Obesity

[**Important** | **Notes** | Extra | **Editing file**]

lecture objectives:

⇨ Definition
⇨ Pathogenesis of obesity
⇨ Factors predisposing to obesity
⇨ Complications of obesity
⇨ Assessment and screening of obesity
⇨ Management of obesity

Done By:

Razan AlSabti, Nojood Alhaidri & Asrar Batarfi

Revised By: Omar Alsulaiman.

References: Doctors' Slides+Davidson+step up

Obesity

What is Obesity?

- Obesity means excess accumulation of fat in the body.
- 20% or more over an individual's ideal body weight.
- Once it develops it is difficult to 'cure' and usually persists throughout life.

Obesity is usually diagnosed on the basis of calculation of:
- Body mass index
- Measurement of waist-hip ratio

Obesity Classification–BMI

BMI Calculation:
- Body Mass Index (BMI) = weight divided by height squared (kg/m2)

لاحظوا ان الطول بالمتر! ممكن في الاختبار يجيبوه لكم بالسانتي عشان يلخبطوكم! لازم تحولوه لمتر اول

A. BMI less than 18.5 is underweight

B. BMI of 18.5 to 24.9 is normal

C. 25.0 to 29.9 is overweight

D. 30 to 34.9 is obese class 1

E. 35-39.9 is obese class 2

F. 40 and over is obese class 3

وطبعا لما يحددوا الاوبزتي يقيموا comorbidities to know when to interfere

what I mean by comorbidities: dyslipidemia, DM, HTN & osteoarthritis. Then the risk increases and we need to interfere immediately.

Classification	BMI		Waist	
	BMI (kg/m²)	Comorbidity Risk	Waist Circumference and Comorbidity Risk	
			Men ≤40 in (102 cm) Women ≤35 in (88 cm)	Men >40 in (102 cm) Women >35 in (88 cm)
Underweight	<18.5	Low but other problems		
Normal weight	18.5-24.9	Average		
Overweight	25-29.9	Increased	Increased	High
Obese class I	30-34.9	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

Table 6. Classification of Overweight and Obesity by BMI and Waist Circumference (31 [EL 4; NE])

Abbreviations: BMI = body mass index; in = inches.

POPULATION	ORGANIZATION	MEN	WOMEN
Europid	IDF	≥94 cm ≥37 inches	≥80 cm ≥31 inches
Caucasian	WHO	≥94 cm (↑ risk) ≥37 inches ≥102 cm (↑↑ risk) ≥40 inches	≥80 cm (↑ risk) ≥31 inches ≥88 cm (↑↑ risk) ≥35 inches
United States	AHA/NHLBI (ATPIII)	≥102 cm ≥40 inches	≥88 cm ≥35 inches
Canada	Health Canada	≥102 cm ≥40 inches	≥88 cm ≥35 inches
European	European Cardiovasc. Societies	≥102 cm ≥40 inches	≥88 cm ≥35 inches
Asian (including Japanese)	IDF	≥90 cm ≥35 inches	≥80 cm ≥31 inches
Asian	WHO	≥90 cm ≥35 inches	≥80 cm ≥31 inches
Japanese	Japanese Obesity Society	≥85 cm ≥33 inches	≥90 cm ≥35 inches
China	Cooperative Task Force	≥85 cm ≥33 inches	≥80 cm ≥31 inches
Middle East, Mediterranean	IDF	≥94 cm ≥37 inches	≥80 cm ≥31 inches
Sub-Saharan African	IDF	≥94 cm ≥37 inches	≥80 cm ≥31 inches
Ethnic Central and South American	IDF	≥90 cm ≥35 inches	≥80 cm ≥31 inches

Table 7. Waist Circumference Thresholds for Abdominal Obesity (32 [EL4; NE])

Abbreviations: AHA = American Heart Association; ATPIII = Adult Treatment Panel III; IDF = International Diabetes Federation; WHO = World Health Organization.

ممكن يجيكم سؤال عن waist circumference so know it's variable

usually waist circumference is based on the ethnic background. eg. asian & china are lesser than us bc our body built is slightly bigger and so on. NOTE THAT; waist circumference is VARIABLE

Classification of obesity as per fat distribution

Android (or abdominal or central, males)
- Collection of fat mostly in the abdomen (above the waist)
- apple-shaped
- Associated with insulin resistance and heart disease
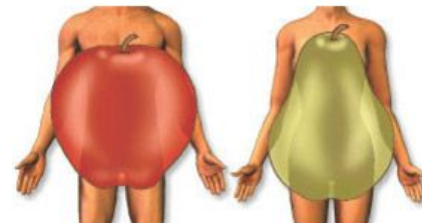
Gynoid (below the waist, females)
- Collection of fat on hips and buttocks
- pear-shaped
- Associated with mechanical problems that means they are more prone to osteoarthritis, difficulty on walking and so on from mechanical fat maldistribution

