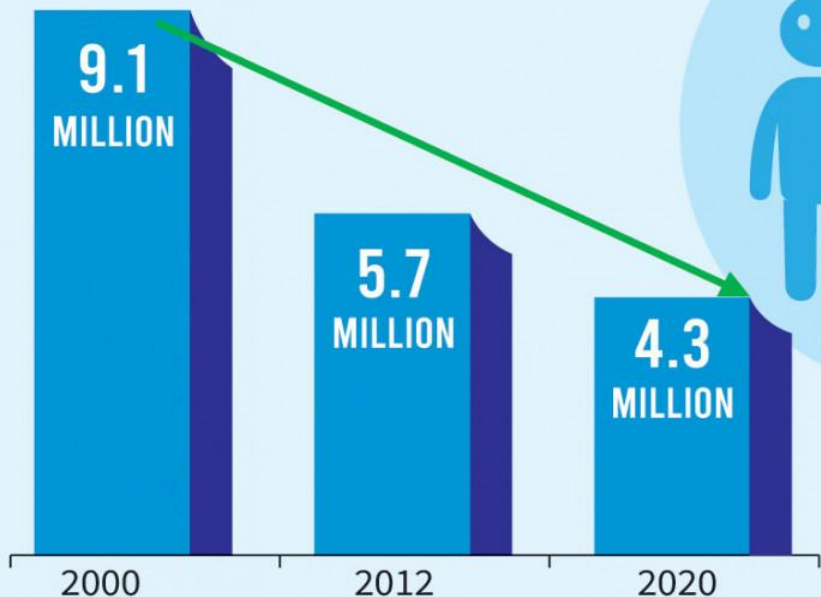
(<https://www.tbsnews.net/bangladesh/health/overweight-emerging-concern-fewer-children-stunted-bangladesh-242107>)

# BANGLADESH: LEVELS AND TRENDS IN CHILD MALNUTRITION



## CHILDREN AFFECTED BY STUNTING

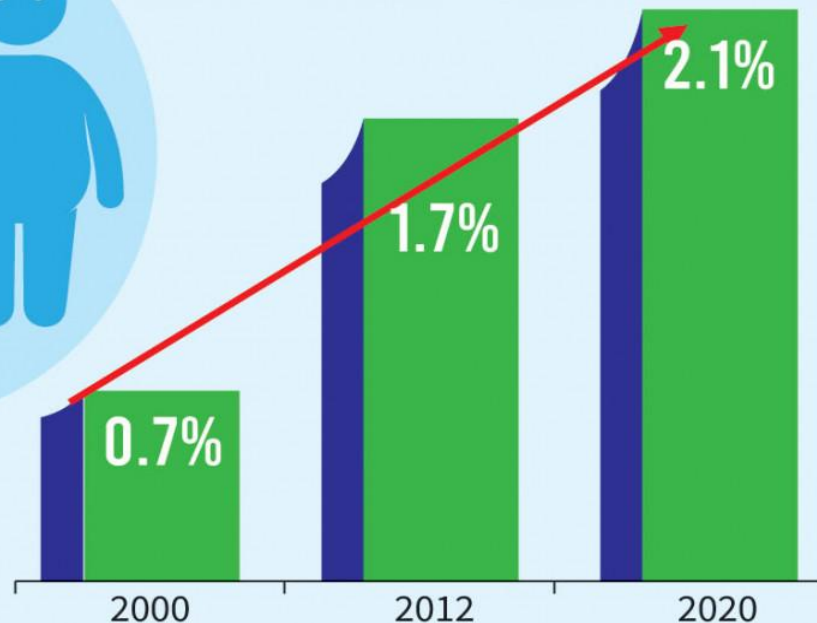
A child who is too short for their age



SDG target: Reducing the number of stunted children by 50% from 2012

## CHILDREN AFFECTED BY OVERWEIGHT

A child who is too heavy for their height



SDG target: Reducing and maintaining child obesity below 3%

## PRIMARY OBESITY VS SECONDARY OBESITY

### **Primary Obesity:**

There is no underlying disease or genetic Mutation. There is an imbalance between energy intake and expenditure.

### **Secondary Obesity:**

There is an **underlying disease** or **genetic disorder** causing weight gain.

# PRIMARY OBESITY

## Causes:

- Excessive intake of calories and unhealthy foods
- Lack of physical activity
- Dysfunction or imbalance of the gut microbiome
- Congenital alterations
- Genetic susceptibility
- Epigenetic alterations

# Causes of Obesity



Overeating



Medication



Sweetened Drinks



Inactive



Gut Hormones



Lack of Sleep



Smoking



Genetics

# SECONDARY OBESITY

## Endocrine Disorders

- Cushing Syndrome
- Hypothyroidism
- Type 2 diabetes
- PCOS
- Hypogonadism

## Drug induced

- Psychotropics: Atypical anti-psychotics, Tricyclic antidepressants, SSRI's
- Corticosteroids
- Anti Epileptics
- Anti-diabetic: Insulin, sulfonylurea

## Central Nervous System Disorders

- Hypothalamic Tumor (craniopharyngioma)
- Trauma to or inflammation of the hypothalamic region

## Binge eating disorder

## Bulimia nervosa

## Genetic Syndromes

- Prader-Willi syndrome
- Bardet-Biedel syndrome
- Cohen syndrome
- Laurence-Moon syndrome

# DIAGNOSTIC TESTS

## **General Investigations for all obese patient:**

- Fasting Blood Sugar
- Fasting insulin level
- Fasting lipids profile
- Liver enzymes
- Thyroid screening (TSH and FT4)

## **To diagnose/exclude Cushing Syndrome:**

- 24h-urinary free cortisol
- Late night salivary cortisol
- Dexamethasone suppression tests



# DIAGNOSTIC TESTS

## **To diagnose/exclude PCOS:**

- Transvaginal USG
- Serum testosterone, FSH, LH

## **To diagnose/exclude Hypogonadism:**

- Early morning serum testosterone,
- Serum Prolactin, FSH, and LH levels.

