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جمعية القلب السعودية
Saudi Heart Association

Bariatric Surgery- Insight into pathophysiology of Obesity and Weight Loss

Osama Alhadramy

Interventional Cardiologist

Taibah University

Member of Scientific Committee of Adult
Cardiology Program of SCFHS



Disclosure

- I drove to Jeddah



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Objectives

- Prevalence worldwide and KSA
- Risk Factors, morbidity and mortality of Obesity
- Pathophysiology
- Mechanism of Obesity-associated Diabetes Mellitus
- Obesity Management:
 - ☐ Life Style
 - ☐ medications
 - ☐ Bariatric Surgery



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Why Obesity?



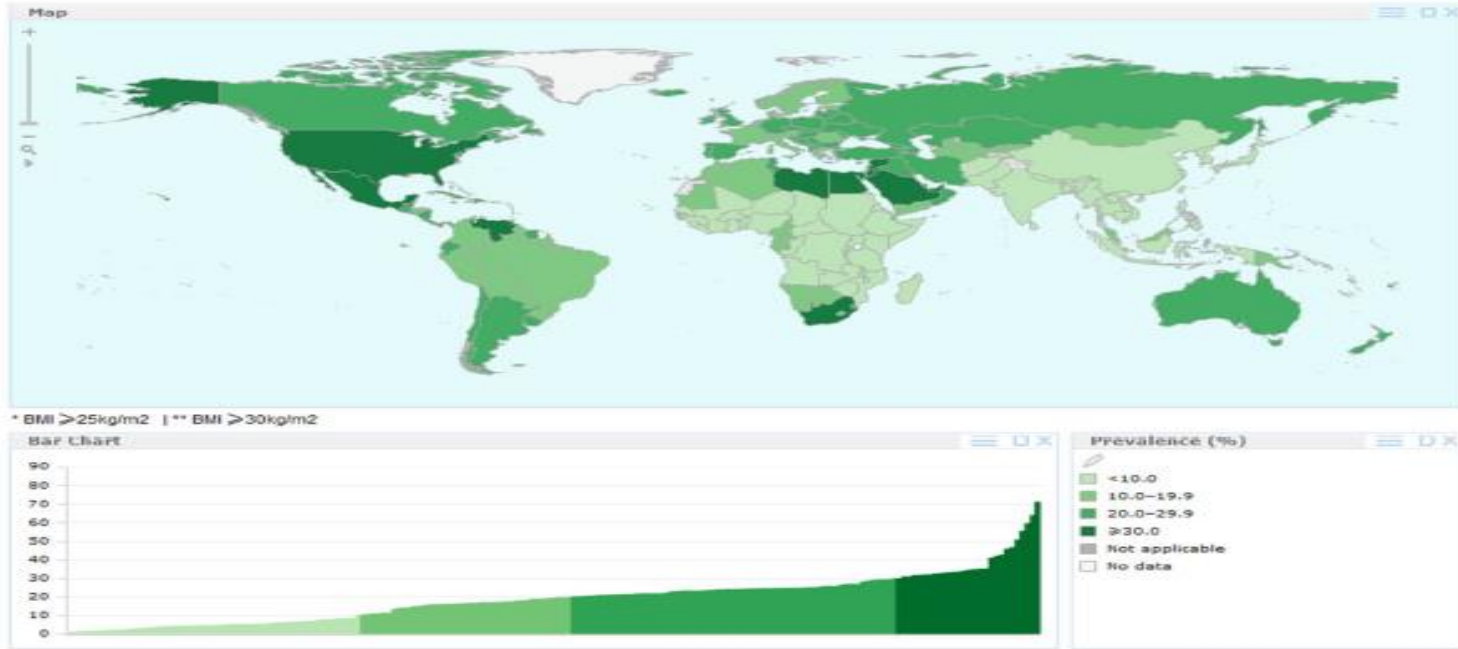
June 2013, the AMA adopted policy that recognizes obesity as a disease requiring a range of medical interventions to advance obesity treatment and prevention



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WHO Prevalence of Obesity 2008



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Obesity in Saudi Arabia

From Wikipedia, the free encyclopedia

Obesity in Saudi Arabia is a growing health concern with health officials stating that it is one of the leading causes of preventable deaths in [Saudi Arabia](#). According to *Forbes*, Saudi Arabia ranks 29 on a 2007 list of the fattest countries with a percentage of 68.3% of its citizens being overweight (BMI>25).^[1] Compounding the problem, according to a presentation at the 3rd International Obesity Conference in February 2014, is that obesity-related surgeries are not covered under Saudi healthcare.^[2]

See also [\[edit\]](#)

- [Epidemiology of obesity](#)



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Definition

Obesity is **defined** as : abnormal or excessive fat accumulation.

BMI : person's weight in kilograms divided by the square of his/her height in meters (kg/m^2).