Obesity-prevalence[1]

now we can see type 2 DM in children bc of obesity
- Well recognized as a serious and growing public health problem.
- WHO estimates that over 1.7 billion people around the world are overweight, 310 million are obese.
- Rates of obesity have tripled in the last 20 years in the developing world.
- In US, 33.3 % of men and 35 % of women are obese in 2007.
- *Preschool children increase from 5 to 10 % (1980 to 2008), 5.6 to 19 in school age children, adolescent between 5 to 18 % in US*
- 15-25 % of American children are obese.
- In SA: study done between 1995-2000 in age group between 30-70 on 17000 subjects.
- Prevalence of overweight: 36.9 % : 42% male, 31.8 % female.
- Prevalence of obesity: 35.5 % , severe obesity 3.2 % with female of 44 %, male 26.4 %
- The prevalence of overweight and obesity was higher amongst a group of married women than among a group of single women in Saudi Arabia.
  Dietary habits, sedentary lifestyle, high socioeconomic status
- Considered to be a global epidemic, particularly in developed nations.
- Health hazards associated with obesity: hypertension, heart disease, hyperlipidemia, type 2 diabetes, stroke, heart disease, osteoarthritis, liver disease, cancer, obstructive sleep apnea, and depression.
- Obesity is associated with a significant increase in mortality.

Mechanism of Obesity

Food intake and utilization is regulated: normal appetite is controlled by those (neurotransmitters & hormones carry signals to the CNS which will stimulate the thirst or hunger and so on)
- Hormones.
- Neurotransmitters.
- Central nervous system.

Mechanism:
- Signals from peripheries are carried out by neurotransmitters and hormones to CNS in presence or absence of food.
- Signal from fat by hormone leptin to hypothalamus to reduce food intake and increase sympathetic activity and energy expenditure they develop leptin resistance (high amount of leptin but it doesn't work)
- Gastric distension and contraction send signal for satiety and hunger, if the stomach distended signals will go to the hypothalamus telling that I'm full stop eating. or in stomach contraction signals will stimulate the hunger feeling in order to eat
- Fall in blood sugar send signals to CNS for hunger. in hypoglycemia u'll have tremor, headache … etc
- Sympathetic activity from food thermogenesis leads to reduce food intake.

[1]
- *Saudi Med J. 2005 May;26(5):824-9*
- *International Journal of Obesity (2003) 27, 134–139.*

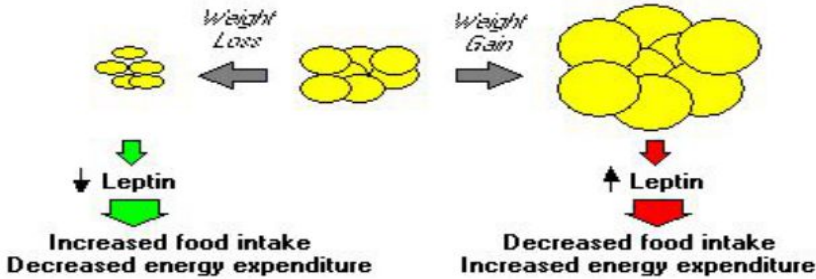# Role of hypothalamus in mediation of hunger and satiety
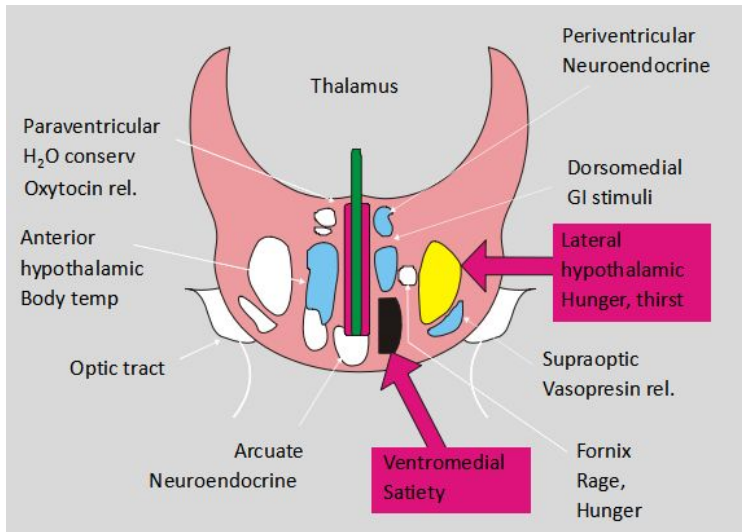
Obesity-Pathogenesis

- More in and less out = weight gain.
- More out and less in = weight loss.
- Hypothalamus: Control center for hunger and satiety.
- Endocrine disorders: Where are the hormones?

