EPIDEMIOLOGY OF
DIABETES MELLITUS

Contents:

- types of Diabetes Mellitus
- The Global prevalence of diabetes
- The state of diabetes in KSA.
- Risk factors of diabetes.
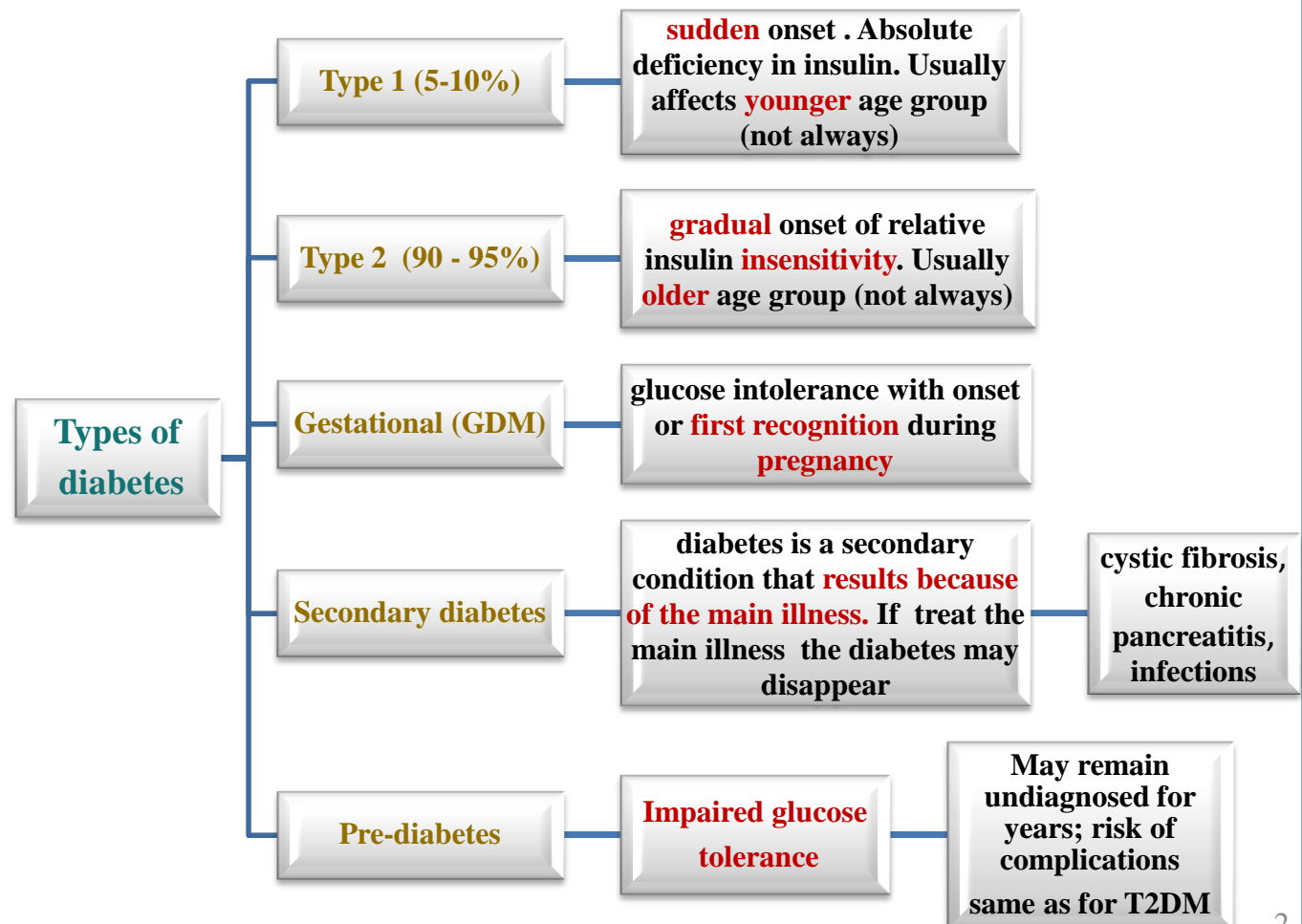- The magnitude of complications of diabetes.

