

Epidemiology of Obesity

Objectives

- To understand the magnitude of obesity worldwide and nationally
- To define obesity
- To list the risk factors for obesity
- To list complications/consequences of obesity
- Discuss attributes associated with obesity.
- To learn the different treatment modalities for obesity
- To apply prevention measures for obesity, starting with the level of your community



Color index:

- **Important**
- **Notes**
- Extra
- **Boys' slides**

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Reference: Girls' & Boys' Slides



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Waiting for your **Feedback**

Obesity

Definition: A condition of abnormal and excessive fat accumulation in adipose tissue to the extent that health may be adversely affected “**dangerous**”.

“Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health.”

– World Health Organization

Classification of Obesity

Children

In U.S.: Obesity weight greater than or equal to the 95th percentile, based on the 2000 CDC growth charts.

International Obesity Taskforce:

• 0–5:

- o Overweight= 2 standard deviations (SD) above median BMI
- o Obese = 3 SD above median BMI

• 5–19:

- o Overweight = 1 SD above median BMI
- o Obese= 2 SD above median BMI

* The median is the value separating the data into two equal halves.

* Standard deviation used to quantify the amount of variation or dispersion of a set of data values.

- Sex/age-specific BMI
- BMI \geq 95th percentile is obese
- 85th to less than 95th percentile is overweight

Adults

WHO classifications of BMI:

Classification	BMI(kg/m ²)	
	Principal cut-off points	Additional cut-off points
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 – 16.99	16.00 – 16.99
Mild thinness	17.00 – 18.49	17.00 – 18.49
Normal range	18.50 – 24.99	18.50 – 22.99
		23.00 – 24.99
Overweight	\geq 25.00	\geq 25.00
Pre obese	25.00 – 29.99	25.00 – 27.49
		27.50 – 29.99
Obese	\geq 30.00	\geq 30.00
Obese class I	30.00 – 34.99	30.00 – 32.49
		32.50 – 34.99
Obese class II	35.00 – 39.99	35.00 – 37.49
		37.50 – 39.99
Obese class III	\geq 40.00 (extreme obesity)	\geq 40.00

As you can see in this table there is 3 classes of obesity, it is usually used to determine the management options. we do Bariatric surgery for obese class 3 patient, but it is usually not ethical to do it for class 1 obese patients

The BMI is not an ideal indicator of fat as it has some negative features (muscular man will high BMI but the body fat is low). If we combine BMI and waist circumference, the result will become more sensitive.

Other ways of estimating obesity

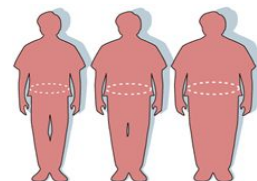
Look



Scale



Waist circumference



Global Burden

Overweight + obesity were estimated to cause 3.4 million deaths worldwide in 2010

indicators of Global burden:

- Accounted for 3.9% of **years of life lost**
- Accounted for 3.8% of **DALYs** *disability adjusted life years*
- Associated with reduction of **life expectancy** by 5– 10 years
- Obesity is associated with increase in:
 - All-cause mortality
 - Cancer related mortality
 - CVD-related mortality

Is obesity a disease or a condition/risk factor?

“...recognize obesity as a disease state with multiple pathophysiological aspects requiring a range of interventions to advance obesity treatment and prevention.”

– American Medical Association

Incidence of obesity

No official measures of Saudi obesity incidence currently

Would require accurately identifying the **population at risk** (non-obese) at a given time, as well as **new cases**

Potential for prospective cohort studies

Prevalence of obesity globally

Obesity worldwide prevalence

1995 200 million

2000 300 million

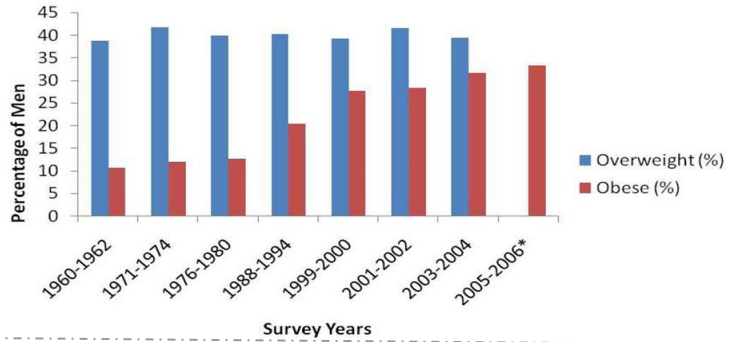
2008 857 million

2013 2.1 billion

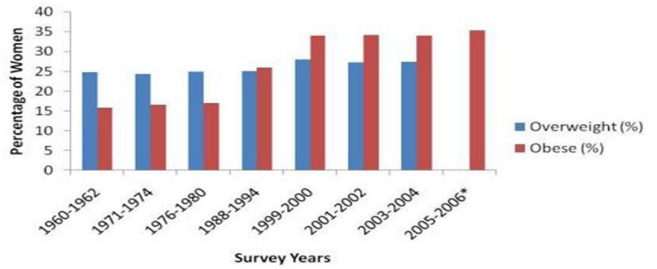
1997 WHO

Obesity

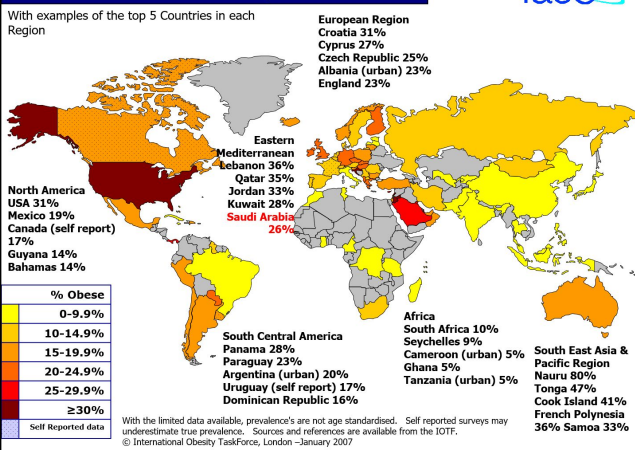
Prevalence and Trends of Overweight and Obesity Among men Ages 20–74 Years in the United States: 1960–2006