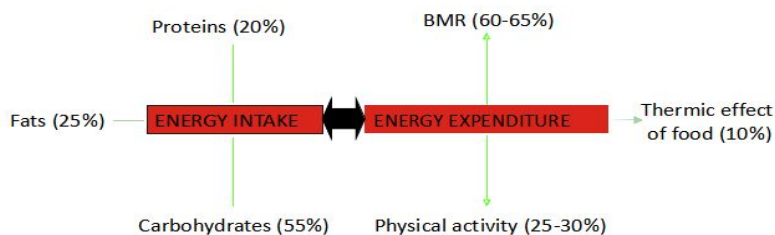# Hormones

Leptin from adipocytes
- Acts on hypothalamus to decrease food intake and stimulate energy expenditure.

Ghrelin:
- Secreted in the stomach.
- Acts on hypothalamus to stimulate appetite.
- Peak before meal and decrease after.

Obesity – An imbalance in energy intake and energy expenditure

- basically when your energy intake exceeds your expenditure, u'll gain weight and vice versa
- BMR= basal metabolic rate

Obesity: How does it happen?

- Calories consumed not equal calories used over along period of time.

Due to combination of several factors:
- Individual behaviors (10 % to BMI).
- Social interaction.
- Environmental factors. if the parents are obese then the kids will be obese too
- Genetic (40 % to BMI and adiposity).

Table 1. Causes of Obesity

Excessive/inappropriate food intake
Sedentary lifestyle
Genetic disorders with obesity
    Prader-Willi syndrome
    Bardet-Biedl syndrome
    Carpenter's syndrome (acrocephalopolysyndactyly type II)
    Cohen syndrome
Endocrine disorders
    Cushing's syndrome
    Hypothalamic tumors/inflammation/trauma
    Hypothyroidism
    Polycystic ovary syndrome
    Insulinoma
Drugs
    Antipsychotics, especially atypical agents
    Tricyclic antidepressants
    Sulfonylureas
    Insulin
    β Blockers
    Corticosteroids
    Estrogen
    Progestins

Factors predispose to obesity[2]

Factors predispose to obesity				
Lifestyle	Sleep deprivation	Cessation of smoking	Social influences	Diet
-Sedentary lifestyle lowers energy expenditure. -52 % of Saudi women are inactive, < 19 % doing regular physical activity. -Prolonged TV watching.	- < 7 hours of sleep → obesity. لانه غالبا كل ما طول صاحي كل ما اكل اكثر - ↓ sleep → ↓ leptin, ↑ ↑ Ghrelin → ↑ appetite and CHO eating at night - لما يتلخبط نومنا تتلخبط عندنا السليب سايكل وبالتالي تتلخبط الهرمونات فتزداد شهيتنا وناكل اكثر بالليل عشان كذا اغلب مرضى السكر يجونا جايبين العيد في الاجازات بسبب ان نظامهم ملخبط.	why? bc nicotine suppress the appetite -Average weight gain is 4 kg. -Due to nicotine withdrawal. -Can be prevented by calories restriction and exercise program.	-Obese parents most likely to have obese children. -Obese individuals are surrounded by obese friends.	-Overeating, frequency of eating, high fat meal, fast food (> 2 fast food/wk). -Night eating syndrome: if > 25 % of intake in the evening يعني لما تاكل كاربز بالليل تكون عرضة للسمنة اكثر من باقي اوقات اليوم لانك لو اكلت بالنهار ممكن تمشيلك خطوتين تحرق اللي اكلته هه

بس مو معناته ان كل بيشنت جاني اوبيز يعني السبب واحد من هالاشياء! دايم لازم اناظر السكندري كوزيز! غالبا اذا شفت المريض وحسيت ان الفيتشرز التي فيه سجستف اوف باثولجي!
like if he has cushing syndrome it will be so clear, genetic disorders, acromegaly, hypothyroidism, polycystic ovarian syndrome, insulinoma & medication such as, psychotic drugs & some diabetic medication

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[2] In hypothalamus mainly paraventricular, ventromedial nucleus or amygdala affected by tumor, inflammation, radiation, trauma

Health consequences of obesity

- Although overweight associated with decreased survival.
- Obesity is associated with reduction in life expectancy during adulthood.
- Increase in BMI is associated with increase in morbidity ,CVD risk factors and mortality.
- Increase cost rate on obesity
- Increase number of sick leaves for obese subjects.
- Increase number of hospitalization.
- Early age of retirement.
- Increase cost of drugs for DM, CVD, GI disease.
- Poor quality of life due to psychosocial issues.

