جامعة الملك سعود
King Saud University

MEDICINE

Epidemiology of obesity

436
MEDICINE
KING SAUD UNIVERSITY

OBJECTIVES :

1/ describe the magnitude of the problem of obesity.

2/ Recognize the consequences of obesity.

3/ List the factors leading to obesity.

4/ Discuss the prevention of obesity

MEDICINE
436's TEAMWORK

Editing file

IMPORTANT

NOTES

EXTRA

تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

Terms Obesity and Overweight

•Obesity and overweight is excessive fat accumulation in adipose tissue to the extent that it can affect and impair health. (WHO)

•When a person is "overweight", it means that they have more body fat than they need for their body to function.

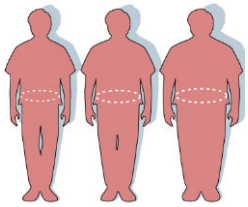
•Weight ranges are greater than what is generally considered healthy for a given height

•Such ranges of weight increase the likelihood of certain diseases and health problems.

Nobody is exempted from obesity
It can be you.

Today's obese child -- tomorrow's diabetic patient?

Measuring Obesity



Body Mass Index

Primary screening measure. BMI is very important

BMI=Weight (Kg)/Height (m^2

Calculated from a person's weight and height

Reliable indicator of body fatness for most people

Inexpensive & easy-to-perform screening for weight categories that may lead to health problems

Does not measure body fat directly, but correlates to direct measures of body fat like:

1/ Skin fold thickness

2/ underwater weighing

3/ dual energy x-ray

BMI and Body Fat

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

Other way of measuring

- lookالنظر
- scaleالوزن
- waist circumference

Obesity classification:

Obesity is divided into **three separate classes**, with Class III obesity being the most extreme of the three.

*Children have a specific chart

*Majoring BMI in adults and children differs.

Adults:

With a BMI of:	*You are considered:*
Below 18.5	**Underweight**
18.5 - 24.9	***Healthy Weight***
25.0 - 29.9	**Overweight**
30 or higher	**Obese** **Class I : 30-34.9** **Class II: 35-39.9** **Class III: ≥ 40.0 (extreme obese)**

*Increasing over time

Children / Adolescents:

Sex/age-specific BMI.

BMI >= 95th percentile is obese.

85th to less than 95th percentile is overweight .

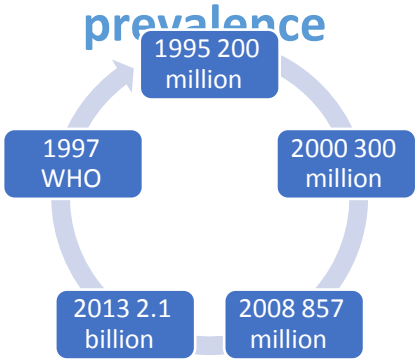
Is considered as disease cause it:
1- Made changes in body
2- Needs a treatment

Is obesity a disease or a condition risk factor ?

It is a **disease**

Due to multiple pathophysiological aspect requiring a range of intervention to advance obesity treatment and prevention

Obesity worldwide prevalence

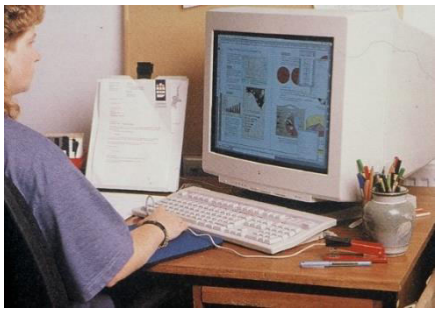


A Global Epidemic

Why is obesity accelerating in developing countries?

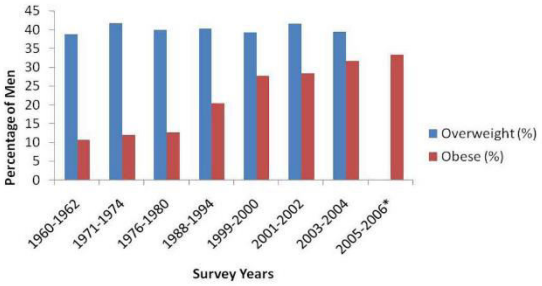
- **Increased consumption of energy dense, nutrient poor foods.**
- **Reduced physical activity.**

The work From Ancient to Modern extra (extra)

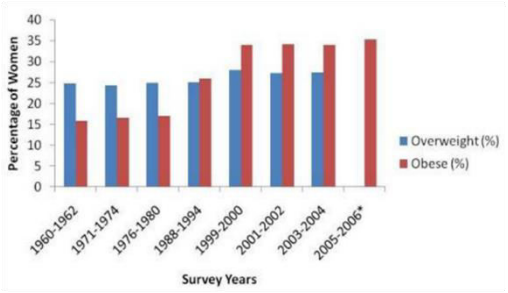


U.S* لازم تفرقوا اذا الاحصائيات ب او بالسعودية

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



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



*Obesity among female is much higher.