## **To diagnose/exclude Pseudohypoparathyroidism:**

- Serum total calcium and ionized calcium
- Serum phosphate levels
- Serum PTH

# DIAGNOSTIC TESTS

## **To Diagnose or exclude Hypothalamic Disorders:**

- MRI of Brain

## **Genetic test:**

- Prader-Willi syndrome (PWS) - DNA methylation analysis.
- Bardet-Biedl syndrome genetic panel test-Next Generation Sequencing (NGS)

# IMPACT OF OBESITY

## Health

- Type 2 DM
- NAFLD
- HTN
- Cancer
- Osteoarthritis
- OSA

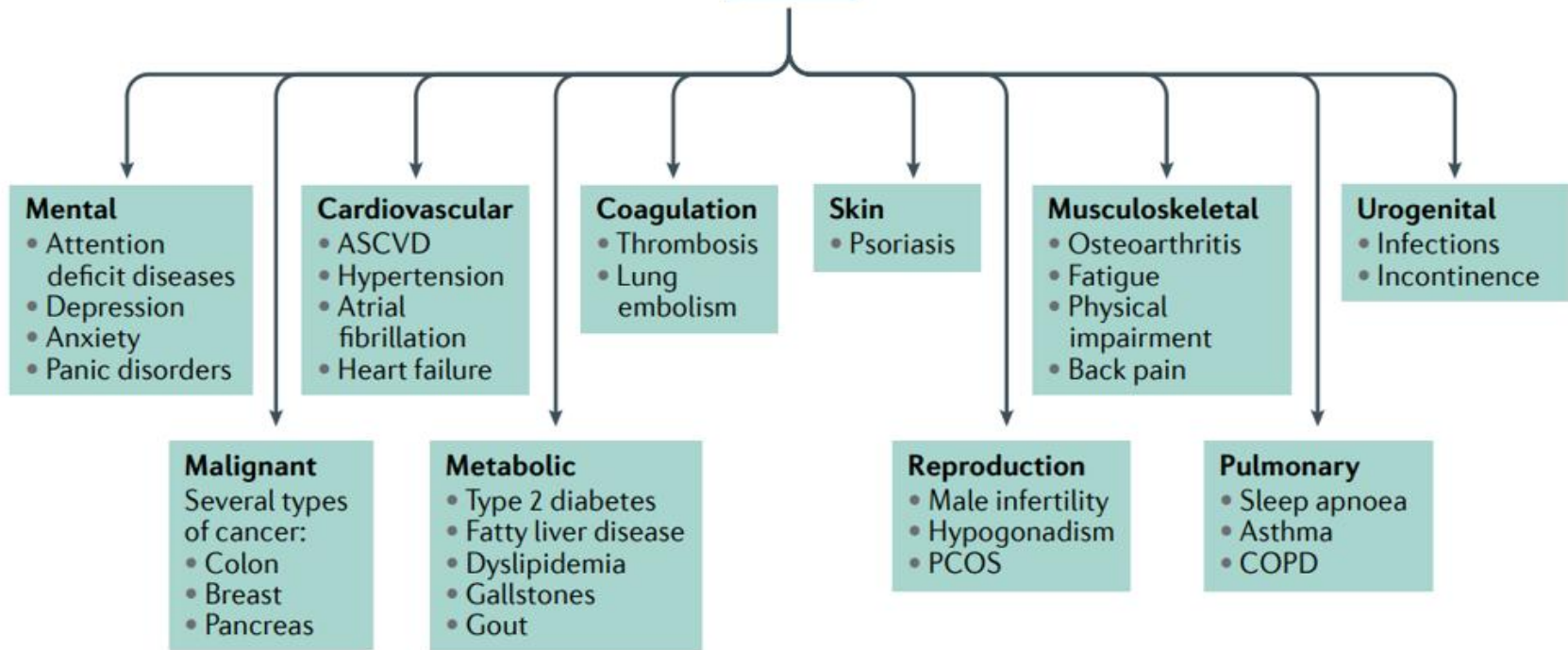
## Psychology

- Depression
- Anxiety
- Personality disorder
- Dysfunctional eating behavior
- Low self esteem

## Economy

- Direct and indirect cost on individual
- Reduced economic growth of the society
- Global Economic burden

## Obesity



Obesity is a significant risk factor for several NCDs

# CLINICAL COMPONENT OF OBESITY AND OVERWEIGHT

- Metabolic syndrome
- Prediabetes
- Type 2 diabetes
- Dyslipidemia
- Hypertension
- Cardiovascular disease
- Nonalcoholic fatty liver disease
- Polycystic ovary syndrome

- Obstructive sleep apnea
- Asthma/reactive airway disease
- Osteoarthritis
- Urinary stress incontinence
- Gastroesophageal reflux disease
- Mental depression
- Infertility (women)
- Hypogonadism (men)

# MANAGEMENT OF OBESITY

## Life-style therapy:

- a. Reduced Calorie Intake
- b. Physical activities
- c. Behavioral interventions

## Metabolic and Bariatric Surgery

## Anti-Obesity Medications:

### FDA-Approved:

- Orlistat
- Semaglutide
- Liraglutide
- Tirzepatide
- Phentermine combined with topiramate
- Naltrexone combined with bupropion