Table 2. Complications Associated with Obesity

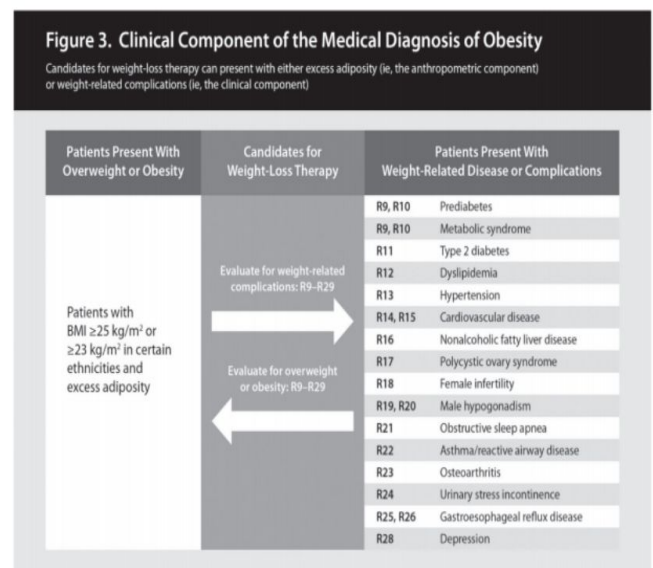|	
Cardiovascular	Coronary artery disease, stroke, congestive heart failure, hypertension, dysrhythmias, pulmonary embolism
Pulmonary	Obstructive sleep apnea and obesity hypoventilation syndrome
Endocrine	Metabolic syndrome, insulin resistance, dyslipidemia, diabetes mellitus type 2, polycystic ovary syndrome
Gastrointestinal	Gallstones, abdominal hernia, nonalcoholic fatty liver disease, gastroesophageal reflux disease
Bone, joint, and skin	Osteoarthritis, low back pain, gout, acanthosis nigricans
Vascular	Venous stasis
Neurologic	Pseudotumor cerebri
Gynecologic/ genitourinary	Stress incontinence, sexual dysfunction, abnormal menses

NOTE: Obesity is also associated with cancer of the esophagus, colon, pancreas, liver, prostate, breast, endometrium, cervix, and ovaries.

Each 5 kg/m2 increase in BMI was associated with significant increase in mortality related to:

- IHD and stroke.
- Diabetes and non-neoplastic kidney disease[3].
- Different types of cancer.
- Respiratory disease.

it's imp. to assess the pt. and see in which class is he and assess the comorbidity to know from where to start in treatment. if class 2 start with medication or class 3 start with surgery directly.

For both men and women, increasing BMI was associated with higher death rates due to the following cancers:

- Esophagus.
- Colon and rectum.
- Liver.
- Gallbladder.
- Pancreas.
- Kidney.
- Non-Hodgkin lymphoma.
- Multiple myeloma.

Acanthosis nigricans

Classic hyperpigmented axillary lesion in acanthosis nigricans.
Courtesy of Jeffrey Flier, MD.

doctor only focused on the complications in the schedule below.

Assessment and screening:

- screening of adults for obesity is important, With significant increase in morbidity and mortality.
- Although not in routine practice but it should be as a part of periodic health assessment.
- Screening:
  - BMI measurement
  - Waist circumference
  - Evaluation of overall medical risks
- Is the patient obese or overweight?
- What are his key health issues? Morbidity and mortality-related.

Figure 3. Clinical Component of the Medical Diagnosis of Obesity

Candidates for weight-loss therapy can present with either excess adiposity (ie, the anthropometric component) or weight-related complications (ie, the clinical component)

Patients Present With Overweight or Obesity	Candidates for Weight-Loss Therapy	Patients Present With Weight-Related Disease or Complications	
		R9, R10	Prediabetes
		R9, R10	Metabolic syndrome
		R11	Type 2 diabetes
	Evaluate for weight-related complications: R9–R29	R12	Dyslipidemia
		R13	Hypertension
Patients with BMI ≥25 kg/m² or ≥23 kg/m² in certain ethnicities and excess adiposity		R14, R15	Cardiovascular disease
		R16	Nonalcoholic fatty liver disease
		R17	Polycystic ovary syndrome
		R18	Female infertility
	Evaluate for overweight or obesity: R9–R29	R19, R20	Male hypogonadism
		R21	Obstructive sleep apnea
		R22	Asthma/reactive airway disease
		R23	Osteoarthritis
		R24	Urinary stress incontinence
		R25, R26	Gastroesophageal reflux disease
		R28	Depression

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[3] Obesity related glomerulopathy, focal segmental glomerulosclerosis

BMI measurement:

- Reliable, easy, correlated with percentage of body fat.
- Guide for selection of therapy.
- Varies among different races.
- Recent WHO classification applied to whites, hispanics and black.
- Asians are different: overweight BMI 23-24.9 kg/m2 and obesity by BMI > 25 kg/m2.