Data not available for overweight for 2006

Economist.com rankings

Highest obesity*

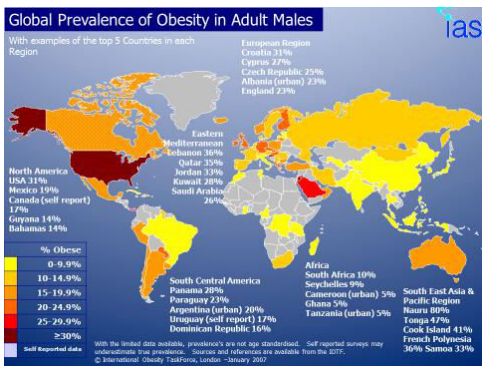
	Men, % of total population		Women, % of total population	
1	Lebanon	36.3	Qatar	45.3
2	Qatar	34.6	Saudi Arabia	44.0
3	Kuwait	32.8	West Bank and Gaza	42.5
4	Panama	27.9	Lebanon	38.3
5	United States	27.7	Panama	36.1
6	Cyprus	26.6	Albania	35.6
7	Saudi Arabia	26.4	Bahrain	34.1
8	West Bank and Gaza	23.9	United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

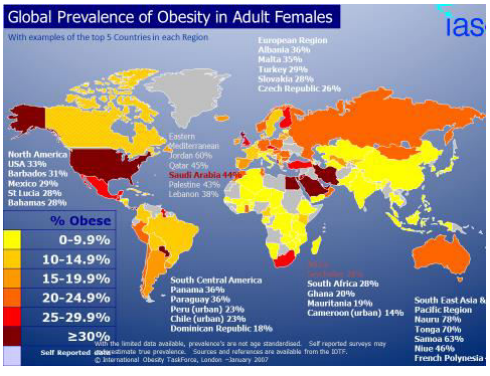
Source: "Pocket World in Figures", based on data from the World Health Organisation

*Obesity in Saudi is high the 7th country.

Male



Female



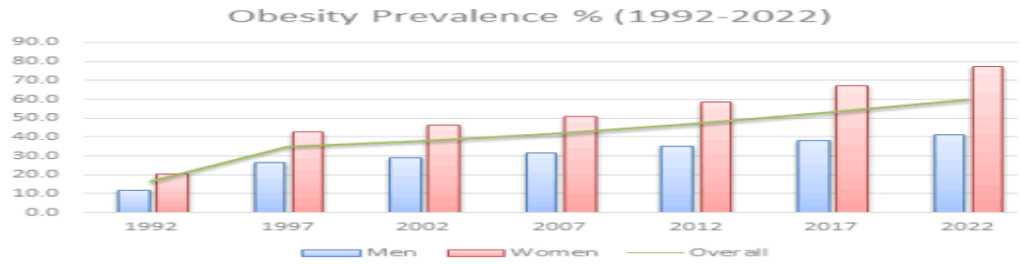


Figure 2: Obesity Prevalence % (1992-2022). As indicated earlier, the current research paper adopts a qualitative approach and follows a review-design to explore the research problem; i.e. to examine the prevalence of obesity in KSA, and explain its causes and consequences, the study performed a detailed literature review. The following table presents a summary of the reviewed studies in order to highlight and discuss the key statistics and findings. Data Source: [18].

* in Saudi Arabia obesity is very common we have high prevalence of obesity Between 2007 to 2022 there is 10% increased.

*Prevalence: in this moment how much people are obese
Incidence: number of new cases.

Incident 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 study

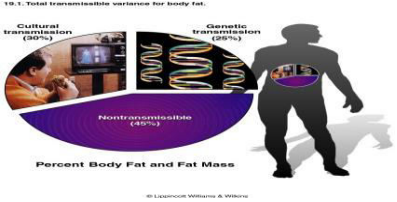
Prospective cohort studies: Track People who is going to be obese by taking 2 group: one get exposed to factor other not

Prevalence: in this moment how much people are obese. Incidence: number of new cases

Incidence require identifying: 1-population at risk 2-new cases

Attributes associated with obesity Who is most affected?