Please check out this link before viewing the file to know if there are any additions or changes: medicine Editing

Important:
This Work doesn't include the whole graphs,
the doctors said you don't have to memorize numbers..
Just the main concept and the main idea of the statistics results …

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Diabetes Mellitus

Definition..?

A metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both .

Types of diabetes

Type 1 (5-10%) — **sudden** onset . Absolute deficiency in insulin. Usually affects **younger** age group (not always)

Type 2 (90 - 95%) — **gradual** onset of relative insulin **insensitivity**. Usually **older** age group (not always)

Gestational (GDM) — glucose intolerance with onset or **first recognition** during **pregnancy**

Secondary diabetes — diabetes is a secondary condition that **results because of the main illness.** If treat the main illness the diabetes may disappear — cystic fibrosis, chronic pancreatitis, infections

Pre-diabetes — **Impaired glucose tolerance** — May remain undiagnosed for years; risk of complications same as for T2DM

Symptoms:

Frequent Urination · Unexplained Weight Loss · Increased Thirst · Malaise & Excessive Fatigue

BUT – many years of pre-diabetes (type 2) before these symptoms appear!
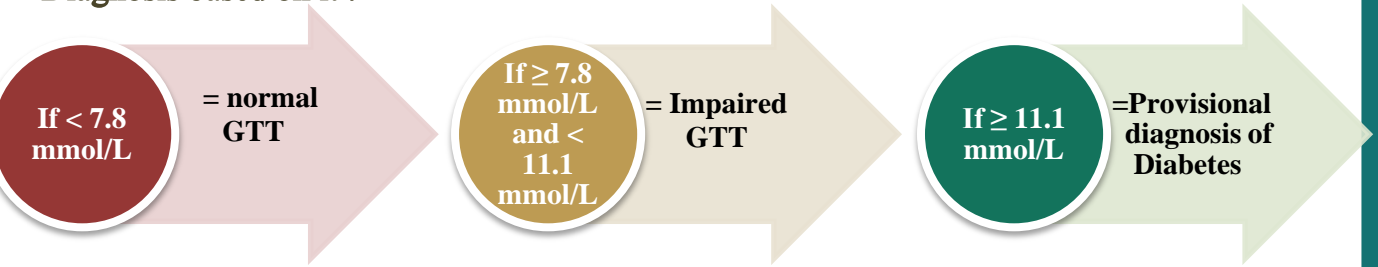
+Infections (thrush)

Biochemical tests :

- Random plasma glucose: → Diabetic :>200 mg/dl (>11.1m mol/dl)

- Fasting plasma glucose:
  - Diabetic: FPG >126 mg/dl (>7 m mol/dl)
  - Glucose Intolerance: FBS 110 -125 mg/dl (6.1-6.9 m mol/dl).
  - Non diabetic: FBS< 110 mg/dl (6.1m mol/dl).

- Oral glucose tolerance test – 2 hr post 75 gm glucose

  Diagnosis based on it :

 | If < 7.8 mmol/L | = normal GTT | If ≥ 7.8 mmol/L and < 11.1 mmol/L | = Impaired GTT | If ≥ 11.1 mmol/L | =Provisional diagnosis of Diabetes |

Why is diabetes so important..?