Waist circumference:

- Measurement of central adiposity.
- Associated with increased risk of morbidity and mortality.
- Reflects visceral adiposity.
- Increase risk of heart disease, DM, hypertension, dyslipidemia.
- Important in identifying the risk in BMI 25-34.9 kg/m2.
- Risk increase with WC > 88 cm in women, 102 cm in men.
- Not useful if BMI > 35 kg/m2.
- In Asian population risk starts with WC > 80 cm in Asian women and > 90 cm in Asian men.

Table 9.3   Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks

| | BMI (kg/m²) | Obesity class | Disease risk relative to normal weight and waist circumference | |
			Men ≤102 cm (≤40 in.) Women ≤88 cm (≤35 in.)	>102 cm (>40 in.) >88 cm (>35 in.)
Underweight	<18.5		—	—
Normal	18.5-24.9		—	—
Overweight	25.0-29.9		Increased	High
Obesity	30.0-34.9	I	High	Very high
	35.0-39.9	II	Very high	Very high
Extreme obesity	≥40	III	Extremely high	Extremely high

Reprinted from National Institutes of Health 1998.

- In adults with a BMI of 25 to 34.9 kg/m2, a waist circumference greater than 102 cm (40 in) for men and 88 cm (35 in) for women is associated with a greater risk of hypertension, type 2 diabetes, and dyslipidemia, and CHD.

Identify the aetiology:

- Medical history is important.
- Age at onset of obesity, course of it.
- Eating habits, activity habits.
- Past medical history.
- Medications: antipsychotic & anticonvulsant.
- Cessation of smoking history.
- Ethnic background.
- Family history of obesity.

Etiologic classification of obesity

Iatrogenic causes
- Drugs that cause weight gain
- Hypothalamic surgery

Dietary obesity
- Infant feeding practices
- Progressive hyperplastic obesity
- Frequency of eating
- High fat diets
- Overeating

Neuroendocrine obesities
- Hypothalamic obesity
- Seasonal affective disorder
- Cushing's syndrome
- Polycystic ovary syndrome
- Hypogonadism
- Growth hormone deficiency
- Pseudohypoparathyroidism

Social and behavioral factors
- Socioeconomic status
- Ethnicity
- Psychological factors
- Restrained eaters
- Night eating syndrome
- Binge-eating

Sedentary lifestyle
- Enforced inactivity (post-operative)
- Aging

Genetic (dysmorphic) obesities
- Autosomal recessive traits
- Autosomal dominant traits
- X-linked traits
- Chromosomal abnormalities

Other
- Low birth weight

Drugs that cause weight gain and alternatives

Category		Drugs that cause weight gain	Possible alternatives
Antipsychotics			
	Conventional	Thioridazine	Haloperidol
	Atypical	Olanzapine, Clozapine, Quetiapine, Risperidone	Ziprasodone, Aripiprazole
	Lithium	Lithium carbonate	
Anti-depressants			
	Tricyclics	Amitriptyline, Clomipramine, Doxepin, Imipramine, Nortriptyline	Protriptyline
	Selective serotonin reuptake inhibitors	Paroxetine	Other SSRIs
	Other	Mirtazapine	Bupropion, Nefazadone
Anticonvulsant drugs		Valproate, Carbamazepine, Gabapentin	Topiramate, Lamotrigine, Zonisamide
Antidiabetic drugs		Insulin, Sulfonylureas, Metiglinide, Thiazolidinediones	Metformin, Alpha-glucosidase inhibitors
Serotonin and histamine antagonist		Pizotifen	
Antihistamines		Cyproheptidine	
Beta-adrenergic blockers		Propranolol, Atenolol, Metoprolol	
Steroid hormones		Glucocorticoids	
		Progestins: Megestrol acetate, Medroxyprogesterone acetate	

Assessment of risk status

- Identify risk factors:
  - After BMI and WC, history.
  - BP measurement.
  - Fasting lipid profile.
  - Fasting blood sugar.
- Identify comorbidity:
  - Help to classify the risk of mortality.
  - Presence of atherosclerosis, DM2, HTN, dyslipidemia.
  - Sleep apnoea.
  - GI, osteoarthritis, gout.