### Not FDA-approved:

- Phentermine HCL

**TABLE 2.** Diagnosis and Medical Management of Adult Patients With Obesity: AACE/ACE Framework<sup>3</sup>

Diagnosis		Staging and treatment	
BMI, <sup>a</sup> kg/m <sup>2</sup>	Clinical component <sup>b</sup>	Disease stage	Suggested therapy (based on clinical judgment)
Anthropometric component			
< 25 < 23 in patients of certain ethnicities; waist circumference below regional/ethnic cutoffs		Normal weight (no obesity)	<ul style="list-style-type: none"> <li>• <b>Healthy lifestyle:</b> Healthy meal plan/physical activity</li> </ul>
25–29.9 23–24.9 in patients of certain ethnicities	Evaluate for presence or absence of adiposity-related complications and severity of complications	Overweight stage 0 (no complications)	<ul style="list-style-type: none"> <li>• <b>Lifestyle therapy:</b> Reduced-calorie healthy meal plan/physical activity/behavioral interventions</li> </ul>
≥ 30 ≥ 25 in patients of certain ethnicities	<ul style="list-style-type: none"> <li>• Metabolic syndrome</li> <li>• Prediabetes</li> <li>• Type 2 diabetes</li> <li>• Dyslipidemia</li> <li>• Hypertension</li> <li>• Cardiovascular disease</li> </ul>	Obesity stage 0 (no complications)	<ul style="list-style-type: none"> <li>• <b>Lifestyle therapy:</b> Reduced-calorie healthy meal plan/physical activity/behavioral interventions</li> <li>• <b>Anti-obesity medications<sup>c</sup>:</b> Consider if lifestyle therapy fails to prevent progressive weight gain (BMI ≥ 27)</li> </ul>
≥ 25 ≥ 23 in patients of certain ethnicities	<ul style="list-style-type: none"> <li>• Nonalcoholic fatty liver disease</li> <li>• Polycystic ovary syndrome</li> <li>• Infertility (women)</li> <li>• Hypogonadism (men)</li> </ul>	Obesity stage 1 <sup>d</sup> (1 or more mild to moderate complications)	<ul style="list-style-type: none"> <li>• <b>Lifestyle therapy:</b> Reduced-calorie healthy meal plan/physical activity/behavioral interventions</li> <li>• <b>Anti-obesity medications<sup>c</sup>:</b> Consider if lifestyle therapy fails to achieve therapeutic target or initiate concurrently with lifestyle therapy (BMI ≥ 27)</li> </ul>
≥ 25 ≥ 23 in patients of certain ethnicities	<ul style="list-style-type: none"> <li>• Obstructive sleep apnea</li> <li>• Asthma/reactive airway disease</li> <li>• Osteoarthritis</li> <li>• Urinary stress incontinence</li> <li>• Gastroesophageal reflux disease</li> <li>• Mental depression</li> </ul>	Obesity stage 2 <sup>d</sup> (at least 1 severe complication)	<ul style="list-style-type: none"> <li>• <b>Lifestyle therapy:</b> Reduced-calorie healthy meal plan/physical activity/behavioral interventions</li> <li>• <b>Add anti-obesity medication<sup>c</sup>:</b> Initiate concurrently with lifestyle therapy (BMI ≥ 27) Consider bariatric surgery: (BMI ≥ 35)</li> </ul>

# LIFESTYLE THERAPY

A structured and comprehensive lifestyle intervention program designed for weight loss that includes

- Healthy meal plan
- Physical activity
- Behavioral intervention



# DIETARY STRATEGIES (IFSO,WGO)

Dietary strategies can be classified into **five categories**

1. Diets designed to manipulate macronutrient content (e.g., low-fat, high-protein, and low-carbohydrate diets).
2. Diets that primarily restrict specific foods or food groups (e.g., gluten-free, Paleo, vegetarian/vegan)

3. Dietary approaches that incorporate cultural aspects and proximity foods from a specific geographical area (e.g Mediterranean diet).
4. Very-low calorie diets (VLCD)
5. Diets that manipulate when people can eat (e.g., fasting).

# MEDITERRANEAN DIET



# MEDITERRANEAN DIET

The term 'Med Diet' reflects the traditional dietary pattern that existed in olive-tree growing areas of Crete, Greece, and Southern Italy in the late 1950s.

The main features of the Med Diet are :