The burden to patients, carers, NHS*(by supplying the health care to the disease it self and to manage each of the complications)

- **Complications**
    - **Cardiovascular:** Arterial sclerosis ,ischemic heart disease ,cerebrovascular accident (Diabetes accounts for more than 5% of the global deaths, which are mostly due to CVD.)
    - **Eyes Retinopathy:** (Diabetics are 20 times more likely to develop blindness than non diabetics)
    - **Renal**: Hypertension, renal failure (Diabetes is responsible for over one third of end-stage renal disease)
    - **Neuropathy:**
    - **Feet amputations:** (10 times more common diabetic patients)
    - Skin, infections(e.g. TB) , sexual, psycho-sexual, depression
    - Premature mortality

*National Health Service
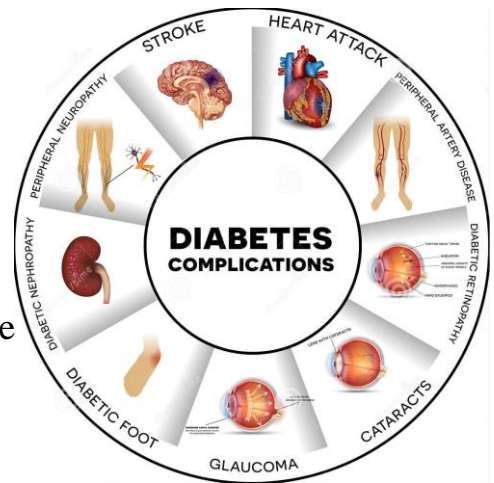
Risk factors:

1)obesity: Contributes to the resistance to endogenous insulin.

2) Genetic factors:

may play a part in development of all types; autoimmune disease and viral infections may factors in Type I DM.

3) Physiologic or emotional stress:

causes prolonged elevation of stress hormone levels (cortisol, epinephrine, glucagon and growth hormone), which raises blood glucose levels placing increased demands on the pancreas

4) Pregnancy:

causes weight gain and increases levels of estrogen and placental hormones, which antagonize insulin

5) Medications:

that are known to antagonize the effects of insulin: thiazide diuretics, adrenal corticosteroids, oral contraceptives

6) physical inactivity   **7) dietary imbalance**   **8)Infections**

Epidemiology of diabetes..?

Epidemiology of Diabetes <u>worldwide</u> :

Prevalence is increasing[1]

in 2000 ➡ 2.8% = 171 million

In 2030 ➡ 4.4% worldwide = 366 million

Increase 213%

The numbers of the diabetic patients is increase and the age of getting diabetes mellitus is getting younger as well

Greatest rise in **developing** (poorer) world
(Because the developed countries can control it by measure the incidence and prevalence and control the speed of the disease to appear in the younger age group)

- **The most affected age group :**
- Devolved countries → elderly → 65 +
- Developing countries →middle age

Countries with the highest prevalence of diabetes:

- India, China, and the United States have the greatest number of people with diabetes in 2010, and these countries are expected to maintain their high prevalence numbers until 2030 (depend on there high population number)

- Nauru ,UAE, KSA have the highest percentage of people with diabetes

- The most affected area by diabetes is Arabian gulf area

1:Prevalence (comparing the number of people found to have the condition with the total number of people studied) the benefit to know the burden and the health care needed to provide

incidence (speed of disease in population, how soon its occurring ,e.g. how many new diabetics its occur in a specific time duration in specific population)

*Prevalence estimates only include reported and diagnosed persons, There is a large % that is undiagnosed as well as a large % at high risk of developing DM

Epidemiology of Diabetes in USA:

- 8.3% of the U.S. population → 25.8 million → Diagnosed: 18.8 million / Undiagnosed: 7.0 million
- **Seventh** leading cause of death

- By 2050, prevalence of total diabetes (diagnosed & undiagnosed) is projected to increase from 1 in 10 adults to between 1 in 5 and 1 in 3 adults

Largely attributed to three key factors:
- Aging of the U.S. population
- Increasing size of higher-risk minority populations
- Declining mortality among those with diabetes

Prevalence of diabetes based on stepwise surveys:
- Jordan: 12%
- Iraq: 10.4%
- Syria: 20.5%
- Saudi Arabia: 17.9%
- Iran: 10.3%

*Know that the highest in this study **Syria** then **KSA***

Saudi Arabia has the highest percentage after Iraq in low physical activity and Low fresh fruit and vegetables intake