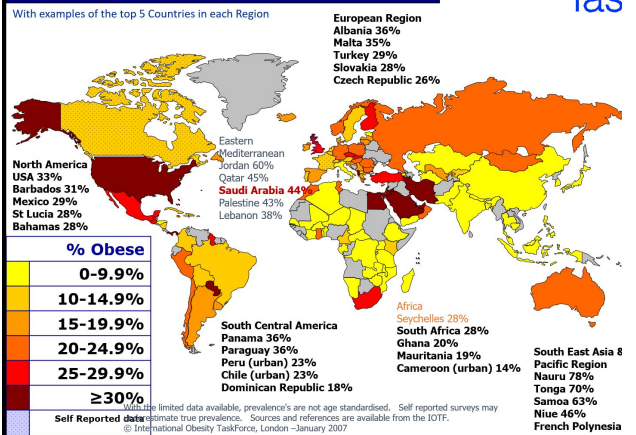
Women Ages 20–74 Years in the United States: 1960–2006



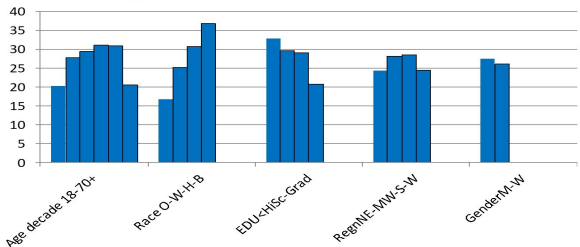
Global Prevalence of Obesity in Adult Males



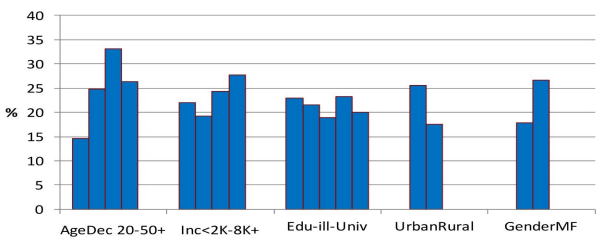
Global Prevalence of Obesity in Adult Females



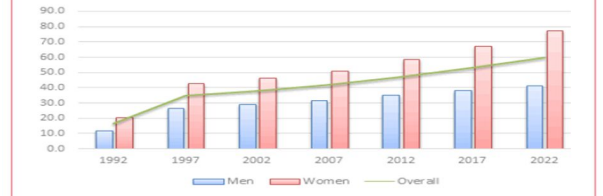
Demographic Prevalence of Obesity (BMI ≥ 30) : USA MMWR August 2010



Demographic Prevalence of Obesity in Saudi Arabia (BMI ≥ 30kg/m²) 1990-1993



Obesity Prevalence % (1992-2022)



Economist.com rankings

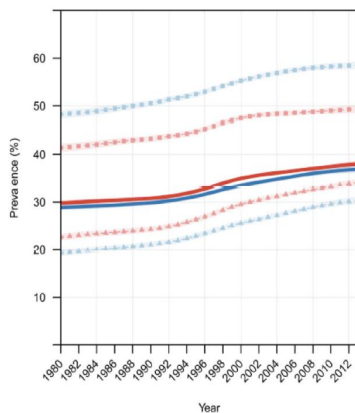
Highest obesity*		Women, % of total population			
1	Lebanon	36.3	1	Qatar	45.3
2	Qatar	34.6	2	Saudi Arabia	44.0
3	Kuwait	32.8	3	West Bank and Gaza	42.5
4	Panama	27.9	4	Lebanon	38.3
5	United States	27.7	5	Panama	36.1
6	Cyprus	26.6	6	Albania	35.6
7	Saudi Arabia	26.4	7	Bahrain	34.1
8	West Bank and Gaza	23.9	8	United States	34.0
9	Bahrain	23.3	9	Egypt	32.4
10	Albania	22.8	10	United Arab Emirates	31.4
11	England	22.7	11	Iran	30.0
12	Germany	22.5	12	Kuwait	29.9
13	Scotland	22.3	13	Turkey	29.4
14	Ireland	20.1	14	Mexico	29.0
15	Israel	19.9	15	Scotland	26.0
16	Mexico	19.4	16	Israel	25.7
17	Australia	19.3	17	Mongolia	24.6
18	United Arab Emirates	17.1	18	Jamaica	23.9
19	Wales	17.0	19	England	23.8
20	Oman	16.7	20	Cyprus	23.7
21	Slovenia	16.5	21	Germany	23.3
22	Turkey	16.5	22	Oman	23.1
23	Lithuania	16.2	23	Peru	23.0
24	Canada	16.0	24	Australia	22.2
25	Peru	16.0	25	Morocco	21.7
26	Luxembourg	15.3	26	Russia	21.6
27	Sweden	14.8	27	Trinidad & Tobago	21.1
28	Portugal	14.5	28	Fiji	19.3
29	Switzerland	14.1	29	Mauritania	19.2
30	Mongolia	13.8	30	Wales	18.0

* Data for these health rankings refer to the latest year available, 1999-2003. Obesity is defined as body-mass index of 30 or more. Source: "Pocket World in Figures", based on data from the World Health Organisation

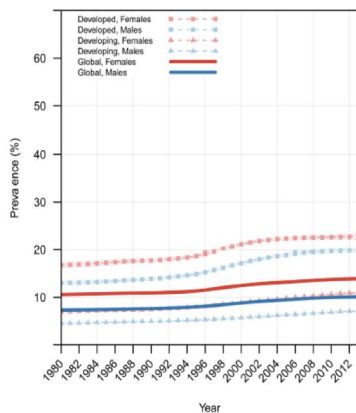
Overweight and Obesity Globally (2013)

1. In adults

A: Overweight and obesity (BMI>=25)



B: Obesity (BMI>=30)

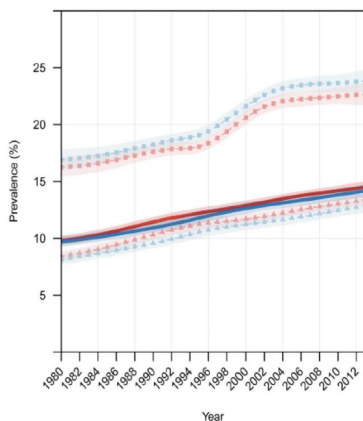


-Graph A: represents the prevalence of overweight/obesity over the years (1980-2012): On average males in developed countries have the highest prevalence of both overweight & obesity.

