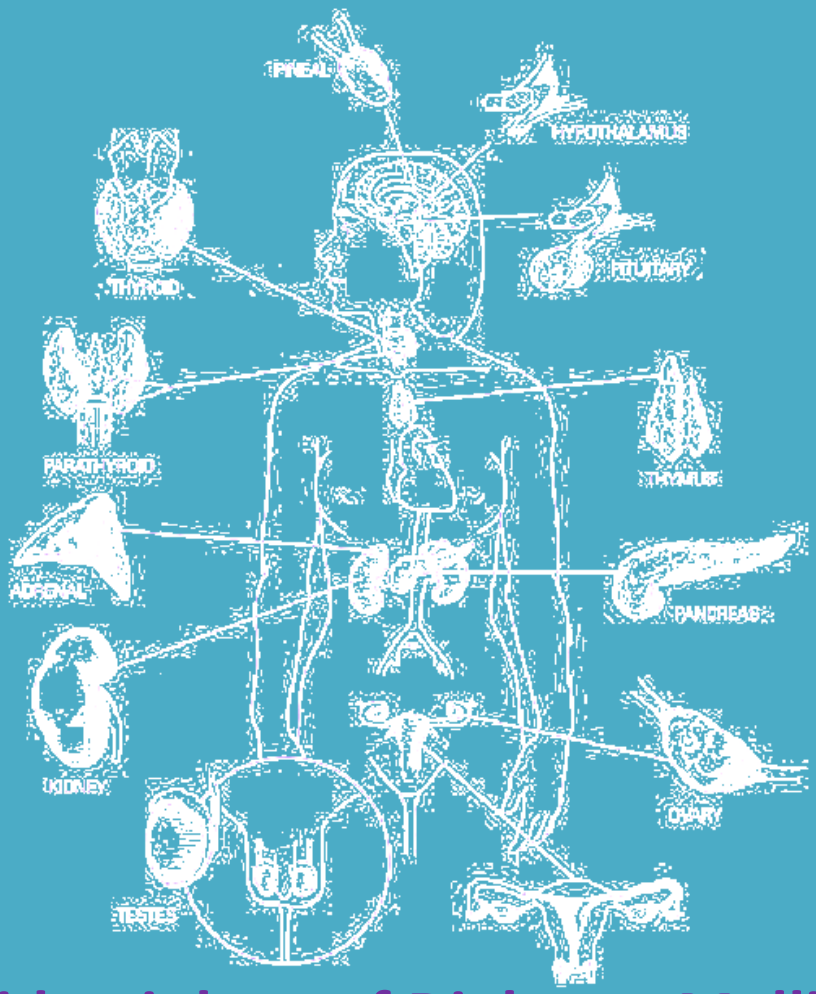
MEDICINE TEAM

431 – Endocrine Block - 2013



Epidemiology of Diabetes Mellitus

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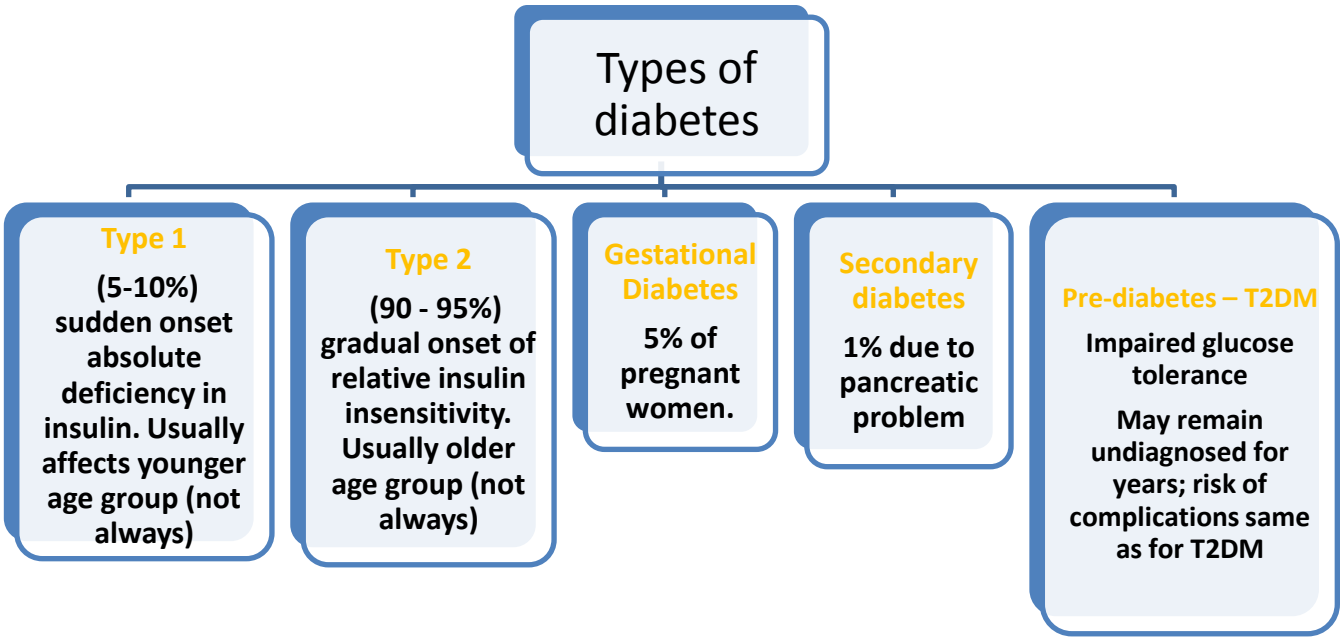
Female Doctor said you don't need to memorize any of the numbers for this lecture.