To know who to target from population though supposed to target all people



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.
- Higher prevalence for American Indians, Alaska Natives, other Hispanic/Latino, Native Hawaiians , Pacific Islanders vs. non-Hispanic whites
- 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

Race and ethnicity plays an important role in obesity

Rare → Asian ppl

Hispanic: Mexican + South America

زي في الثاقافات الآسيوية اجسامهم تكون أصغر وطبيعة اكلهم غير واحياناً امراض تجيهم عند ارتفاع اوزان محدده تكون بثقافات غير اوزان مو كبيره فعشان كذا يكون الرينج في حساب الـ BMI لهم يكون غير

Age

- **Adults (20+)**
- 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)

كلما زاد العمر كلما زادت الاحتماليه انو يكون الشخص اوبيس
لأن الأطفال تكون حركتهم أكثر
والميتابوليك ريت يختلف عن الادولت

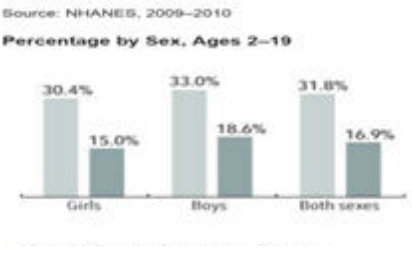
Genetics

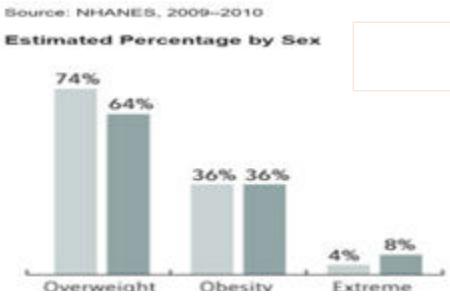
- **Genetics plays a role.** Gene only play 25% -> so the obese could be controllable even if a person has the gene

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.
- How much variation in weight gain among individuals can be accounted for by genetic factors?
- Largest transmissible variation is cultural. الجينات تلعب دور صحيح بس لازم يكون فيها مانجينق عشان يتحكم فيها

Sex





Hormone play roles

Attributes associa

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

1- Fast food (unhealthy food) → cheaper
2- Easy accessible 3- due to less education
High income associated with healthy food intake
-In Mexican –American and black men their culture play a role cause they preferer the obese women ☺

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

اذا الشخص متعلم راح يكون هو وعائلته عندهم علم بمخاطر السمنة وراح يحاول يبعد هم عنها وطريقه اكلهم وعاداتهم راح تكون افضل Education affect the whole family

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

Due to homesick, no one to cook …

Like in KSA: less activity due to the hot weather, no place to walk

It differ: In KSA rural area; they are healthier because they eat what they plant

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

High birth weight due to obese mother

Breastfed lowering the risk of obesity

So low and high birth weight they are all high risk factor for obesity

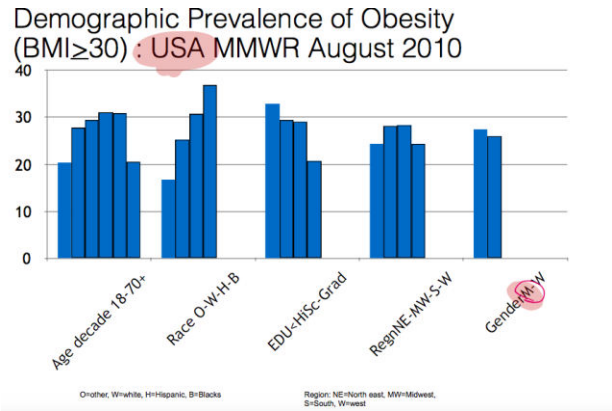
Other risk factors

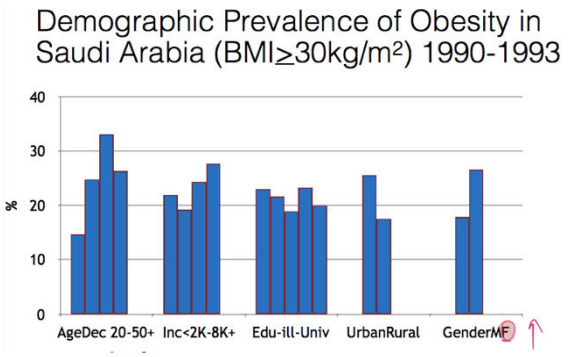
- Maternal smoking
- Extreme birthweight (low or high)
- Not being breastfed
- Disabilities
- Medications (steroids, antidepressants)

High birth weight due to obese mother

Breastfed lowering the risk of obesity

So low and high birth weight they are all high risk factor for obesity





Obese male are higher in USA

Obese Female are higher in KSA

Morbidity/mortality Effects on population health

Many chronic disease cause it increase the visceral fats affecting the organs

"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

Complications of obesity

Morbidity associated with obesity

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

• Type 2 Diabetes

• Cardiovascular Disease

• Stroke • Hypertension

• Nonalcoholic fatty liver disease

• Osteoarthritis

• Some cancers

Mortality

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

يعني إذا فيه اثنين كلهم نورمال ويت واحد كان اوبيس واهو صغير وواحد كان عادي لما كان صغير فاللي يكون معرض أكثر للامراض الشخص اللي كان سمين لما كان صغير أكثر لان كل تغيرات الاوبيسيتي قد حصلت لجسمه

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 childrenRegardless of final body weight as adults, overweight children exhibit more illnesses as adults than normal kids.