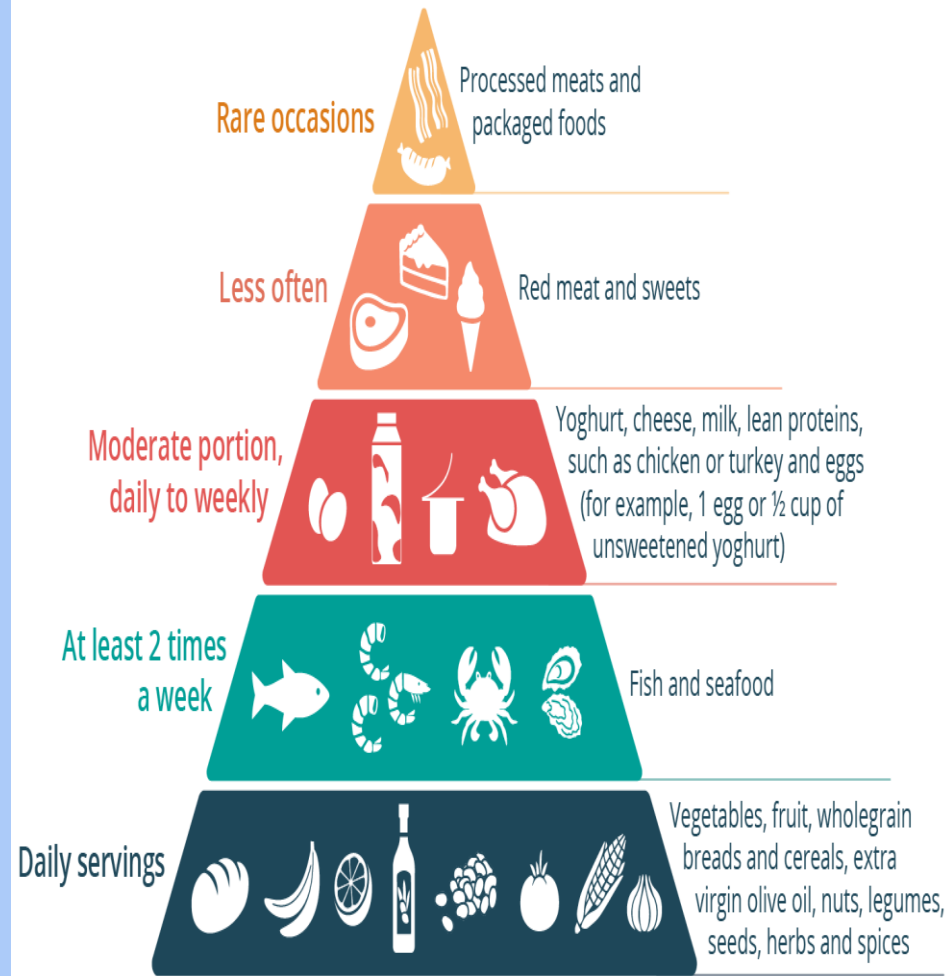
- a. high fat intake, mostly as extra-virgin olive oil, used generously to cook and dress vegetable dishes
- b. high consumption of low-glycemic-index, carbohydrate-rich foods, like whole grain cereals, legumes, nuts, fruits, and vegetables

# MEDITERRANEAN DIET

c. moderate to high fish consumption

d. moderate to little poultry and dairy product consumption

e. low consumption of red meat and meat products



# PHYSICAL ACTIVITY

**Table 5-3: General guidelines for prescribing exercise for obese individuals**

General Guidelines	<p>It is important that the development of the exercise program is supervised by an exercise physiologist.</p> <p>The program should emphasize isometric exercises, which cause less muscle injury than isotonic exercises.</p> <p>Resistance training is crucial to preserving and recovering lean mass.</p> <p>Each individual must establish an exercise routine.</p> <p>Electronic devices (pedometer, phone apps) and environments with attractive distractions (e.g., music, television, scenery) can improve adherence.</p> <p>Individuals can change their exercise activities frequently, as long as they have some other exercise activity or activities already in place.</p>
Types of exercise	<p>Each patient's personal tastes must be considered (walking is usually well accepted)</p> <p>Exercises done in water (e.g., water aerobics, swimming) generally place less stress, especially on lower extremity joints and the back.</p> <p>Exercises are best that are easy to do and convenient to perform.</p> <p>Movements that involve large muscle groups should be emphasized.</p> <p>Cycle ergometers can be very useful.</p>

Frequency/duration	<p>Exercise should be performed throughout the day. For example: 10 minutes of walking three times daily (e.g., morning, afternoon, evening). Patients with severe obesity should start with 3–5-minute walks several times per day.</p> <p>In addition to regular exercise, an overall active lifestyle should be encouraged (e.g., taking stairs instead of elevators; walking instead of driving, when possible).</p>
Assessments should include:	<p>Anthropometric measurements (e.g., height, weight, body mass index)</p> <p>Demographic details</p> <p>A daily routine and time spent in sedentary behaviours</p> <p>Personal goals</p> <p>Previous exercise program(s)</p> <p>Any cardiometabolic or musculoskeletal disorders</p>

## BEHAVIORAL TREATMENT

The AACE/ACE guidelines recommend that behavioral interventions be escalated for patients who do not achieve 2.5% weight loss within 1 month of starting treatment.

Interventions include:

- a. Individual activities (goal setting, self-monitoring of food intake and physical activity)
- b. 1:1 sessions with clinicians ( cognitive behavioral therapy, dietary education)



c. group meetings(gatherings with peers, use of social support structures)

d. An in-person, high-intensity program ( $\geq 14$  sessions in 6 months) is recommended as the most effective behavioral treatment for overweight or obesity.

# **PHARMACOLOGICAL THERAPY**

**TABLE 3.** FDA-Approved Medications for the Long-Term Treatment of Obesity, and Phentermine Hydrochloride<sup>3,5-8,23-29,a,b,c</sup>

Medication	Drug class	Indication <sup>d</sup>	Dosing	Common adverse events
Semaglutide injection (Wegovy <sup>®</sup> ; Novo Nordisk) <sup>8</sup>	GLP-1 receptor agonist	As an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management in adults with an initial BMI $\geq 30$ kg/m <sup>2</sup> or $\geq 27$ kg/m <sup>2</sup> in the presence of $\geq 1$ weight-related comorbid condition (eg, hypertension, T2D, dyslipidemia)	0.25 mg SC once weekly for 4 wk to start, followed by dosage escalations as per package labeling to a maintenance dose of 2.4 mg SC once weekly  Give on the same day each week, at any time of day, with or without meals.	Nausea, diarrhea, vomiting, constipation, abdominal pain, headache, fatigue, dyspepsia, dizziness, abdominal distension, eructation, hypoglycemia in T2D, flatulence, gastroenteritis, GERD <sup>e</sup>
Liraglutide injection (Saxenda <sup>®</sup> ; Novo Nordisk) <sup>7</sup>	GLP-1 receptor agonist	As an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management in adults with an initial BMI $\geq 30$ kg/m <sup>2</sup> or $\geq 27$ kg/m <sup>2</sup> in the presence of $\geq 1$ weight-related comorbid condition (eg, hypertension, T2D, dyslipidemia)	0.6 mg SC for 1 wk to start, followed by dose escalations as per package labeling to a recommended dose of 3 mg SC once daily	Nausea, diarrhea, constipation, vomiting, injection site reaction, headache, hypoglycemia in T2D, dyspepsia, fatigue, dizziness, abdominal pain, increased lipase, upper abdominal pain <sup>f</sup>