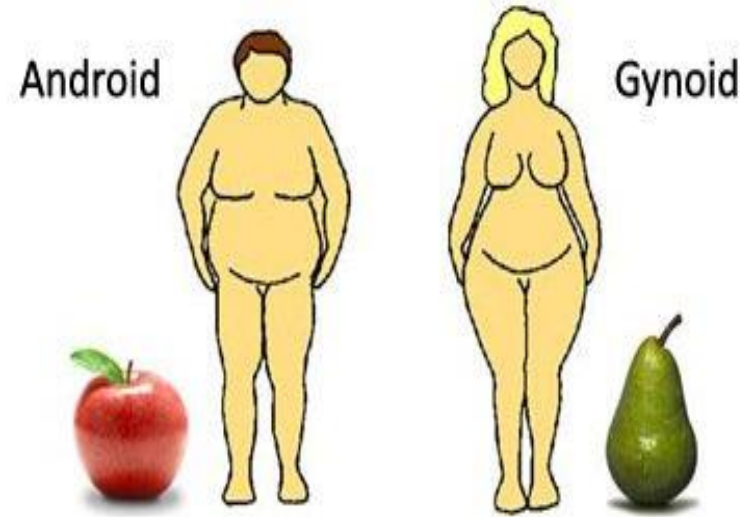
*** Waist Circumference**



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Classification	BMI (kg/m ²)
Underweight	<18,5
Normal weight	18,5 – 24,9
Overweight	25,0 – 29,9
Obesity grade 1	30,0 – 34,9
Obesity grade 2	35,0 – 39,9
Obesity grade 3	>40,0

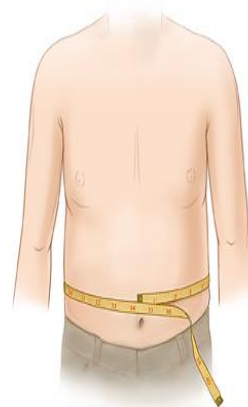


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Waist Circumference

- Locate the upper hip bone and the top of the right iliac crest.
- Place a measuring tape in a horizontal plane around the abdomen at the level of the iliac crest.
- For women:
 - * risk is high at ≥ 88 cm
 - * risk is high at ≥ 102 cm



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Risk Factors

- Food Consumption : Fast foods and any other type of food not prepared at home*.
 - Avoiding breakfast **.
 - Urbanization***.
 - Cultural Factors.
-
- * T. T. Amin, A. I. Al-Sultan, and A. Ali, "Overweight and obesity and their association with dietary habits, and sociodemographic characteristics among male primary school children in Al-Hassa, Kingdom of Saudi Arabia,"