CVD risk factors that would affect mortality risk:

اذا جاك بيشنت اوفرويت او كلاس 1 وعنده كارديك بروبلم ستارت
انترفنشن رايت ناو لا تنتظر لين يصير كلاس2

- HTN.
- DM2 (fasting blood glucose 110-125 mg/dl).
- Smoking.
- Dyslipidemia (low HDL < 35 or high LDL> 130).
- Family history of premature CAD.
- Physical inactivity.

other risk factors:

Age of onset of obesity.

Why is it important to look at it?

- It is a common disease with significant morbidity and mortality and without screening many high risk patients may not receive counseling about health risks, lifestyle changes, obesity treatment options, and risk factor reduction.
- Screening with BMI, waist circumference, and risk factor assessment is inexpensive and available to nearly all clinicians.
- Weight loss is associated with a reduction in obesity-associated morbidity.

Advantages of weight loss:

- Weight loss of 0.5-9 kg (n=43,457) associated with 53% reduction in cancer-deaths, 44% reduction in diabetes-associated mortality and 20% reduction in total mortality due to malignancies, IHD & stroke
- Survival increased 3-4 months for every kilogram of weight loss.
- Reduced hyperlipidemia, hypertension and insulin resistance.
- Improvement in severity of diseases.
- Person feels 'fit' and mentally more active.

Treatment goals:

- Prevention of further weight gain.
- Weight loss to achieve a realistic, target BMI.
- Long-term maintenance of a lower body-weight.

How much weight loss is significant?

A 5-10% reduction in weight (within 6 months) and weight maintenance should be stressed in any weight loss program and contributes significantly to decreased morbidity

Management of obesity:

3 main interventions:

1. Lifestyle intervention (diet, exercise). لا تطلبي من المريض ينقص وزن خيالي في فترة قصيرة يعني لا تقولي 20 كيلو بشهر إكذا تحمليه عبئ وبجيه دبرشن
ويمكن يرجع اسمن! خمسة كيلو بثلاث شهور از فاين وحفزيه عليها

2. Pharmacotherapy.
3. Surgical intervention.

1)Lifestyle intervention

- Most important recommendation.
- Initial goal: 10% weight loss.
    - Significantly decreases risk factors.
- Rate of weight loss:
    - 1-2 pound per week.
    - Reduction of calories intake 500-1000 calories/day
- Slow weight loss is preferred approach
    - Rapid weight loss is almost always followed by rapid weight gain
    - Rapid weight loss is associated with gallstones and electrolytes abnormalities
- Aim for 4-6 months for weight loss
- Average is 8-10 kg loss
- After 6 months, weight loss is difficult
    - Ghrelin and leptin effect
    - Energy requirement decrease as weight decreases
- Set goals for weight maintenance for next 6 months then reassess

Figure 4. Lifestyle Therapy
Evidence-based lifestyle therapy for treatment of obesity should include 3 components
Recommendations: R64 through R75

Meal Plan (R64, R65, R66)	Physical Activity (R64, R67, R68, R69, R70, R71)	Behavior (R64, R72, R73, R74, R75)
• Reduced-calorie healthy meal plan • ~500–750 kcal daily deficit • Individualize based on personal and cultural preferences • Meal plans can include: Mediterranean, DASH, low-carb, low-fat, volumetric, high protein, vegetarian • Meal replacements • Very low-calorie diet is an option in selected patients and requires medical supervision Team member or expertise: dietitian, health educator	• Voluntary aerobic physical activity progressing to >150 minutes/week performed on 3–5 separate days per week • Resistance exercise: single-set repetitions involving major muscle groups, 2–3 times per week • Reduce sedentary behavior • Individualize program based on preferences and take into account physical limitations Team member or expertise: exercise trainer, physical activity coach, physical/occupational therapist	An interventional package that includes any number of the following: • Self-monitoring (food intake, exercise, weight) • Goal setting • Education (face-to-face meetings, group sessions, remote technologies) • Problem-solving strategies • Stimulus control • Behavioral contracting • Stress reduction • Psychological evaluation, counseling, and treatment when needed • Cognitive restructuring • Motivational interviewing • Mobilization of social support structures Team member or expertise: health educator, behaviorist, clinical psychologist, psychiatrist

a) Diet therapy

- Indicated for all with BMI > 30 and those with BMI 25- 30 with comorbidities.
- Teaching about food composition (fat, CHO, protein).
- Calories contents of food by reading labels.
- Type of food to buy and to prepare.
- Low calories diet-portion controlled.
- Low fat diet, Low CHO diet.
- Mediterranean diet.
- Average for women: 1000-1200 kcal/day
- Average for men: 1200-1600 kcal/day.
- Adjust based on activity and weight
    - How much is 1200 calories?