- **Diabetes Mellitus:**

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.

- **Diagnosis of diabetes:**

- **Symptoms:**

  -Thirst. - Passing lots of urine. -Malaise. -Infections (thrush). -Weight loss.

  BUT there may be many years of pre-diabetes (type 2) before these symptoms appear.

- **Biochemical tests :**
  - **Random plasma glucose**
  - **Fasting plasma glucose**
  - **Oral glucose tolerance test – 2h glucose**

Indicate DM but need to be confirmed

IFG=Impaired fasting glucose

• A symptomatic patient plus casual plasma glucose ≥ 11.1 mmol/L or FPG ≥ 7.0 mmol/L.

• During an OGTT 2-hr post 75 gm-glucose ≥ 11.1 mmol/L.

● In the absence of symptoms suggestive of DM, these criteria should be confirmed by repeat testing on a different day.

• Fasting plasma glucose :

FPG ≤ 5.5 = normal | **FPG ≥ 5.6 to 6.9= IFG** | **FPG ≥ 7.0 =DM**

• Oral glucose tolerance test:

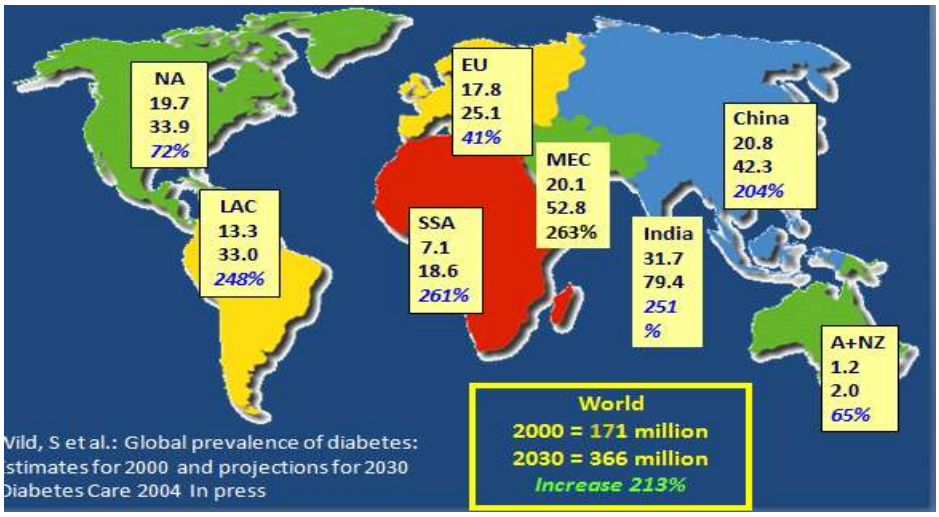
If < 7.8 = normal GTT | **If ≥ 7.8 and < 11.1 =Impaired GTT** | **If ≥ 11.1 =DM**

- **Epidemiology of diabetes:**

-Prevalence worldwide is increasing*

2000: 2.8% (171 million) ➔ 2030: 4.4% (366 million)

- The greatest rise is seen in the developing world.