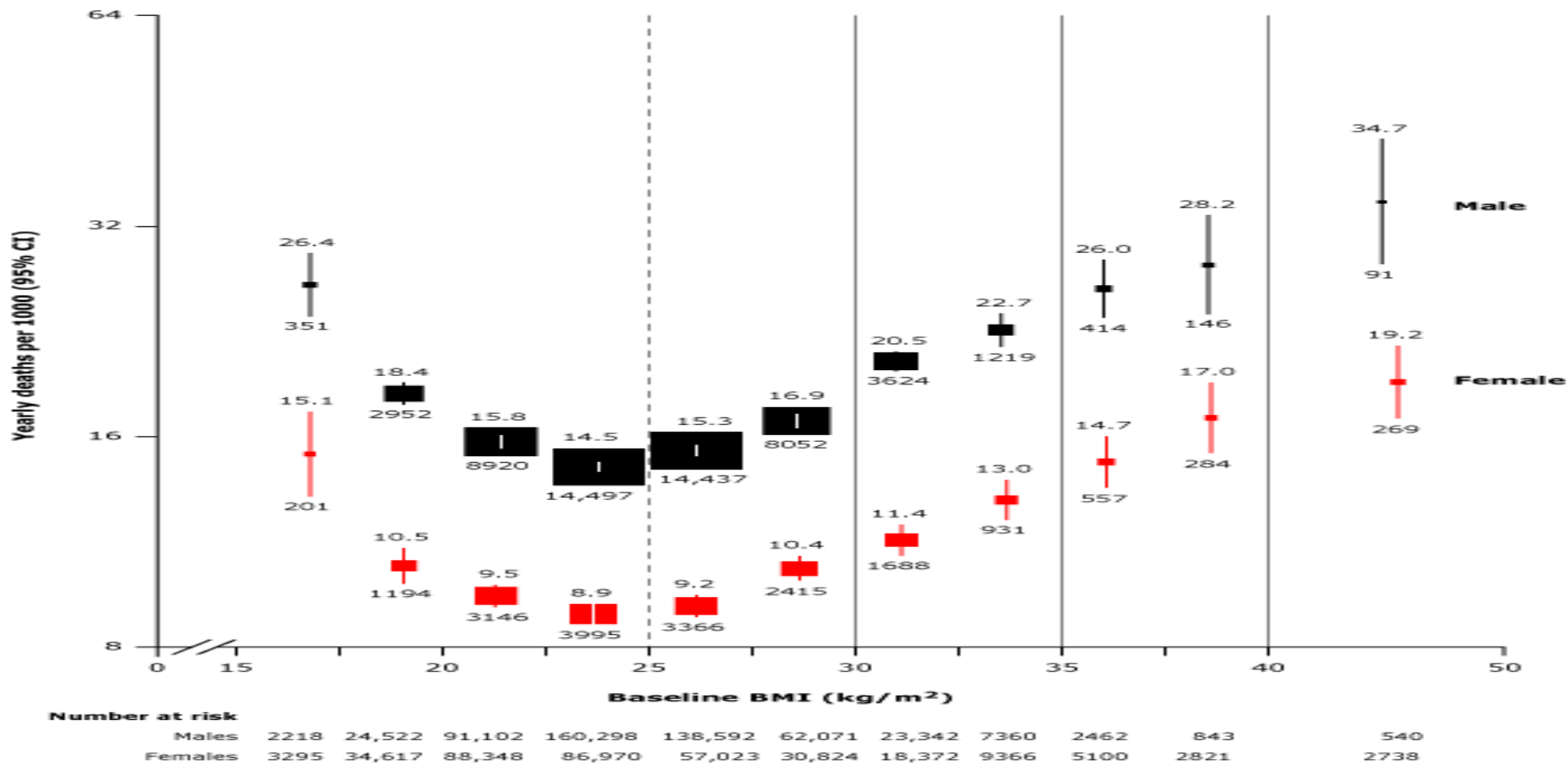


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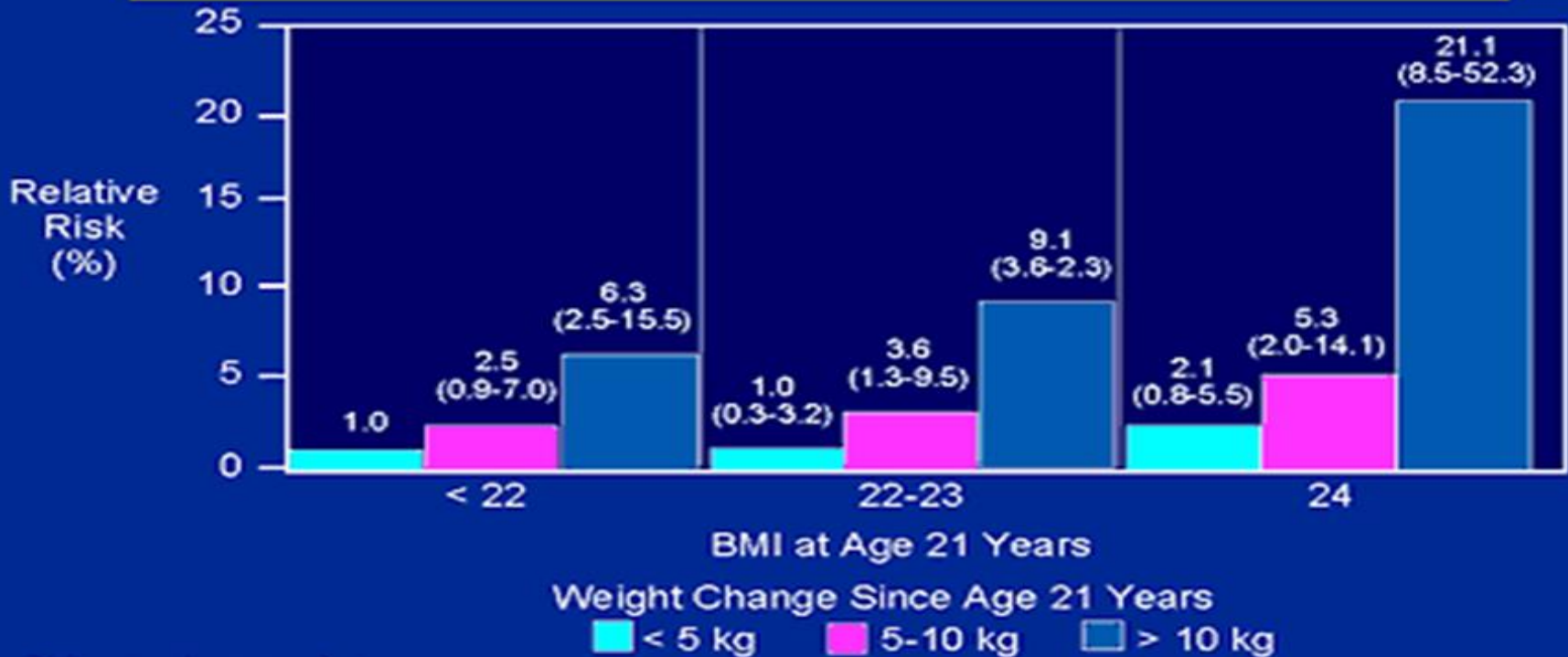
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All-cause mortality versus BMI