## FDA-approved medications for long term treatment of obesity

Phentermine HCl and topiramate extended-release capsules (Qsymia; VIVUS) <sup>5</sup>	Combination sympathomimetic amine anorectic/ anti-epileptic analogue	As an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management in adults with an initial BMI $\geq 30$ kg/m <sup>2</sup> or $\geq 27$ kg/m <sup>2</sup> in the presence of $\geq 1$ weight-related comorbidity (eg, hypertension, T2D, dyslipidemia)	One 3.75-mg phentermine HCl/2-mg topiramate extended-release cap PO once daily in the morning for 14 d to start  Continue on a dose-escalation schedule based on BMI; give with or without food.	Paresthesia, dizziness, dysgeusia, insomnia, constipation, and dry mouth <sup>9</sup>
Naltrexone HCl and bupropion HCl extended-release tablets (Contrave; Currax Pharmaceuticals) <sup>6</sup>	Combination opioid antagonist/ aminoketone antidepressant	As an adjunct to a reduced-calorie diet and increased physical activity for chronic weight management in adults with an initial BMI $\geq 30$ kg/m <sup>2</sup> or $\geq 27$ kg/m <sup>2</sup> in the presence of $\geq 1$ weight-related comorbidity (eg, hypertension, T2D, dyslipidemia)	One 8-mg naltrexone HCl /90-mg bupropion HCl extended-release tab PO once daily in the morning for 1 wk to start  Continue on a dose-escalation schedule, up to 2 extended-release tabs PO twice daily.	Nausea, constipation, headache, vomiting, dizziness, insomnia, dry mouth, diarrhea <sup>h</sup>

Orlistat (Xenical;  
H2-Pharma)<sup>24</sup>

Lipase inhibitor

Obesity management,  
including weight loss  
and weight maintenance  
when used with a  
reduced-calorie diet

Reduction of risk for weight  
regain after prior weight loss

For use in patients  
with an initial BMI  
 $\geq 30 \text{ kg/m}^2$  or  $\geq 27 \text{ kg/m}^2$   
in the presence of other risk  
factors (eg, hypertension,  
T2D, dyslipidemia)

One 120-mg cap PO 3  
times/d with each main  
meal containing fat  
(during or up to 1 h after  
the meal)

GI symptoms<sup>i</sup>:

- Oily spotting
- Flatus with discharge
- Fecal urgency
- Fatty/oily stool
- Oily evacuation
- Increased defecation
- Fecal incontinence

### Not FDA-Approved for Long-Term Treatment<sup>b</sup>

Phentermine  
HCl (eg,  
Adipex-P; Teva  
Pharmaceuticals  
[37.5-mg caps  
or tabs], and  
Lomaira; KVK  
TECH [8-mg caps  
or tabs])<sup>27-29,b</sup>

Sympathomimetic  
amine anorectic

As a short-term (few  
weeks) adjunct to exercise,  
behavioral modification,  
and caloric restriction  
for exogenous obesity  
in adults with an initial BMI  
 $\geq 30 \text{ kg/m}^2$  or  $\geq 27 \text{ kg/m}^2$   
in the presence of other risk  
factors (eg, hypertension,  
T2D, hyperlipidemia)

Individualized to obtain  
adequate response  
with lowest effective  
dose. *37.5-mg caps or  
tabs*: usually, 37.5 mg/d  
PO before or 1 to 2 h  
after breakfast. *8-mg  
tabs*: usually, 8 mg PO  
3 times daily, 30 min  
before meals.

Dosage may be adjusted  
to patient need.

Primary pulmonary hypertension  
and/or regurgitant cardiac valvular  
disease, effect on ability to engage  
in potentially hazardous tasks,  
withdrawal effects after prolonged  
high-dose administration,  
cardiac palpitation, tachycardia,  
elevation of blood pressure,  
ischemic events, overstimulation,  
restlessness, dizziness, insomnia,  
euphoria, dysphoria, tremor,  
headache, psychosis, dryness  
of mouth, unpleasant taste,  
diarrhea, constipation, other GI  
disturbances, urticaria, impotence,  
changes in libido

# TIRZEPATIDE

- Tirzepatide is a medication **approved by** the US Food and Drug Administration (**FDA**) for treating type 2 diabetes mellitus (**T2DM**) in **May 2022**. In **November 2022**, it was approved **for chronic weight management**. Recently, in December 2022, FDA approved the drug as first and only medication for **OSA in adult associated with obesity**.
- Tirzepatide is a novel dual glucose-dependent insulinotropic polypeptide (**GIP**) and glucagon-like peptide-1 (**GLP-1**) **receptor agonist**.
- **Dose** :Initial dose 2.5 mg -subcutaneously-once a week. After 4 weeks: increased to 5 mg weekly. Maximum dose: 15 mg once a week.