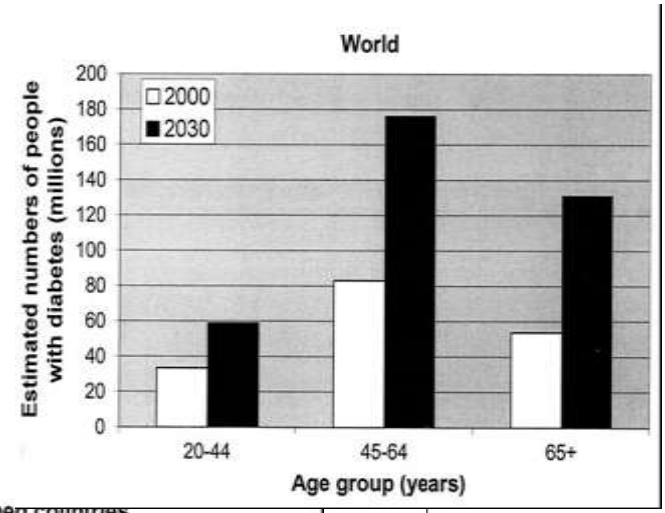
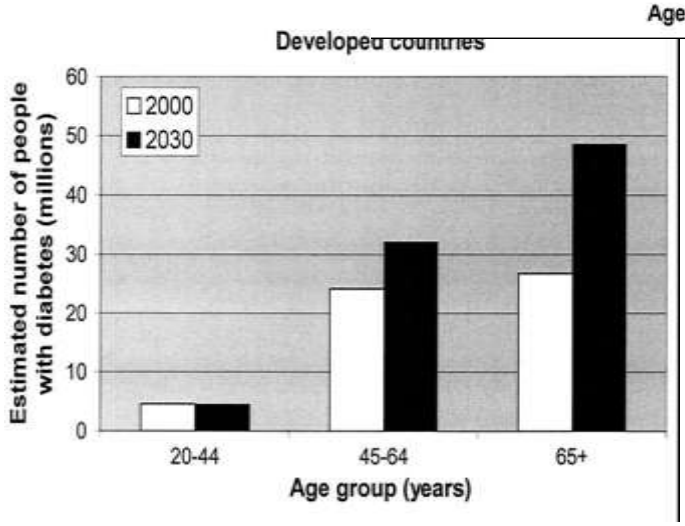
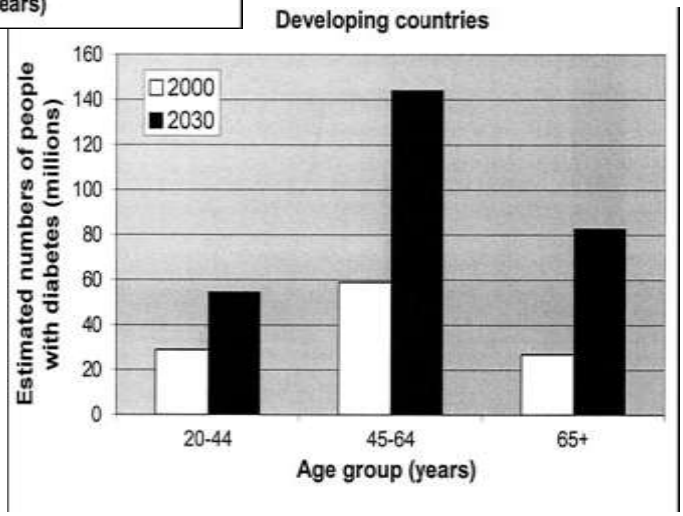


Chart comparing the estimated number of people with diabetes in the years 2000 (white) and 2030 (black).

The greatest increase can be seen in the (45-64)





Developed Countries:

The greatest increase can be seen in the 65+ age group. Almost no change is found in the (20-44) age group.

Developing countries:

The greatest increase can be seen in the (45-64) age group.

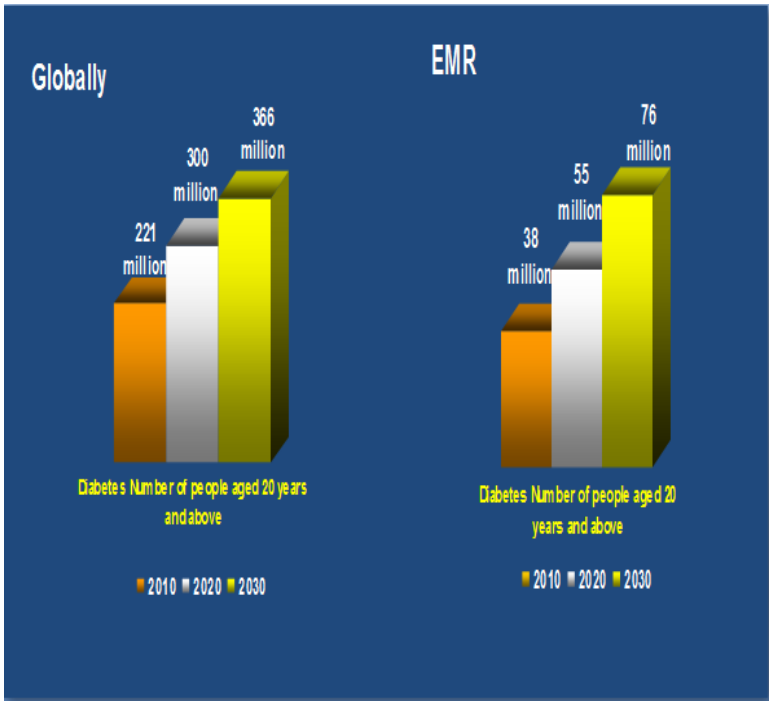


Table 2.1. Top 10 countries/territories for prevalence* (%) of diabetes (20-79 years), 2011 and 2030