        1 big mac (580)

1 small fries (210)
1 small shake (430)

- Then weight maintenance:

 # How much should people eat?

female	
Age 20-49	2300 Kcal/day
Age 50+	1900 Kcal/day
male	
Age 20-49	2900 kcal/day
Age 50 +	2500 Kcal/day

Table 9. Association of Eating Patterns and Macronutrient Composition on Weight-Loss Efficacy		
Eating Pattern or Macronutrient Change	**Effect**	**Reference [EL]**
Low glycemic index/load	• ⬆ Endothelial function • ⬇ Glycemic variability • Effects on energy expenditure • Decreased adipocyte diameter • No incremental effect on weight loss[1]	33 [EL 1; RCT], 34 [EL 1; RCT], 35 [EL 1; RCT, small N=13], 36 [EL 1; RCT]
Low carbohydrate	• Improved glycemic status and lipids • Improved other cardio-metabolic risk factors • Improved renal function • No incremental effect on weight loss (some studies show more short-term weight loss)[2]	37 [EL 4; NE], 38 [EL 1; RCT], 39 [EL 1; RCT], 40 [EL 1; RCT], 41 [EL 1; RCT], 42 [EL 1; RCT], 43 [EL 2; NRCT], 44 [EL 1; RCT], 45 [EL 1; RCT], 46 [EL 1; RCT], 47 [EL 1; RCT]
High protein	• Longer benefit on WC, %fat • Improved cardio-metabolic risk factors • Decreased adipocyte diameter • Animal (not plant) proteins associated with markers of inflammation • Less relative loss of muscle mass • No incremental effect on weight loss	33 [EL 1; RCT], 38 [EL 1; RCT], 45 [EL 1; RCT], 48 [EL 1; RCT], 49 [EL 1; RCT], 50 [EL 1; RCT], 51 [EL 1; RCT], 52 [EL 1; RCT], 53 [EL 1; RCT]
Moderate carbohydrate – moderate protein	• Improved body composition, lipid, ppINS • No incremental effect on weight loss	37 [EL 4; NE], 54 [EL 1; RCT]
Low fat	• Beneficial effects on lipids • Benefits on lipids replacing with unsaturated fat • Improved renal function • No incremental effect on weight loss	37 [EL 4; NE], 41 [EL 1; RCT], 47 [EL 1; RCT], 55 [EL 1; RCT], 56 [EL 1; RCT]
High fat	• With lactation: when hypocaloric, great weight loss compared with hypocaloric low-carbohydrate diet	57 [EL 2; PCS]
Mediterranean-style	• Decreased risk certain cancers • EVOO supplementation – no effect on weight • Reduces cardio-metabolic risk factors and MetS • Reduces markers of inflammation • Improves hepatic steatosis and insulin sensitivity • Improves renal function • No incremental effect on weight loss	40 [EL 1; RCT], 58 [EL 1; RCT, post-hoc analysis], 59 [EL 2; PCS, post-hoc analysis], 60 [EL 1; RCT, secondary analysis], 61 [EL 2; PCS], 62 [EL 1; RCT], 63 [EL 1; RCT], 64 [EL 2; PCS], 65 [EL 2; PCS], 66 [EL 1; RCT]

Abbreviations: EL = evidence level; EVOO = extra-virgin olive oil; MetS = metabolic syndrome; ppINS = postprandial insulin response; WC = waist circumference.
[1] Incremental effect in comparison to a isocaloric control diet does not occur or is inconsistent.
[2] Short-term is <1 year.

b) physical activity:

- لازم يسوي رياضة يعني يجيك واحد ياكل نفس مقدار الكالوريز الموصى بها بدون رياضة و يسمن ولا في ناس تجي تقول انا من سنة بس ما خسرت؟ لازم رياضة (يخسروا في البداية بس)

- As integral part of weight loss.
- Reduce risk of DM, heart disease, hypertension.
- Alone is not helping.
- Help to prevent weight regain.
- Start slowly.
  - Change of daily living activities.
  - Avoid injury.

- Increase intensity and duration gradually.
- Long –term goal:
  - 30-45 min or more of physical activity daily.
  - 3 or 5 or more days per week.
  - Burn 1000+ calories per week.

c) Behavioral strategies:

- Keep agenda of diet and activity:
  - Set specific goals regarding: diet, activity related behavior.
  - Reminder system. يعني لما يكتب طول اليوم شأكل نهاية اليوم بيحدد شيسوي
  - Reward yourself. امشي اسبوع تمام واخر الاسبوع تاكلك ايس كريم ذا شيء زين
  - Don't deprive yourself, watch portion.
- Track improvement:
  - Weight measurement on regular basis.