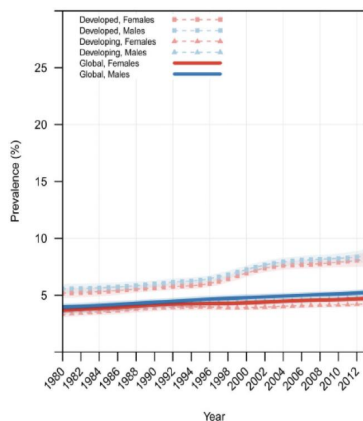
-Graph B: represents the prevalence of obesity alone over the years (1980-2012): On average females in developed countries have the highest prevalence of obesity alone.

2. In children

A: Overweight and obesity (based on IOTF cutoffs)



B: Obesity (based on IOTF cutoffs)



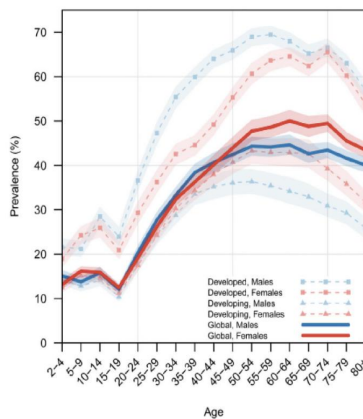
-Graph A: there is a huge gap between developed & developing countries and that's because children in developing countries have malnutrition.

-Graph B: Here the gap is narrow between developed & developing countries and that's because obesity in children is not common but it does happen.

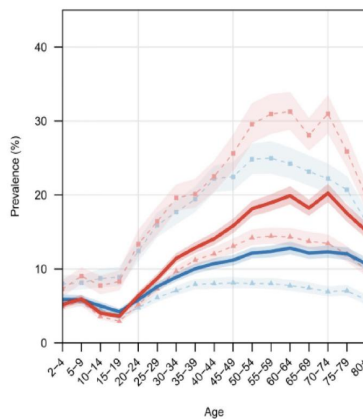
There is also a little difference between boys and girls.

3. Age standardized

A: Overweight and obesity (BMI>=25)



B: Obesity (BMI>=30)



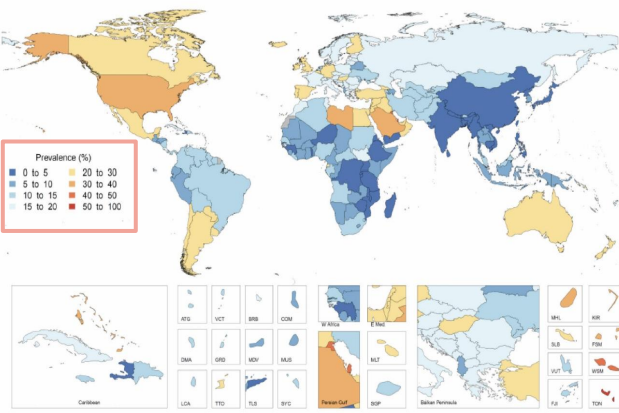
These graphs depend on age groups.

-Graph A: the biggest age group that suffers from overweight/obesity are 50-60 years old developed countries males.

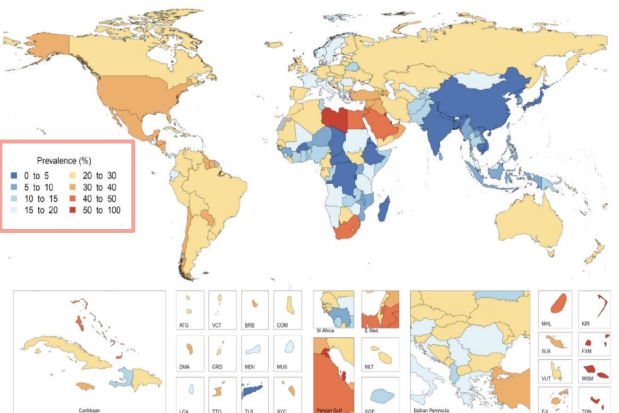
-Graph B: the biggest age group that suffers from obesity alone are 50-70 years old developed countries females.

Obesity Worldwide (2013)

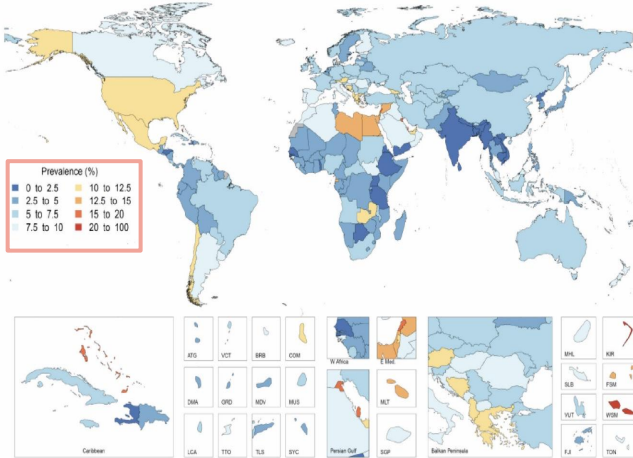
Male:



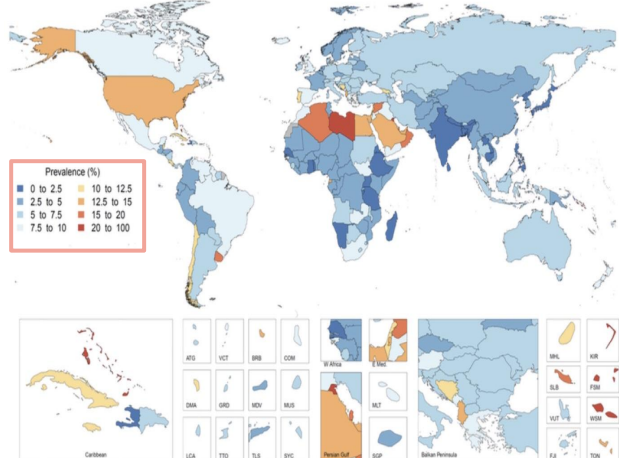
Female:



Boys:



Girls:



*note the difference between adult prevalence and children prevalence.