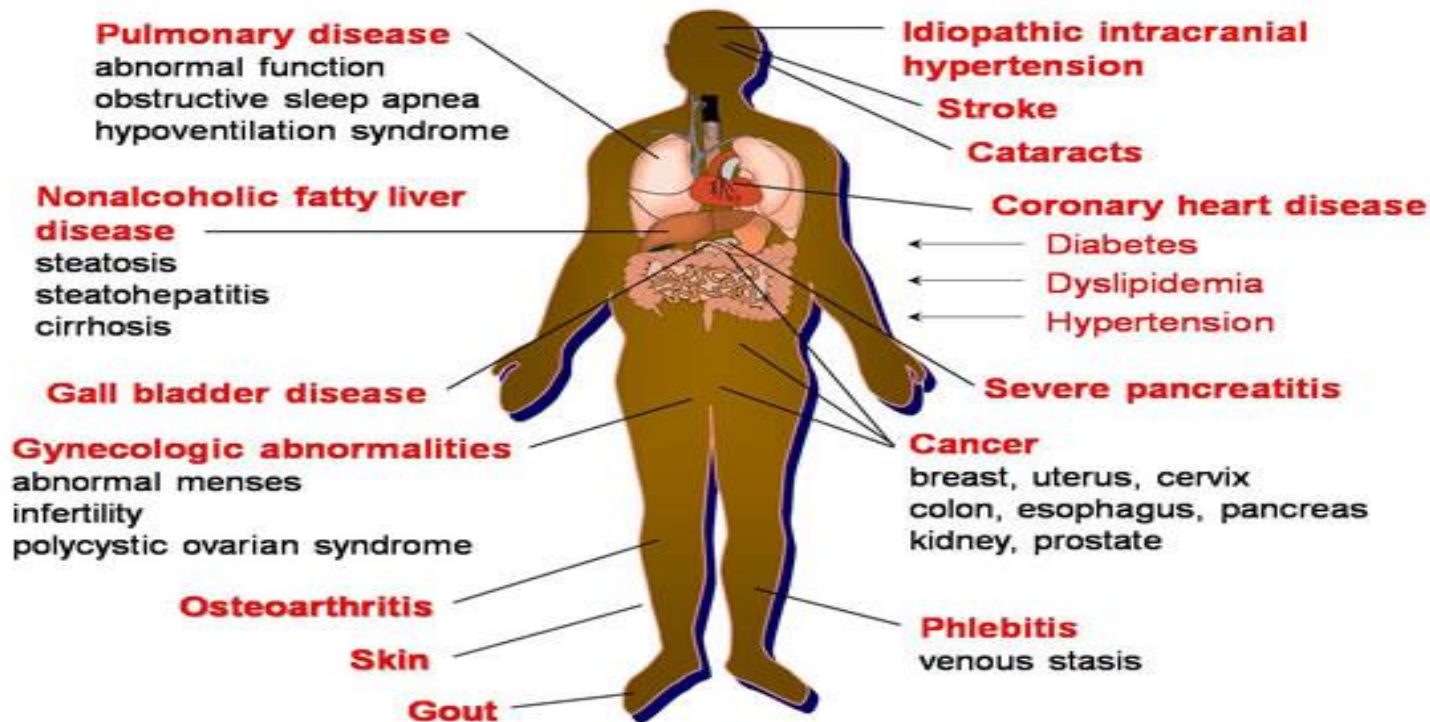
Weight Gain and Diabetes Risk



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Medical Complications of Obesity