2) Pharmacotherapy:

Indications: طبعا اول شيء لايف ستايل بعدين

- BMI > 30(MCQ!!!)
- BMI 27-30 with comorbidities.
- Should not be used for cosmetic weight loss.
- Used only when 6 months trial if weight and exercise fail to achieve weight loss.
  - ❖ Types:
  1. Sympathomimetics:(MCQ!!!)
     a. Stimulate release of norepinephrine or inhibits its reuptake by nerve terminals.
     b. Block serotonin and NE reuptake (sibutramine).
     c. Directly act upon adrenergic receptor.
     d. Reduced appetite by early satiety.
  2. Pancreatic lipase inhibitor:
     a. Orlistat: inhibits fat absorption. cause hepatotoxicity
     b. Orlistat is a first-line agent and can be continued for up to 4 years
  3. Antidepressant.
  4. Antiepileptic.
  5. Diabetic drugs: metformin.
- **for the medication table she said no need to memories it except those who are in the pharmacotherapy section**

  - الدكتورة قرأت جدول الميديكيشن مع الميكانزمز والكوموربيدتي
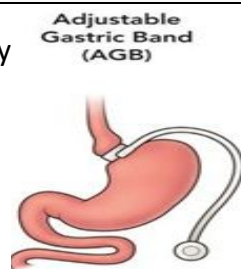
3) Surgical intervention(bariatric surgery):

Indications:

- Well-informed and motivated patients.
- Best evidence is for patients with BMI over 40(MCQ!!!).
- Acceptable risk of surgery.
- Failed previous non-surgical method
- BMI > 35 with comorbidities(MCQ!!!) like diabetes, sleep apnea, osteoarthritis, cardiomyopathy.
- Bariatric surgery is effective in reducing comorbidities associated with obesity, including hypertension, diabetes, obstructive sleep apnea, and hyperlipidemia. This translates into a 29% reduction in mortality. Only indicated in patients who have earnestly tried other means of losing weight and have been unsuccessful.
- BMI 25-29.9 with WC > 102 cm in male and 88 cm in women.
- Age 18-60.
- Psychologically stable.

types of bariatric surgery based on 2 mechanisms:

Restrictive type of surgery(via a small stomach reservoir):	Malabsorptive and restrictive(via decreasing small bowel length):
- Vertical banded-gastroplasty - Gastric banding ▶Note: *Restrictive techniques are technically easier, have lower complication rates, but result in less weight loss than malabsorptive techniques. *The laparoscopic adjustable gastric banding (Lap Band) has fewer complications, is reversible, but is not as effective in achieving weight loss as compared with the gastric bypass.	- Roux-en-Y gastric bypass(most common procedure) - Biliopancreatic diversion

MCQs

1) body mass index gives a measure of relative weight adjusted for height. the healthy range for BMI is?
   a. 15-18.5
   b. 18.5-25
   c. 25-29.9
   d. >30

2) which of the following is <u>false</u> about upper abdominal obesity?
   a. increase abdominal circumference(>102 cm in men and 88 cm in women)
   b. high waist-hip ratios(>1.0 in women and > 0.85 in men)
   c. visceral fat within the abdominal cavity is more hazardous to health than subcutaneous fat around the abdomen.
   d. risk for DM, stroke, CAD and early death

3) choose the true statement about lower abdominal obesity?
   a. also called apple shaped obesity
   b. waist to hip ratio(<1.0 for women and <0.8 for men)
   c. relatively common in females
   d. associated with increase risk for coronary heart disease, stroke and DM

4) the major role for leptin in body - weight regulation is?
   a. to signal satiety to the hypothalamus
   b. to reduce dietary intake and fat storage
   c. modulation of energy expenditure and carbohydrate metabolism
   d. all of the above

5)which of the following is <u>not</u> secondary cause of obesity?
   a. cushing syndrome
   b. insulinoma
   c. hypothyroidism
   d. DM

6) which of the following adipose derived hormones promotes insulin sensitivity in peripheral tissues?
   a. adiponectin
   b. resistin
   c. amylin
   d. leptin

7) bariatric surgery is an increasingly prevalent treatment option for patients with obesity. choose the incorrect statement about it?
   a. most popular is the roux-en-y gastric bypass
   b. the operation can be done laparoscopically
   c. can be the treatment of choice for any grade of obesity

Answer key:

1 (B) | 2 (B) | 3 (C) | 4 (D) | 5 (D) | 6 (A) | 7(C)|