Children numbers are less because it would be a disaster if there is for example 40% or 50% obese children

Comparing Estimates across countries (2013)

Country/Region	Males <20		Males >20		Females <20		Females >20	
	Overweight	Obese	Overweight	Obese	Overweight	Obese	Overweight	Obese
Algeria	217 (185-252)	77 (62-94)	420 (390-448)	111 (98-123)	302 (255-345)	153 (125-184)	574 (551-609)	249 (224-274)
Bahrain	224 (192-260)	93 (73-114)	457 (455-462)	310 (284-337)	267 (225-308)	187 (85-134)	752 (728-775)	429 (400-459)
Egypt	313 (275-357)	127 (107-152)	471 (469-473)	284 (250-278)	393 (347-443)	144 (119-164)	700 (776-813)	484 (461-509)
Iran	216 (186-245)	58 (48-72)	494 (472-516)	136 (125-148)	262 (223-304)	72 (57-89)	613 (610-614)	293 (272-314)
Iraq	195 (165-228)	82 (68-98)	624 (597-653)	257 (233-281)	250 (213-289)	82 (66-100)	681 (651-709)	375 (344-406)
Jordan	241 (206-280)	80 (64-99)	716 (693-741)	275 (253-297)	254 (218-293)	80 (62-100)	756 (740-773)	459 (434-479)
Kuwait	246 (211-285)	167 (139-201)	445 (424-466)	433 (409-461)	453 (401-509)	23 (195-278)	843 (826-861)	58 (53-63)
Lebanon	333 (289-379)	159 (130-191)	711 (689-734)	263 (242-284)	298 (256-340)	125 (102-154)	623 (599-648)	295 (276-317)
Lithuania	425 (385-469)	145 (120-170)	409 (388-431)	492 (476-509)	417 (361-469)	42 (31-54)	472 (457-487)	57 (52-64)
Morocco	225 (192-261)	79 (64-94)	547 (517-575)	181 (165-200)	254 (213-292)	91 (73-111)	524 (490-559)	209 (188-231)
Oman	345 (295-395)	84 (67-102)	537 (509-567)	394 (355-432)	423 (374-473)	154 (124-185)	734 (710-757)	369 (339-401)
Pakistan	279 (238-321)	119 (98-143)	700 (674-724)	298 (280-315)	304 (264-353)	125 (101-152)	770 (748-792)	424 (403-444)
Qatar	333 (293-380)	188 (158-219)	757 (738-774)	440 (418-464)	221 (186-257)	155 (126-184)	762 (723-801)	547 (521-570)
Saudi Arabia	235 (202-268)	94 (78-112)	690 (671-707)	300 (284-318)	373 (328-424)	149 (122-177)	762 (723-801)	444 (424-465)
Sudan	112 (92-134)	57 (46-69)	358 (332-384)	127 (113-142)	144 (120-170)	58 (45-71)	399 (373-427)	183 (164-204)
Syria	329 (286-375)	139 (115-165)	720 (695-742)	242 (218-266)	333 (288-383)	154 (125-186)	727 (699-751)	399 (368-430)
Tunisia	177 (150-200)	42 (34-52)	517 (488-544)	133 (117-169)	234 (196-273)	42 (33-52)	573 (544-603)	128 (111-143)
Turkey	204 (175-236)	71 (57-87)	638 (621-655)	201 (188-213)	198 (166-230)	57 (45-70)	658 (642-675)	341 (324-358)
United Arab Emirates	403 (295-515)	122 (98-147)	661 (636-688)	273 (255-290)	314 (271-362)	126 (100-157)	664 (675-654)	352 (300-396)
Yemen	84 (66-100)	17 (14-21)	290 (268-312)	44 (37-51)	269 (223-314)	83 (66-103)	579 (551-608)	247 (222-272)
Philippines	55 (45-64)	24 (21-27)	229 (210-248)	41 (36-47)	34 (44-64)	21 (16-27)	259 (238-282)	62 (57-67)

This table compares overweight/obesity between countries:

As we can see:

1- The highest country with obesity among male children and adults is Qatar

2- The highest country with obesity among female children and adults is Kuwait

In Saudi Arabia:

1- Overweight/obesity is much higher in girls compared to boys

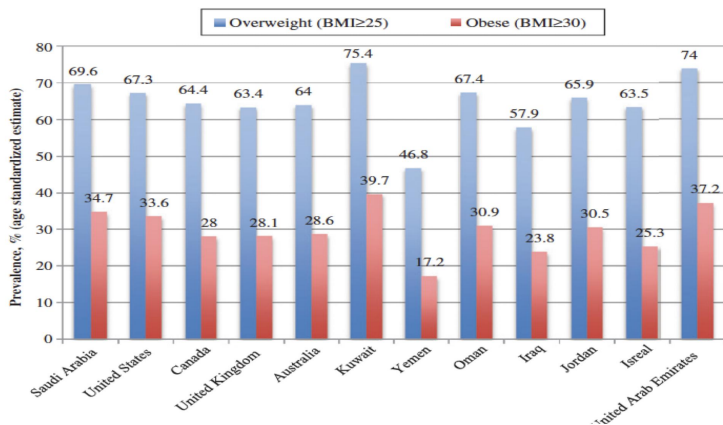
2- Overweight/obesity is much higher in females compared to males