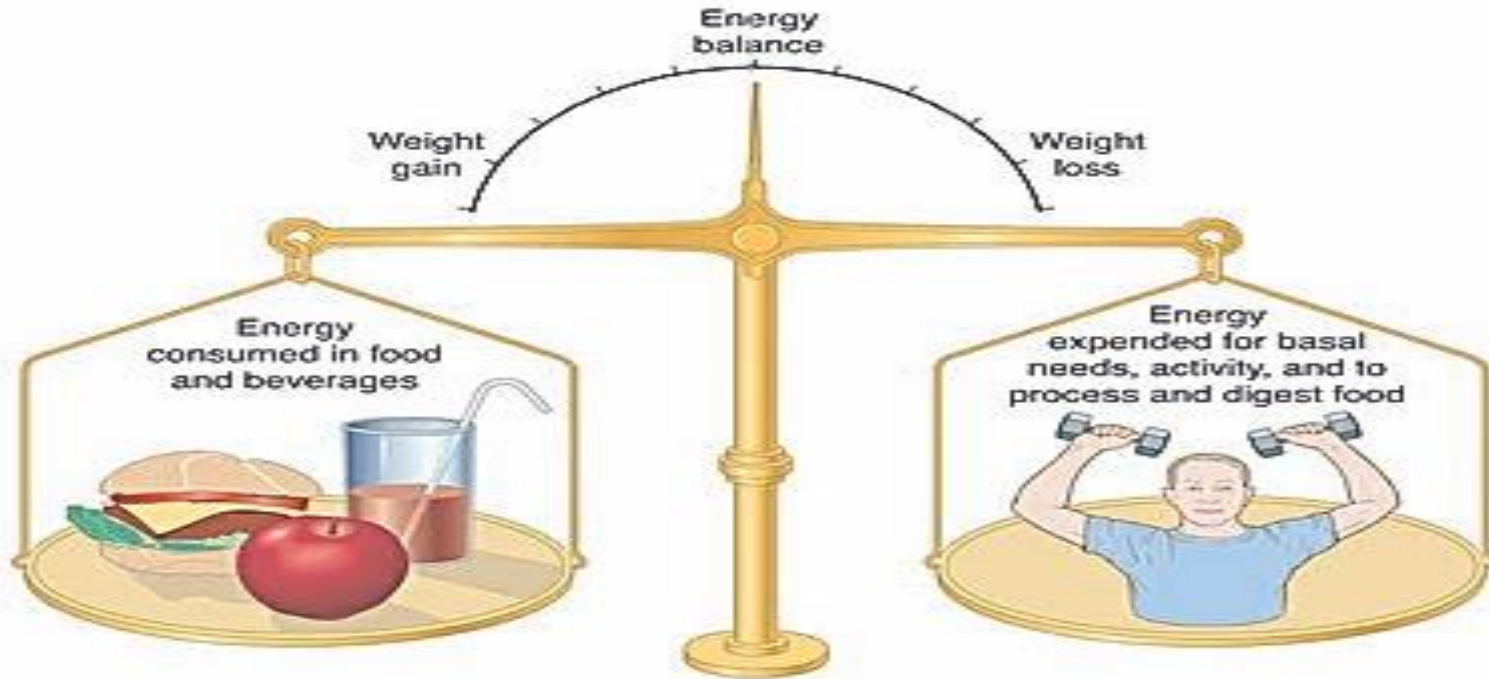


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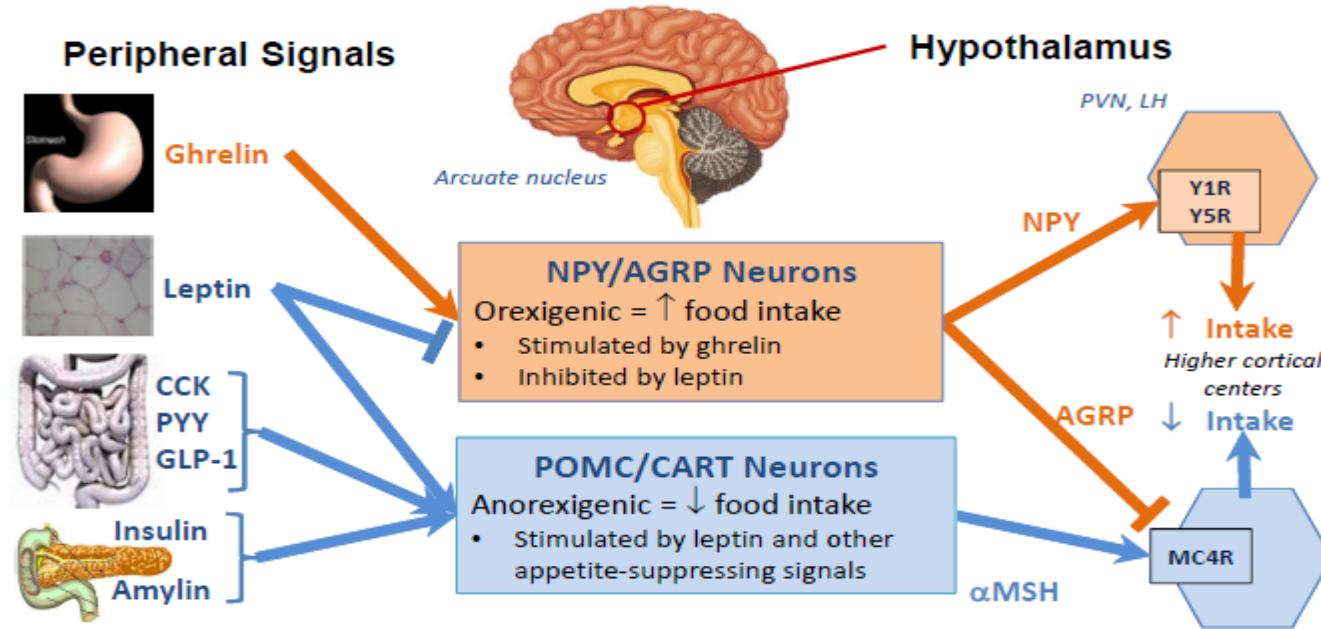
Pathophysiology (Energy Balance)



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Neurophysiological Mechanisms involved in Obesity



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Key Hormone Changes Associated with Weight Gain and Regain

Hormone	Source	Normal function	Alteration
Cholecystokinin (CCK)	Duodenum	Suppress appetite	Levels decrease during dieting and weight loss
Glucose-dependent insulinitropic polypeptide (GIP)	Duodenum, jejunum	Energy storage	Levels increase during dieting and weight loss
Ghrelin	Gastric fundus	Stimulate appetite, particularly for high-fat, high-sugar foods	Levels increase during dieting and weight loss
Glucagon-like peptide 1 (GLP-1)	Ileum	Suppress appetite and increase satiety	Decreased functionality
Insulin	Pancreas	Regulate energy balance Signal satiety to brain	Insulin resistance in obese persons Reduced insulin levels after dieting
Leptin	Adipocytes	Regulate energy balance Suppress appetite	Levels decrease during weight loss
Peptide YY (PYY)	Distal small intestine	Suppress appetite	Levels decreased in obese persons

Sumithran P, Proietto J. *Clin Sci (Lond)*. 2013;124:231-241.