Diabetes Mellitus in the Gulf Countries:

UAE is the highest in:
- Impaired Glucose Tolerance Prevalence (KSA is the 3rd)
- Diabetes Mellitus Prevalence (KSA is the 4th)

Prevalence of T2DM in urban and rural areas in the Arabic-speaking countries in 2011 in 20-79 age groups

- The highest number in both urban and rural community is found in Egypt
- The second highest number in urban is Saudi Arabia

Diabetes and obesity :

(comparative)The relative risk of high BMI to develop DM in females (ref. BMI < 22Kg/m2)(the normal BMI with the higher one)

22-23	**the risk is 3 times more**
24-25	**5 times more**
> 30	**40 times more**

India has the highest percent risk to develop DM with the increase in BMI index in both men and women as compare it to other countries

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Diabetes Complications epidemiology :
Prevalence of micro vascular complications:

- **The major complications will be soon the highest in Arab countries due to the lack of prevention programs , Genetics, environmental and life style reasons as well**

- **Number of persons with diabetic retinopathy (and other diabetes complications)is higher in developing countries(and it will increase more in future) than in developed countries**

- **The longer the duration of the disease the higher risk to develop complications (e.g. neuropathy)**

countries with highest prevalence of these complications

Microvascular Disease

Eyes	Kidneys	Nerves
RETINOPATHY	NEPHROPATHY	NEUROPATHY
Mexico	Japan	Thailand

- **complications occur sooner in patients diagnosed in older age While the complications take more time to occur in patients diagnosed in younger age**

- **Patient with non insulin dependent diabetes mellitus (type 2)has a higher risk to develop NEUROPATHY**

- **Prevalence of Retinopathy in Saudi diabetic patients ⟶ 31.5%** ⟨ IDDM 42.5% / NIDDM 25.3%
- **Risk factors for Retinopathy in Saudi diabetic patients**

Duration > 10 years.
Presence of nephropathy.
Older than 60 years.
**Poor diabetes control.**
Use of insulin.

- **the leading cause of adult onset blindness →DM , while in children = Vit A deficiency**
- **after 20 years of diagnosis nearly all diabetic patient have retinopathy**
- **control diabetes → only delay the onset of complication**

Future Directions:

- o Tackling environmental factors and lifestyle

- o Appropriate use of screening tools to control diabetes mellitus (FBG, random blood glucose level, BMI ,glucose tolerance)

- o Early interventions in high risk populations (elderly ,high BMI , family history)

- o Therapeutic and management choices and updated criteria for treatment

- o Rehabilitation services for complications

1:The clinic and inpatient sample has a higher percentage of diabetes and diabetes complications then community sample

Remember :
India has the highest prevalence in the world
In gulf countries UAE followed by Saudi Arabia
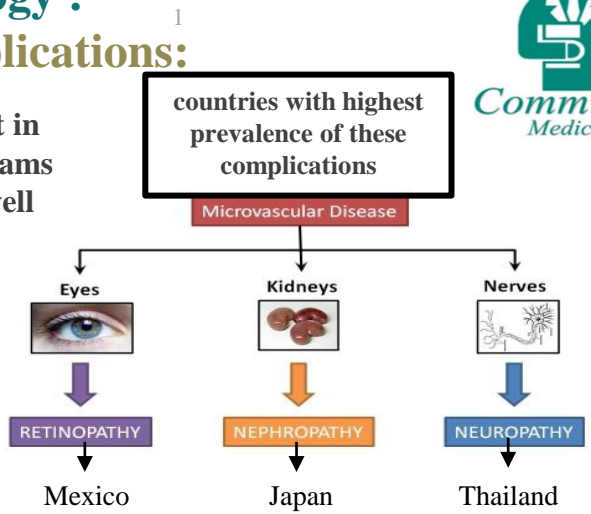
Summary

Types of diabetes:

1. Type 1 diabetes.
2. Type 2 diabetes →THE MOST COMMON
3. Prediabetes
4. Gestational Diabetes
5. Secondary Diabetes

Symptoms:

 Thirst, passing a lot of urine, malaise, infections (thrush), weight loss

Epidemiology of Diabetes:

1:Prevalence is increasing worldwide. Mostly in DEVELOPING countries.