Country/Region	Males <20		Males >20		Females <20		Females >20	
	Overweight	Obese	Overweight	Obese	Overweight	Obese	Overweight	Obese
Morocco	225 (193-261)	79 (64-94)	547 (517-575)	181 (165-200)	254 (213-292)	91 (73-111)	524 (490-559)	209 (188-231)
Oman	345 (295-395)	84 (67-102)	537 (509-567)	394 (355-432)	423 (374-473)	154 (124-185)	734 (710-757)	369 (339-401)
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Tunisia	177 (150-200)	42 (34-52)	517 (488-544)	133 (117-169)	234 (196-273)	42 (33-52)	573 (544-603)	128 (111-143)
Turkey	204 (175-236)	71 (57-87)	638 (621-655)	201 (188-213)	198 (166-230)	57 (45-70)	658 (642-675)	341 (324-358)
United Arab Emirates	403 (295-515)	122 (98-147)	661 (636-688)	273 (255-290)	314 (271-362)	126 (100-157)	664 (675-654)	352 (300-396)
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Philippines	55 (45-64)	24 (21-27)	229 (210-248)	41 (36-47)	34 (44-64)	21 (16-27)	259 (238-282)	62 (57-67)
Denmark	197 (166-231)	87 (71-107)	592 (565-619)	196 (177-219)	194 (159-232)	59 (47-75)	447 (417-477)	199 (177-220)
Finland	240 (223-258)	92 (75-112)	622 (595-649)	209 (189-232)	211 (175-250)	66 (52-81)	504 (475-532)	223 (203-246)
France	199 (166-233)	58 (47-70)	559 (532-587)	193 (174-214)	160 (135-187)	47 (38-59)	428 (400-457)	197 (177-217)
Germany	205 (174-238)	35 (45-67)	643 (619-668)	219 (202-238)	194 (162-225)	53 (42-65)	490 (465-514)	225 (205-247)

Here we compare with more developed countries and as we can see around the world people are obese/overweight.

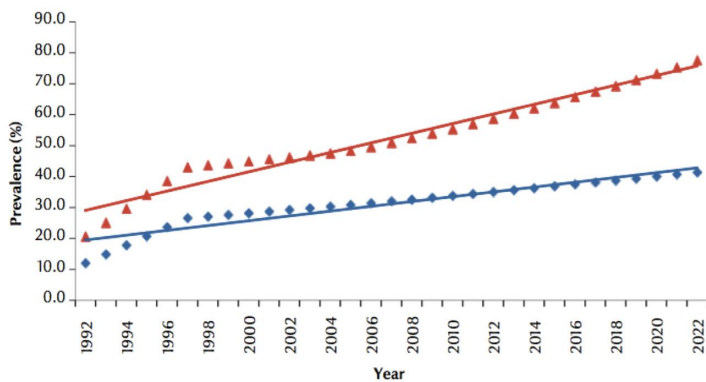
Obesity and Overweight in Saudi Arabia

Comparing in Arab world



Saudi Arabia ranks (3rd) among Arab countries in prevalence of obesity/overweight after Kuwait (1st) and Emirates (2nd).

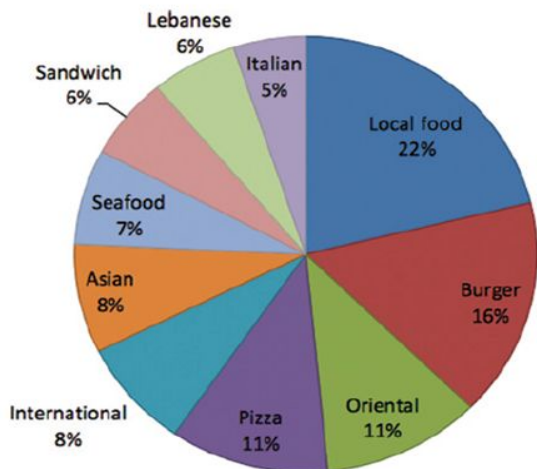
Projections of obesity in Saudi Arabia



This graph shows what our country will look like in 2022 if we don't change our lifestyle and eating habits:

Obesity is increasing and will reach 70% in Females and 40% in Males by the year of 2022.

Top 10 restaurants in Saudi Arabia



Top ten restaurant types searched on phone-apps in 2013

As you can see in this figure, the highest percentage is Local food which is very bad because our local food has high amount of carbohydrates and fats.

Risk Factors for Obesity

1. Genetic factors

- Parents who are obese
- Genetic disorders:
 - o Melanocortin 4 receptor disorders
 - o Prader–Willi Syndrome
 - o Albright’s hereditary osteodystrophy
 - o Leptin deficiency
 - o Leptin receptor mutations
 - o Trisomy 21

The obesity is not genetic dependent, it is the interaction between genetics and environmental factors.

2. Hormonal factors

- o Hypothyroidism
- o Growth hormone deficiency
- o Cushing syndrome
- o Hypothalamic obesity
- o Polycystic ovary syndrome (PCO)
- o Hyperprolactinemia

3. Environmental factors

- **Low income**
- Parents’ bad habits for food and physical activity
- Difficulty accessing places with healthy food options (food desert)
- Living far away from parks **sedentary lifestyle**
- Dangerous neighborhoods **people won’t allow their children to play and go outside in dangerous neighborhoods**
- Food insecurity (no sufficient quantity of affordable healthy food)

4. Behavioral factors

- o Nutrition and diet
- o Physical activity
- o Sleep
- o Stress

Attributes associated with obesity

1. Race/ethnicity

Adults

47.8% non-Hispanic black
42.5% Hispanic
32.6% non-Hispanic white
10.8% non-Hispanic Asian

Children/Adolescents

22.4% Hispanic
20.2% non-Hispanic black
14.1% non-Hispanic white
8.6% non-Hispanic Asian

The assumption that race reflects only biological distinctions is inaccurate.