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Treatment Modalities for Patients with Overweight and Obesity



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When to treat medical/surgical?

- BMI > 27 with comorbidities
- BMI > 30 without comorbidities

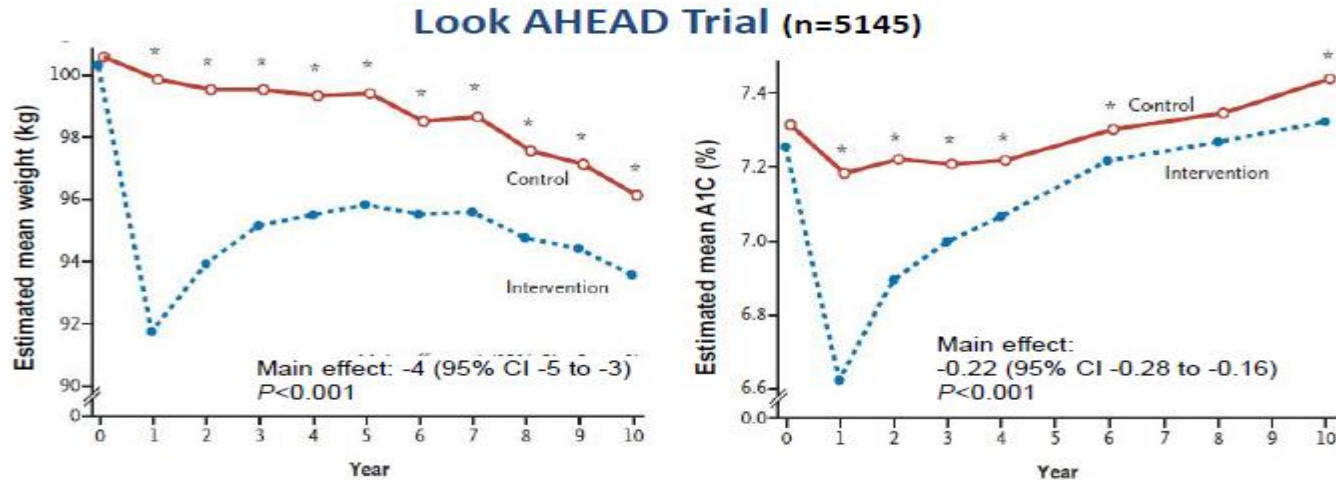


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Look AHEAD

5145 adults with type 2 diabetes who had a body mass index (BMI) > 25 randomly assigned to the intensive lifestyle arm or the diabetes support and education



Look AHEAD Research Group. *N Engl J Med.* 2013;369:145-154.



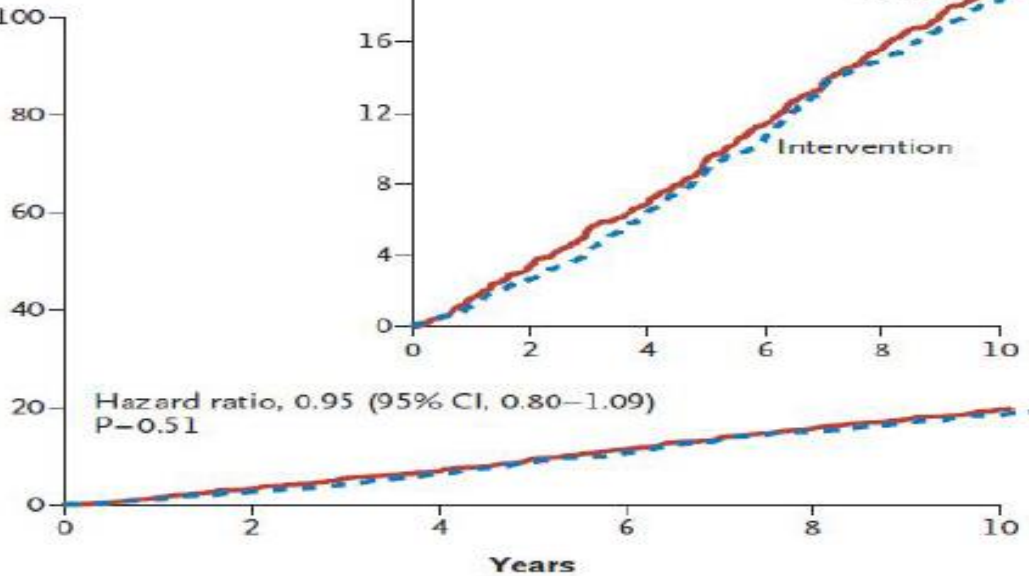
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Look AHEAD Trial

Patients experiencing death from CV causes, nonfatal MI, nonfatal stroke, or hospitalization for angina (%)

No. at Risk
Control
Intervention



	2575	2425	2296	2156	2019	688
Control						
Intervention	2570	2447	2326	2192	2049	505

Look AHEAD Research Group. *N Engl J Med.* 2013;369:145-154.