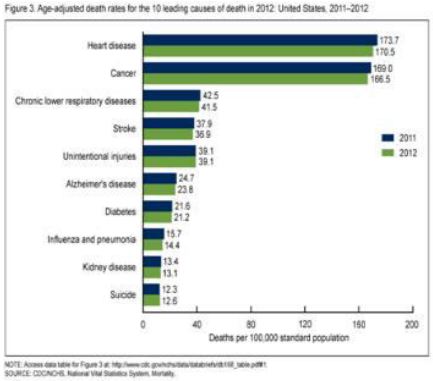


TABLE 2-1 Physical Health, Psychosocial, and Functional Consequences of Obesity Over the Life Course

Physical Health	Psychosocial	Functional
• Cardiovascular disease • Cancer • Glucose intolerance and insulin resistance • Type 2 diabetes • Hypertension • Dyslipidemia • Hepatic steatosis • Cholesitasis • Sleep apnea • Reduction of cerebral blood flow • Menstrual abnormalities • Orthopedic problems • Gallbladder disease • Hyperuricemia and gout	• Stigma • Negative stereotyping • Discrimination • Teasing and bullying • Social marginalization • Low self-esteem • Negative body image • Depression	• 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.

Social marginalization:
يعني الشخص يكون ياله يلقى ملابس بسبب وزنه
او مثلا حزام الطياره ما يرضى يسكر

Screening Limitations and Recommendations

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.

Female and male have the same BMI but female has more fat
Old have more fat than the younger

TABLE 1. National Heart Lung and Blood Institute Classifications of Overweight and Obesity by BMI and Waist Circumference in Adults[4]

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.

BMI + waist circumference:

Additional limitation:

مثلاً لو تتوزع أوراق يكتبوا فيها الاشخاص الطول والوزن احنا مو ضامنين ان كلهم راح يكتبونه دقيق اوما يغيروا فيها

- 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

Interventions Primary, secondary, tertiary, community-level

Can we do something?

Primary توعية

- Preventing obesity **before** it occurs
- 1- Regulating caloric energy balance to prevent problem weight gain :Diet , physical activity
- 2-Environmental factors make place for walking

Address barriers to a healthy diet :

- Access to healthy food
- Food advertising
- Large portion sizes e.g: resturant give a meal for 4 and give it to one person
- Affordability of healthy food
- Time constraints e.g: back from university no time to cook
- 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 Country help

- Tax unhealthy foods/beverages فيصير الناس تضطر للأكل الهيلثي عشان ما يدفعوا زياده☺
- Calorie labeling in food service facilities
- Food purchasing standards for hospitals/ schools

Secondary Patient at risk or obese

- **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**
- We should do screening to prevent the most likely diseases that he/she may have

Tertiary

- **Management of severe obesity to reduce complications**
- **Bariatric surgery** عمليات السمنه زي عمليه قص المعدة وغيرها
  - Type 2 diabetes, other comorbidities
- **Medications, if shown to be effective**
- **Community-level interventions** If we do this the money that spent on a market is much lower from spending it on medicine

Community-level interventions

- Incentives for markets to locate to areas with limited food access
- Food and physical activity standards for childcare, schools, and hospitals يعني ندخل مع جمعيات ونتعاون معاها عشان نزيد الوعي والثقافه حول الاكل الصحي والخيارات الصحيه
- 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

Summary

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.

Questions

6- Which of the following is used to measure obesity ?

A. Appearance
B. Waist circumference
C. Body weight

5- Which one of the following statement is correct?

A. Athletes have high BMI
B. Women have less body fat than men
C. Older people have less body fat than younger adults

4- Which one of the following is NOT a cause for the obesity acceleration in the developing countries ?

A. Increases consumption of the energy dense food
B. decrease physical activity
C. Increase consumption of the nutrient rich food

3- Which one is Not a characteristic of the fast food linked to increase adiposity ?

A. High energy density
B. High complex carbohydrates and fiber
C. Greater saturated fat

2- Which one is considered to be a health risk of abdominal body fat ?

A. Respiratory diseases
B. Type I diabetes
C. Type II diabetes

1- All of the following are components of the obese syndrome except...

A. Glucose intolerance
B. Insulin resistance
C. Hypotension

Answers:

1-B
2-A
3-C
4-B
5-C
6-C
7-A

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THANK YOU

FOR CHECKING OUR TEAMWORK

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Male & Female slides