Suggestion from WHO Western Pacific Region that BMI cutoffs may need to be lower for some Asian populations due to increased risk for poor health outcomes

2. Age

Adults

- 39.5% ages 40–59
- 35.4% ages 60+
- 30.3% ages 20–39

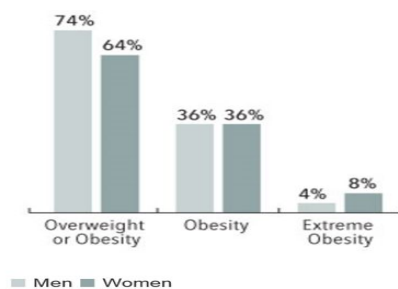
Children/Adolescents

- 20.5% ages 12–19
- 17.7% ages 6–11
- 8.4% ages 2–5*

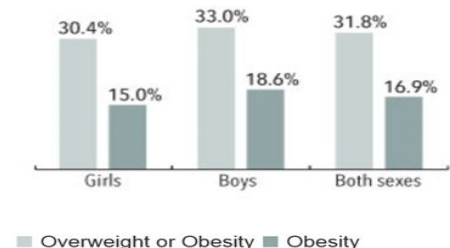
*down from 13.9% in less than a decade (2003/2004 – 2011/2012)

3. Sex

Source: NHANES, 2009–2010
Estimated Percentage by Sex



Source: NHANES, 2009–2010
Percentage by Sex, Ages 2–19



4. Adverse behaviors

- Diets high in calories, added sugars, fast food

Average daily calorie intake for adults: 2,234

- Low physical activity

Only 19% of Americans meet minimum guidelines
Saudi Arabia is one of the countries with low physical activity

- Television or other media

Sedentary activity

Increased exposure to food/beverage marketing

Over 7.5 hours daily for older children/adolescents

Attributes associated with obesity

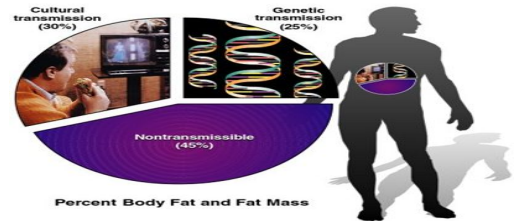
5. Genetics

- Family history of obesity
- Other conditions, such as Cushing's disease or polycystic ovary syndrome
- Potential gene variants affecting hunger or metabolism, interacting with environmental influences

Genetics plays a role.

- How much variation in weight gain among individuals can be accounted for by genetic factors?
- Largest transmissible variation is cultural.

19.1. Total transmissible variance for body fat.



6. Income

- Higher incomes associated with decreased risk of obesity in women, but increased risk in non-Hispanic black men and Mexican-American men
- Being at or below the poverty line is associated with higher rates of obesity among children
- 9 of 10 states with the highest obesity rates are among the poorest

7. Education

- Women with college degrees have lower risk of obesity compared to those with less education
- Generally, obesity rates are lower for children if head of household has college degree versus not finishing high school

8. Geography & culture

- Higher prevalence of obesity in rural areas
- Risk for obesity among immigrants increases with time spent in the U.S.
- States with highest rates of obesity also have lowest physical activity rates for adults
- Unhealthy food and physical activity environments
- Limited food access, availability, affordability

Other risk factors

- Maternal smoking
- Extreme birth weight (low or high)
- Not being breastfed
- Disabilities
- Medications (steroids, antidepressants)

Pathophysiology of obesity

1- Change in adipose tissue

- o ↑circulating fatty acids
- o Proinflammatory factors IL and TNF
- o infiltration of immune cells WBCs

2- Chronic low grade inflammation

- o Dyslipidemia: which leads to Atherosclerosis and Impaired fibrinolysis, which increase the risk of CVD, Stroke and Venous thromboembolism.
- o Insulin resistance leads to type 2 diabetes

Consequences of Obesity

1. In Adults

Class of event	Comorbidities associated with obesity
Cancer/malignancy	Postmenopausal breast, endometrial, colon and rectal, gallbladder, prostate, ovarian, endometrial renal cell, esophageal adenocarcinoma, pancreatic, and kidney cancer
Cardiovascular	Coronary artery disease, obesity-associated cardiomyopathy, essential hypertension, left ventricular hypertrophy, cor pulmonale, accelerated atherosclerosis, pulmonary hypertension of obesity, dyslipidemia, chronic heart failure (CHD), left ventricular hypertrophy (LVH), cardiomyopathy, pulmonary hypertension, lymphedema (legs)
Gastrointestinal (GI)	Gall bladder disease (cholecystitis, cholelithiasis), gastroesophageal reflux disease (GERD), reflux esophagitis, nonalcoholic steatohepatitis (NASH), nonalcoholic fatty liver disease (NAFLD), fatty liver infiltration, acute pancreatitis
Genitourinary	Stress incontinence
Metabolic/endocrine	Type 2 diabetes mellitus, prediabetes, metabolic syndrome, insulin resistance, and dyslipidemia
Musculoskeletal/orthopedic	Pain in back, hips, ankles, feet and knees; osteoarthritis (especially in the knees and hips), plantar fasciitis, back pain, coxavera, slipped capital femoral epiphyses, Blount disease and Legg-Calvé-Perthes disease, and chronic lumbago
Neurological and central nervous system (CNS)	Stroke, dementia idiopathic intracranial hypertension, and meralgia paresthesia
Obstetric and perinatal	Pregnancy-related hypertension, fetal macrosomia, very low birthweight, neural tube defects, preterm birth, increased cesarean delivery, increased postpartum infection and pelvic dystocia, preeclampsia, hyperglycemia, gestational diabetes (GDM)
Skin	Keratosis pilaris, hirsutism, acanthosis nigricans, and acrochondons, psoriasis, intertrigo (bacterial and/or fungal), and increased risk for cellulitis, venous stasis ulcers, necrotizing fasciitis, and carbuncles
Psychological	Depression, anxiety, personality disorder, and obesity stigmatization
Respiratory/pulmonary	Obstructive sleep apnea (OSA), Pickwickian syndrome (obesity hypoventilation syndrome), higher rates of respiratory infections, asthma, hypoventilation, pulmonary emboli risk
Surgical	Increased surgical risk and postoperative complications, deep venous thrombosis, including wound infection, pulmonary embolism, and postoperative pneumonia
Reproductive (Women)	Anovulation, early puberty, polycystic ovaries, infertility, hyperandrogenism, and sexual dysfunction
Reproductive (Men)	Hypogonadotropic hypogonadism, polycystic ovary syndrome (PCOS), decreased libido, and sexual dysfunction
Extremities	Venous varicosities, lower extremity venous and/or lymphatic edema

2. In Children

- o Type 2 Diabetes mellitus
- o Asthma
- o Non-alcoholic fatty liver disease
- o Puberty (delay in boys, advance in girls)
- o Poor self-esteem
- o Sleep problems.
- o Early onset metabolic syndrome
- o Poor dental health
- o GERD
- o Hyperandrogenism
- o ADHD attention deficit/hyperactivity disorder
- o PCOS

“I would argue that [obesity] is the most significant public health challenge we face at this time, both because of the huge number of people it affects and because of the ripple effects it has and will have on the development of debilitating and costly chronic diseases.”