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Bariatric Surgery



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Surgery

Bariatric surgical procedures affect weight loss through two fundamental mechanisms:

- (1) Malabsorption
- (2) Restriction
- (3) Both ways



Adjustable
Gastric Band
(AGB)



Roux-en-Y
Gastric Bypass
(RYGB)



Vertical Sleeve
Gastrectomy
(VSG)



Biliopancreatic
Diversion With a
Duodenal Switch
(BPD-DS)



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Bariatric Surgery Type and Weight Loss

Weight Loss as a Percentage of Excess Body Weight (EBW) 164 patients

Surgical Procedure	%EBW Loss / Follow-up Period		
	1-2 Yrs	3-6 Yrs	7-10 Yrs
Vertical banded gastroplasty	50-72	25-65	--
Gastric banding	29-87	45-72	14-60
Laparoscopic sleeve gastrectomy	33-58	66	50-55
Roux-en-Y gastric bypass	48-85	53-77	25-68
Roux-en-Y gastric bypass – Long-limb	53-74	55-74	--
Biliopancreatic diversion ± duodenal switch	65-83	62-81	60-80

Mechanick JI, et al. *Endocr Pract.* 2008;14(suppl 1):1-83. Mechanick JI, et al. *Endocr Pract.* 2013;19:337-372.

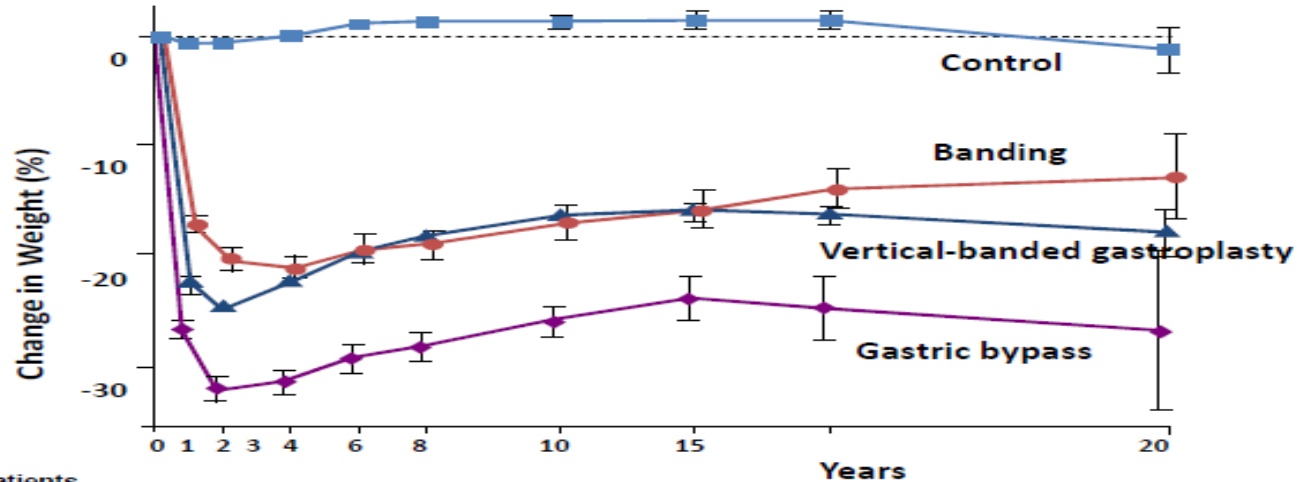


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Weight Regain after Bariatric Surgery

SOS Study: Mean Percent Weight over 15 years



No. patients						
Control	2037	1490	1242	1267	556	176
Banding	376	333	284	284	150	50
Gastroplasty	1369	1086	987	1007	489	82
Bypass	265	209	184	180	37	13

Sjostrom L, et al. N Engl J Med. 2007;357(8):741-752. © 2007 Massachusetts Medical Society..