## TIRZEPATIDE(CONT)

### **Mechanism of action:**

- Stimulate first- and second-phase insulin secretion,
- Delay gastric emptying,
- Lower fasting and postprandial glucose concentration,
- Decrease food intake,<sup>4</sup> increase insulin sensitivity.

- **Limitations of Use:** Coadministration with other tirzepatide-containing products or with **any GLP-1 receptor agonist** is not recommended.
- **Adverse reactions** :include nausea, diarrhea, vomiting, constipation, abdominal pain, dyspepsia, injection site reactions, fatigue, hypersensitivity reactions, belching, hair loss, and heartburn.

# **SURGICAL INTERVENTION**



## **INDICATIONS OF BARIATRIC SURGERY**

Patients with a BMI of  $\geq 40$  kg/m<sup>2</sup> without coexisting medical problems and for whom the procedure would not be associated with excessive risk should be eligible for bariatric surgery

Patients with a **BMI of  $\geq 35$  kg/m<sup>2</sup> and 1 or more severe obesity-related complications**, including T2DM, hypertension, obstructive sleep apnea, obesity-hypoventilation syndrome, Pickwickian syndrome, nonalcoholic fatty liver disease or nonalcoholic steatohepatitis, pseudotumor cerebri, gastroesophageal reflux disease, asthma, venous stasis disease, severe urinary incontinence, debilitating arthritis, or considerably impaired quality of life may also be considered for a bariatric surgery procedure.

Procedure	Target weight loss, %
Laparoscopic adjustable gastric banding	20%-25%
Sleeve gastrectomy	25%-30%
Roux-en-Y gastric bypass	30%-35%
Biliopancreatic diversion with duodenal switch	35%-45%

ASMBS Endorsed and/or FDA-Approved Procedures for Weight-Loss

Procedure	Target weight loss, %
Single anastomosis duodeno-ileal bypass with sleeve gastrectomy	35%-45%
Intragastric balloon	10%-12%
One-anastomosis gastric bypass	35%-40%
Transpyloric bulb	14%
Aspiration therapy	12%-14%
Vagal nerve blocking therapy	8%-9%

## WHAT NOT DO IN OBESITY MANAGEMENT

- **Crash diets:** Rapid weight loss through severe calorie restriction can lead to muscle loss and rebound weight gain.
- **"Magic bullet" supplements:** Be wary of supplements claiming quick weight loss without lifestyle changes
- **Skipping meals:** This can lead to overeating later in the day
- **Detox diets:** These often lack essential nutrients and can be harmful to your body

# KETO DIET

The ketogenic diet has become a popular dietary pattern used for weight loss. The foundation of this diet is **extreme carbohydrate reduction (5-10 % of daily requirements)** and replacing the remaining with dietary fat and protein.

## KETO FOOD PYRAMID



## KETO DIET : WHY NOT RECOMMENDED

- The umbrella review of meta-analyses regarding multiple health outcomes of the ketogenic diet showed that this dietary pattern may lead to a **significant increase in LDL and total cholesterol levels** in individuals without diabetes but with excessive body mass (overweight or obese) as well.
- In the meta-analysis by Rafiullah et al. the ketogenic diet resulted in greater weight loss compared to diabetes-recommended diets after 3 and 6 months, however, **the ketogenic diet was not better than the recommended diet after 12 months.**

(<https://www.sciencedirect.com/science/article/pii/S0146280624000410#:~:text=The%20ketogenic%20diet%20does%20not,significant%20in%20long%2Dterm%20observations>)