– Daniel R. Glickman, Chair, Institute of Medicine’s Committee on Accelerating Progress in Obesity Prevention, 2012

Morbidity associated with obesity

Degree of abdominal fat accumulation is correlated with increased risk of:

- Type 2 Diabetes
- Cardiovascular Disease
- Nonalcoholic fatty liver disease
- Hypertension
- Stroke
- Osteoarthritis
- Some cancers

Morbidity from childhood obesity

- Preschoolers who are overweight or obese are 5 times as likely to be overweight or obese as adults
- Obesity is a long term process.
- Obesity frequently begins in childhood.
- **Obese parents** likely have overweight children.
- Regardless of final body weight as adults, overweight children exhibit more illnesses as adults than normal kids.

Mortality

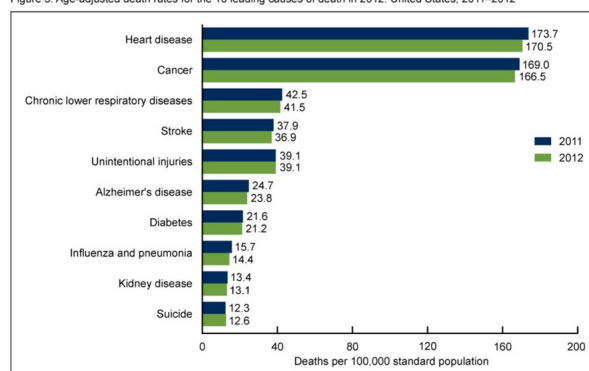
- More deaths globally associated with obesity/overweight than underweight
2.8 million per year

TABLE 2-1 Physical Health, Psychosocial, and Functional Consequences of Obesity Over the Life Course

Physical Health	Psychosocial	Functional
<ul style="list-style-type: none"> • Cardiovascular disease • Cancer • Glucose intolerance and insulin resistance • Type 2 diabetes • Hypertension • Dyslipidemia • Hepatic steatosis • Cholelithiasis • Sleep apnea • Reduction of cerebral blood flow • Menstrual abnormalities • Orthopedic problems • Gallbladder disease • Hyperuricemia and gout 	<ul style="list-style-type: none"> • Stigma • Negative stereotyping • Discrimination • Teasing and bullying • Social marginalization • Low self-esteem • Negative body image • Depression 	<ul style="list-style-type: none"> • Unemployment • Mobility limitations • Disability • Low physical fitness • Absenteeism from school or work • Disqualification from active service in the military and fire/police services • Reduced productivity • Reduced academic performance

SOURCE: Adapted from IOM, 2010a.

Figure 3. Age-adjusted death rates for the 10 leading causes of death in 2012: United States, 2011–2012



NOTE: Access data table for Figure 3 at: http://www.cdc.gov/nchs/data/databriefs/db168_table.pdf#1. SOURCE: CDC/NCHS, National Vital Statistics System, Mortality.

Benefits of Weight Reduction

Reduction of 5% to 10% of weight (why this exact range of percentages, for two reasons, one it's a realistic gainable goal, two the better the sustainability of the long term weight reduction) is associated with significant reduction in risk for:

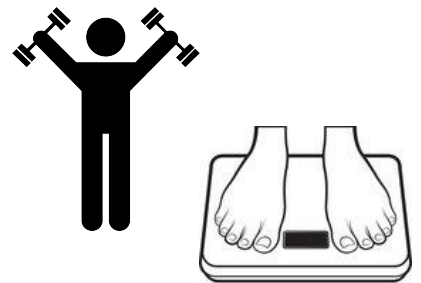
- CVD cardiovascular diseases
- T2DM type 2 diabetes mellitus
- GERD Gastroesophageal reflux disease
- PCOS polycystic ovarian syndrome
- Dyslipidemia
- HTN Hypertension
- Osteoarthritis
- Sleep apnea

Treatment of Obesity

- Behavioral modification
- Bariatric surgery The guideline is different and It has a specific criteria. For example a morbid obesity
- Treatment of underlying cause (if hormonal causes) e.g. we can't ask hypothyroidism patients to reduce their weight without treating hypothyroidism

Important Strategies for Maintaining Weight Reduction

1. Changing lifestyle
 - Modify food intake
 - Increase physical activity
 - Exercise 1 hour daily
 - Weigh weekly
 - Watch less than 10 hours TV per week
 - Use a weight-loss program
2. Set realistic goals
 - 5% - 15% of initial weight
3. Maintaining a food diary
4. Continuous support especially with children and teenagers
5. Prepare the suitable environment
 - Availability of healthy food items
 - Organized family meal times
 - Meal prepping (plan what you eat ahead of time)



Preventing* obesity in children

Preventing obesity in children

- Early stage prevention:
 - Maternal gestational weight control
- During infancy:
 - Dietary intake (self-regulation of breastfeeding ↓ risk, early introduction of solid food ↑ risk)
 - Broad spectrum antibiotics (↑ risk)
- During pre-school: **Having a very strict parenting habit is essential**
 - Response to child temperament “if the child was crying it is unhealthy to give him chocolate or turn on TV”
 - Dietary habits
 - Reducing screen time
- School and adolescents:
 - Physical activity (exergaming) **wii for example**
 - Peer habits



Secondary prevention means that I treat the condition as early as possible to prevent the complication.