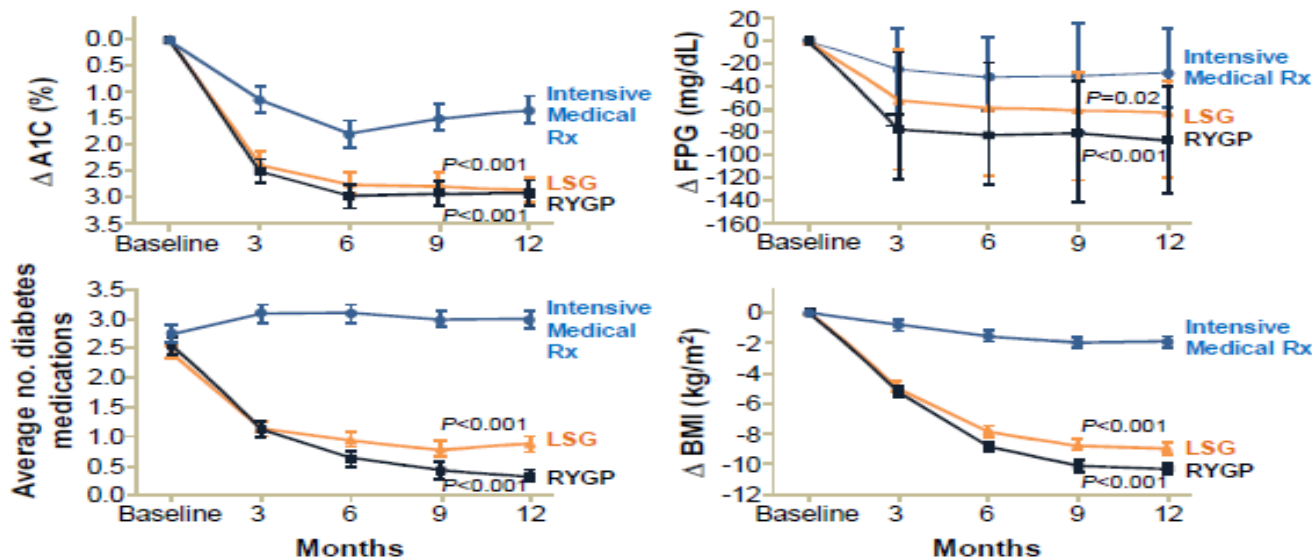
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Bariatric Surgery Outcomes

Patients With Type 2 Diabetes (150 patients)

→ Intensive medical therapy → Sleeve gastrectomy → Roux-en-Y gastric bypass



Schauer PR, et al. *N Engl J Med*. 2012;366:1567-1576.



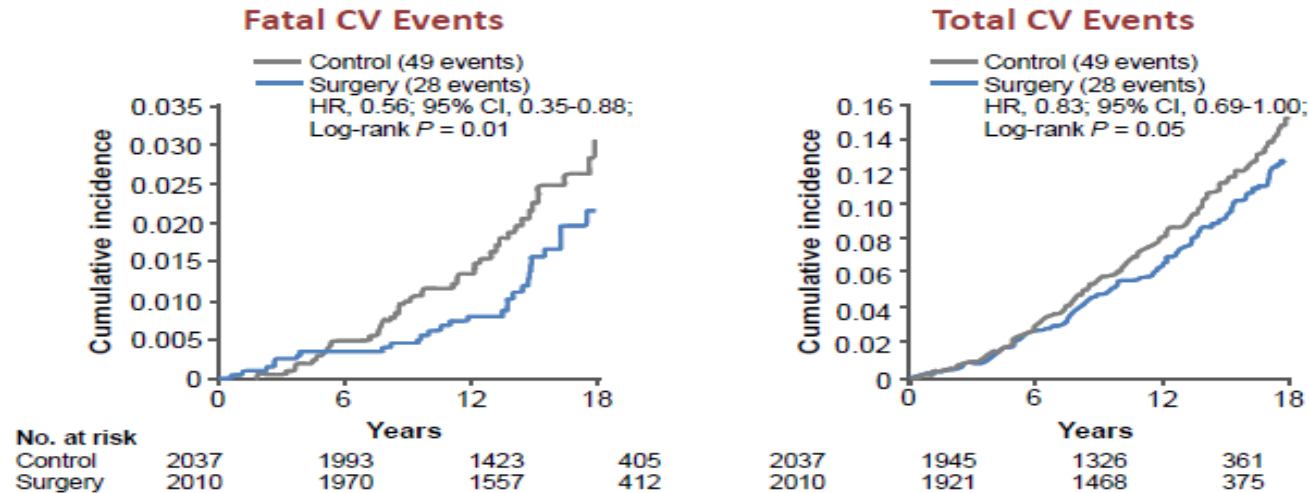
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Bariatric Surgery Outcomes

Mortality Reduced in Severely Obese Patients

Swedish Obese Subjects Study (n=4047)



Sjostrom L, et al. *JAMA*. 2012;307:56-65.



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Who should be referred to surgery?

- Be well-informed and motivated
- **Have a BMI ≥ 40 kg/m²**
- Have acceptable risk for surgery
- Have failed previous non-surgical weight loss
- The NIH also suggested that adults with a BMI **≥ 30 kg/m²** who have serious **comorbidities** such as severe diabetes, sleep apnea, or joint disease may also be candidates



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THE

TAKE-HOME MESSAGE



- Pathophysiology of obesity is complex and include energy scale
- surgical treatment showed better outcome compared to intensive weight loss
- endothelial dysfunction play a major role in complication of obesity and complication after weight loss



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thank you



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