# KETO DIET : WHY NOT RECOMMENDED

## Potential Risks of the Ketogenic Diet

### Acute

*Gastrointestinal Discomfort*

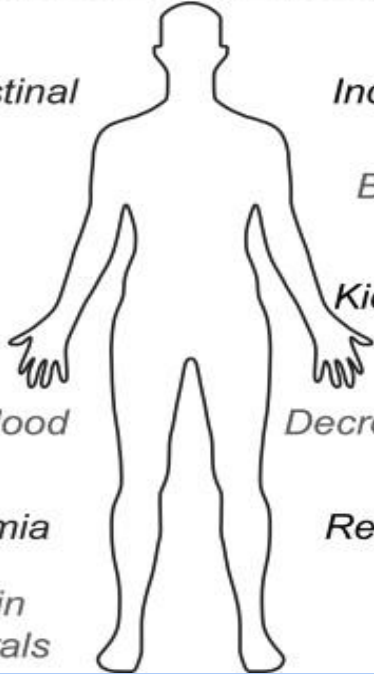
*Nausea & Vomiting*

*Lethargy*

*Elevated Blood Ketones*

*Hypoglycemia*

*Deficiency in trace minerals*



### Chronic

*Increased LDL Cholesterol*

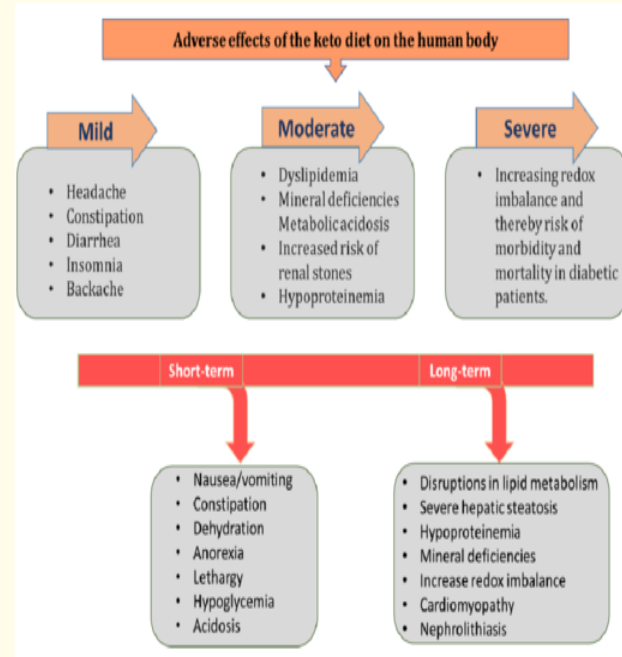
*Bone mineral loss*

*Kidney Stones*

*Decreased IGF-1*

*Renal Damage*

### Adverse effects of the keto diet on the human body



([https://www.researchgate.net/publication/369268283\\_Beyond\\_Weight\\_Loss\\_A\\_Comprehensive\\_and\\_Concise\\_Review\\_of\\_the\\_Ketogenic\\_Keto\\_Diet\\_from\\_Epilepsy\\_Origins\\_to\\_Weight\\_Management](https://www.researchgate.net/publication/369268283_Beyond_Weight_Loss_A_Comprehensive_and_Concise_Review_of_the_Ketogenic_Keto_Diet_from_Epilepsy_Origins_to_Weight_Management))

# PREVENTION OF OBESITY: COMBAT THE EPIDEMIC

## Understanding Obesogenic Environment:

- **Food outlets:** calorie-dense foods and sugary drinks
- **Transportation:** Places that encourage driving over walking, like high streets, stations, and cinemas
- **Buildings:** Buildings with prominent elevators and escalators, and hidden staircases
- **Neighborhoods:** Neighborhoods with limited access to healthy food, parks, and recreational opportunities, unsafe walking paths
- **Media:** The media's influence on people's food choices



# Changing the Obesogenic Environment

1. Continue to intervene in schools: Teaching students how to eat healthy and its importance.
  - (a) Emphasizing the importance of reading food labels.
  - (b) Spreading awareness about how advertisements can be deceiving
  - (c) Demonstrating healthy lifestyle choices
  - (d) Serving food at school that is high in nutrient density.



# Changing the Obesogenic Environment

2. Regulate the advertising of junk foods: Not exposing & glamorizing unhealthy food as much would probably decrease the amount of purchases.

Children ages 8 to 18, consume multiple types of media and spend about 44.5 hours per week in front of a computer, television, and other screens. Research has found strong associations between increases in advertising for junk food and rates of obesity.

(American Psychological Association)



- (a) Limit/cut back on the amount of media exposure
- (b) Advertise healthier foods
- (c) Set a limit on the amount of junk food that is advertised on a daily basis

# Changing the Obesogenic Environment

3. Impose a “Sugared Beverage Tax”: Junk food is notorious for its cheap prices, increasing the price would make it less likely for people to want to purchase as much.



- (a) Implementing a tax on sugared beverages would make it less affordable for people to purchase such items
- (b) It would force people to have to purchase other items that are healthier
- (c) These items would no longer be purchased as much.

# OBESITY PREVENTION

## Combat the obesity epidemic

In WHO's Eastern Mediterranean Region, most countries have experienced a nutrition transition towards unhealthy diets and sedentary lifestyles. Almost half the Region's adults (49%), over a quarter (26%) of adolescents and nearly 6% of children under 5 are affected by overweight or obesity. People living with obesity are twice as likely to be hospitalized if tested positive for COVID-19. Everyone can take action and make change. Everyone can play a role in combatting the obesity epidemic to create a healthier future now and post-COVID-19.

### What can everyone do?



Governments can provide and improve access to quality obesity care, as well as develop and effect policies that promote and normalize healthy eating and living, in addition to banning marketing of unhealthy foods and beverages high in fat, sugar and salt.

Civil society groups, including nongovernmental organizations and the media, can work with individuals and communities to educate and diffuse key messages on the root causes of obesity, the importance of prevention and treatment, as well as the impact of adopting healthy behaviours like keeping physically active and choosing healthy food and drinks.



Health care professionals, whether working directly in obesity care or supporting and working with those living with obesity, can learn more about obesity, expand their knowledge and have up-to-date, evidence-based obesity management resources to help them understand and address the root causes of this disease.

Individuals and families can adopt healthier behaviours, share experiences, as well as ask for support and support others to improve their health and well-being and that of their children.