Secondary prevention measures obesity in children

- Screening for obesity by primary care provider → Provide counseling
- Provide guidance on nutrition and physical activity

Prevention of childhood obesity at community level

- Provide services for obesity prevention and treatment (BMI screening, well-visits)
- Promote healthy food and beverages and physical activity at schools
- Maintain safe neighborhoods
- Encourage going to parks and physical activity (especially **summer vacation**)
- Availability of healthy food resources in all communities
- Funding research for childhood obesity **Because it gives us more information about how to tack this problem and how to prevent it.**

*Prevention is classified in 3 stages:

Primary prevention: to prevent the disease

Secondary prevention: to prevent complications

Tertiary prevention: i treat complications to prevent death and to improve quality of life

Tackling factors affecting childhood obesity



Preventing obesity in Adult

- Educate and promote healthy lifestyle
- Promote social and environmental situation that prevents weight gain
- Involve different stakeholders in combating this epidemic
- Develop population-based policies that target:
 - barriers for healthy food and physical activity
 - Influence positive eating and physical activity behavior
 - Provide weight screening services, weight control services

Primary prevention

Preventing obesity before it occurs

- Regulating caloric energy balance to prevent problematic weight gain
 - Diet
 - Physical activity
- Environmental factors

Address barriers to a healthy diet

- Access to healthy food
- Food advertising
- Large portion sizes
- Affordability of healthy food
- Time constraints
- Established behaviors

Address barriers to physical activity

- Zoning
- Safety
- Areas conducive to physical activity
- Time constraints
- Established behaviors

Physical activity guidelines

- 2.5 hours per week for adults
- 1 hour per day for children/adolescents
 - Physical activity tends to decline as children get older

Policy options

- Tax unhealthy foods/beverages
- Calorie labeling in food service facilities
- Food purchasing standards for hospitals/schools

Secondary prevention

- Recognize overweight or obese individuals early through screening in order to improve outcomes
 - Weight loss interventions
 - Challenges with sustaining weight loss over time
- Reduce risk factors associated with obesity
 - Secondary screening for potential comorbidities
- Need to understand different causes and responses to obesity in order to better target treatments

Tertiary prevention

- Management of severe obesity to reduce complications
- Bariatric surgery
- Type 2 diabetes, other comorbidities
- Medications, if shown to be effective

Community-level interventions

- Incentives for markets to locate to areas with limited food access
- Food and physical activity standards for childcare, schools, and hospitals
- Identifying viable/safe resources for promoting physical activity
- Partnerships for change, including healthy choices and behaviors
- Breastfeeding

Obesity Prevention Foundation

- Educational interventions in schools
- Focus on healthy diet/physical activity choices

Body Mass Index

- BMI was first used in 1835 as a way to estimate the proportion of body fat based on height and weight
- BMI has low sensitivity, especially below 30
- Cannot discern fat vs. muscle content or metabolic risk factors
- Validity?
 - At the same BMI, women tend to have more body fat than men.
 - At the same BMI, older people, on average, tend to have more body fat than younger adults.
 - Highly trained athletes may have a high BMI because of increased muscularity rather than increased body fatness.

BMI + waist circumference

TABLE 1. National Heart Lung and Blood Institute Classifications of Overweight and Obesity by BMI and Waist Circumference in Adults⁴

Classification	BMI (kg/m ²)	Risk of type 2 diabetes, hypertension, and CVD relative to normal weight and waist circumference*	
		Men ≤ 40 in Women ≤ 35 in	Men ≥ 40 in Women ≥ 35 in
Underweight	< 18.5	---	---
Normal weight	18.5 – 24.9	---	---
Overweight	25.0 – 29.9	Increased	High
Obesity (Class I)	30.0 – 34.9	High	Very High
Obesity (Class II)	35.0 – 39.9	Very High	Very High
Extreme obesity (Class III)	≥ 40	Extremely High	Extremely High

*NHLBI guidelines note that increased waist circumference can indicate increased disease risk even in individuals considered normal weight.

Additional limitations – Self-report of height & weight in surveys

Costs Financial impacts on the health care system

- Medical care costs increasing over time due mostly to rise in obesity prevalence
- Socioeconomic costs also related to disability and premature death

\$147 billion in health care costs in 2008
(10% of all medical spending)

Increases in spending from 1998–2006

- 8.5% (\$34.3 billion) Medicare
- 11.8% (\$27.6 billion) Medicaid
- 12.9% (\$74.6 billion) Commercial insurance

Obesity: A condition of abnormal and excessive fat accumulation in adipose tissue to the extent that health may be adversely affected.

Risk factors:

- 1) genetic factors
- 2) Hormonal factors
- 3) Environmental factors
- 4) Behavioral factors

Complications of obesity:

In Adults:

- 1) malignancy
- 2) Cardiovascular
- 3) Gastrointestinal

In children:

- 1) type 2 diabetes mellitus
- 2) Asthma
- 3) GERD

Treatment:

- 1) behavioral modification
 - 2) Bariatric surgery
 - 3) Treatment of underlying cause (if hormonal causes)
- Obesity is affected by a complex interaction between the environment, genetic predisposition, & human behavior.
 - It has increased risk of numerous chronic diseases, from diabetes and cancers to many digestive diseases.
 - The problem of overweight and obesity is one of the most pressing global issue with massive health care cost.
 - Demands attention from the healthcare community, researchers, and policy makers.

MCQs

1. In children between 0-5 years old considered obese when:

- 3SD above the median BMI
- 2SD above the median BMI
- 1SD above the median BMI
- 4SD above the median BMI

2. The BMI of an adult obese class 3

- 25-29.9
- 30-34.9
- 35-39.9
- above or equal to 40

3. Risk factors for obesity

- genetic
- environmental
- behavioral
- all above

4. Genetic disorder that cause obesity?

- trisomy 21
- Stress
- PCO
- all

5. Hormonal factors for obesity

- hypothyroidism
- GH deficiency
- PCO
- all

6. Treatment of obesity

- treating the underlying cause
- bariatric surgery
- behavioral modification
- all

7. Which one of the following diseases has low risk factors?

- Type1 Diabetes
- Type2 Diabetes
- Obesity.
- Cancer.

8. All of the following statements about obesity are true except:

- It frequently begins during childhood.
- People with BMI between 25.0-29.9 are obese.
- Genetics play a role.
- It can be measured by various methods.

9. Which one of the following is inadequately produced in obesity due to defective obese gene and leads as a result to an urge to eat?

- Adiponectin
- Insulin
- leptin
- Cholecystokinin.