2:the most common affected area is Arabian Gulf area

3: India has the highest number of diabetic patient (**number of people**)

4: Nauru has the highest percentage of DM, with more than 40 per cent of the population affected (**prevalence**)

5: Saudi Arabia is the third most common country affected by diabetes (percentage) (**prevalence**)

Complications :

1: diabetic retinopathy (the most common complication) (more common with **DM1**)→ the leading cause of blindness in adults

2:neuropathy (more common with **DM2**) → diabetic foot

3:nephropathy → end stage renal failure

4: vasculopathy :
- •   A: ATHEROSCLEROSIS → MI = the most common cause of death in diabetic patient
- •   B:MICROANGIOPATHY → retinopathy , nephropathy

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Q1) the most common type of diabetes …
A-Type I
B-Type II
C-Secondary diabetes
D-Gestational

Q2)according to the statics below which statement of the following is true:
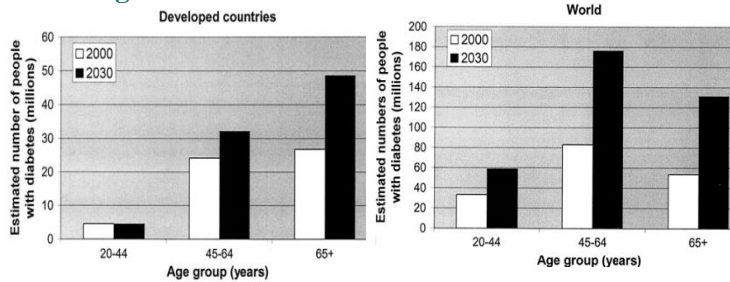
A-The incidence of diabetes for all ages is in 2000 is much more than 2030 for both developed countries and the world.
B- Diabetes has its great incidence between the ages of (45-64) in the developed countries.
C- Developed countries have successively delayed the great incidence to the age of +65
D-The world studies have lesser increase in the incidence in the future than the developed countries studies

Q3)the most serious complication of diabetes and eventually leading to death:
A- amputation and gangrene
B-Acute Renal Failure
C-Retinopathy and Blindness
D-Cardiovascular diseases.

Q4)Which of the following hormones is not an antagonist of insulin:
A-Cortisol
B-Growth hormone
C-Glucagon
D-ADH

Q5)Which one of the following is the primary underlying cause of gestational diabetes:
A-Pregnancy causes insulin deficiency because of the pressure on the pancreas.
B-Placental hormones and estrogen cause insulin resistance by antagonizing it.
C-Physical inactivity during pregnancy
D-It is known that pregnant females are more like to take sugar rich food.

Q6)Which one of the following is true regarding prediabetes patients :
A-They have normal levels of glucose and insulin
B-They are the major risk for developing Diabetes type I
C-They have high insulin and high glucose than normal
D-They have extreme hyperglycemia

Q7)A 43 year old obese female and has a positive family history of DMT2. She has 6 children who are healthy and have no medical issue except that 4 of them are overweight. She came to you with a burning sensation at her periphery and impaired vision. On examination you noticed a small deep ulcer in her left sole. After investigating her you found that she has hyperglycemia and impaired renal function. What is the etiology for all her complications
A- Microangiopathy
B-Impaired immunity
C-Autoantibodies
D-Multiple births

SAQs

Q :list 4 risk factors and 4 complications of diabetes mellitus ?
 Answer :risk factors :Genetic factor , obesity , Pregnancy and stress
 Complications : cardiovascular diseases ,neuropathy ,nephropathy and retinopathy

Thanks for checking our work

GOOD LUCK

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