## We can create happier, longer and healthier lives

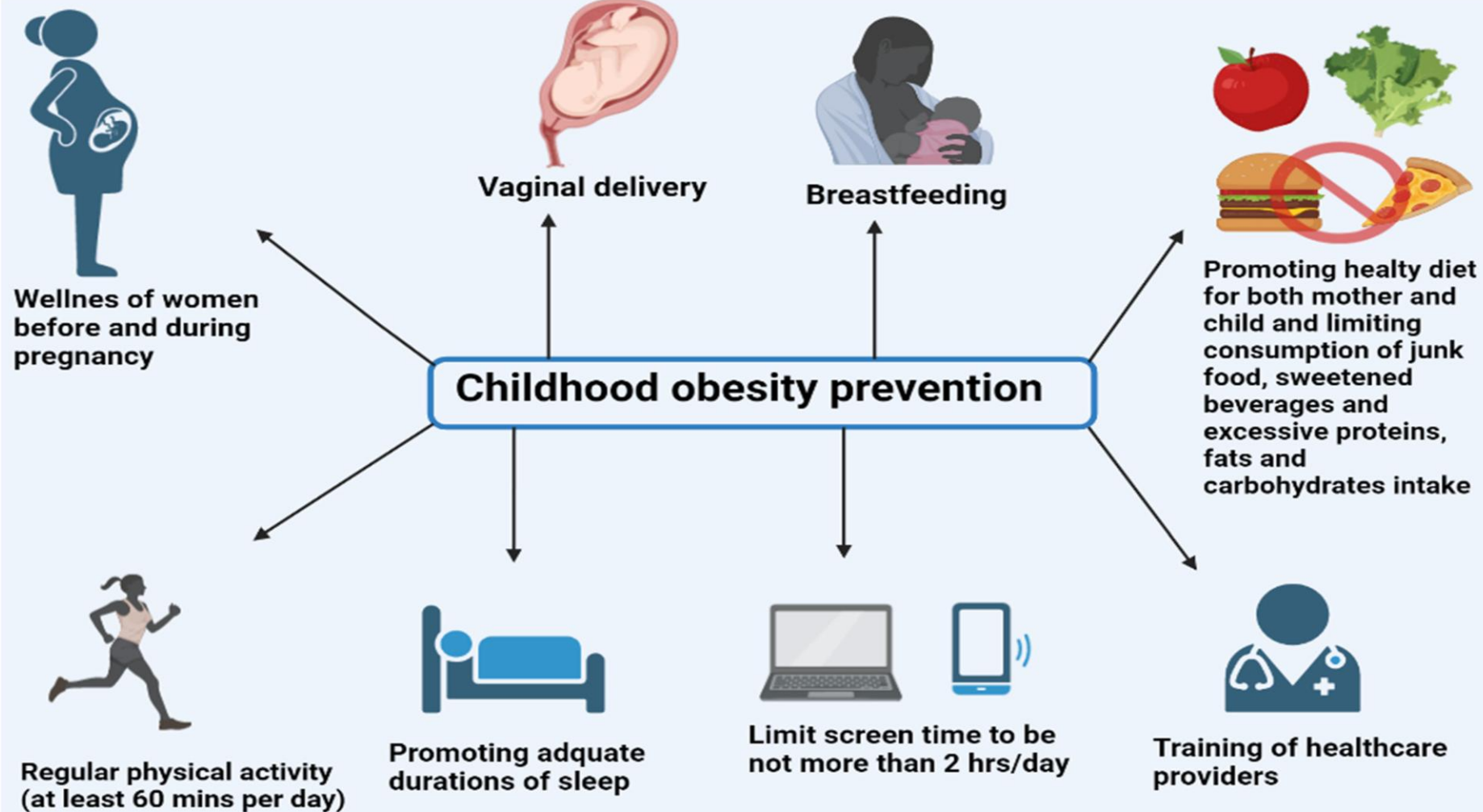


World Health  
Organization

REGIONAL OFFICE FOR THE Eastern Mediterranean

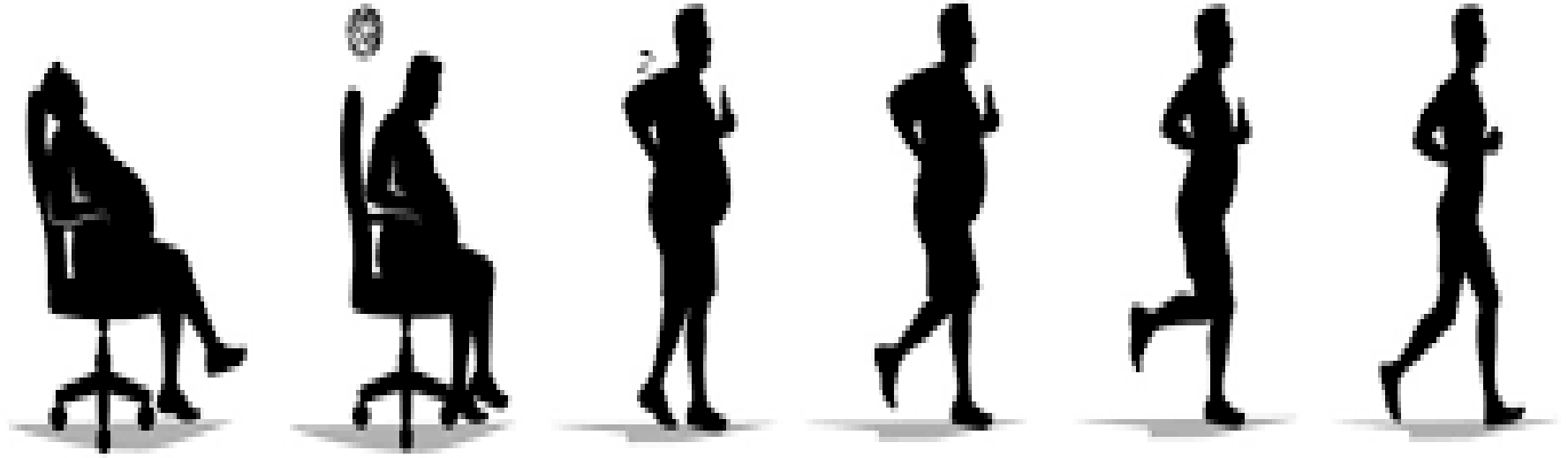
#beatobesity

[www.emro.who.int/nutrition](http://www.emro.who.int/nutrition)



## TAKE HOME MESSAGES

- **Obesity is a chronic non-communicable disease** and should be managed to prevent associated morbidity.
- **Lifestyle modifications** are the fundamentals of weight management, AOM and surgery are adjunct therapy.
- **Healthy diets** do not include keto diet, crash diets or skipping meals.
- **Obesity** should be **prevented from childhood** .



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**THANK YOU**