	COUNTRY /TERRITORY	2011 PREVALENCE (%)		COUNTRY /TERRITORY	2030 PREVALENCE (%)
1	Kiribati	25.7	1	Kiribati	26.3
2	Marshall Islands	22.2	2	Marshall Islands	23.0
3	Kuwait	21.1	3	Kuwait	21.2
4	Nauru	20.7	4	Tuvalu	20.8
5	Lebanon	20.2	5	Nauru	20.7
6	Qatar	20.2	6	Saudi Arabia	20.6
7	Saudi Arabia	20.0	7	Lebanon	20.4
8	Bahrain	19.9	8	Qatar	20.4
9	Tuvalu	19.5	9	Bahrain	20.2
10	United Arab Emirates	19.2	10	United Arab Emirates	19.8

*comparative prevalence

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

- **Type 1 diabetes epidemiology:**
  - ✓ Very big variation in incidence and prevalence
  - ✓ Variation in growth-rate
  - ✓ Disease process relatively well described
  - ✓ Genetic markers known
  - ✓ Weak risk factors

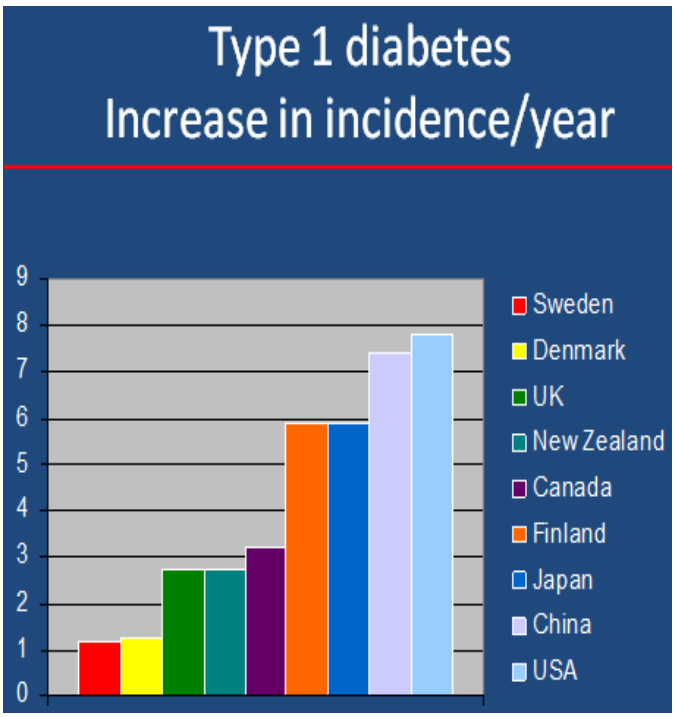
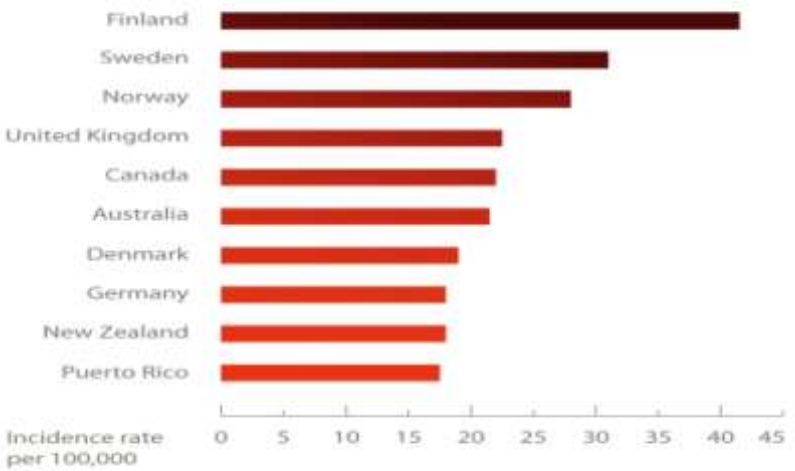


FIGURE 2.3

Top 10 countries: incidence rate for type 1 diabetes in children (0-14 years)



Only countries where studies have been carried out in that country have been included

Source: *Diabetes Atlas* 3rd Ed., © International Diabetes Federation, 2006

❖ The Global burden of diabetes:

- Diabetes accounts for more than **5%** of the global deaths, which are mostly due to CVD.
- Diabetes is responsible for over **one third of end-stage renal disease** requiring dialysis.
- **Amputations** are at least 10 times more common in people with diabetes.
- **A leading cause of blindness** and visual impairment. Diabetics are 20 times more likely to develop blindness than non-diabetics.

❖ Diabetes Mellitus is an Epidemic disease in Gulf countries:

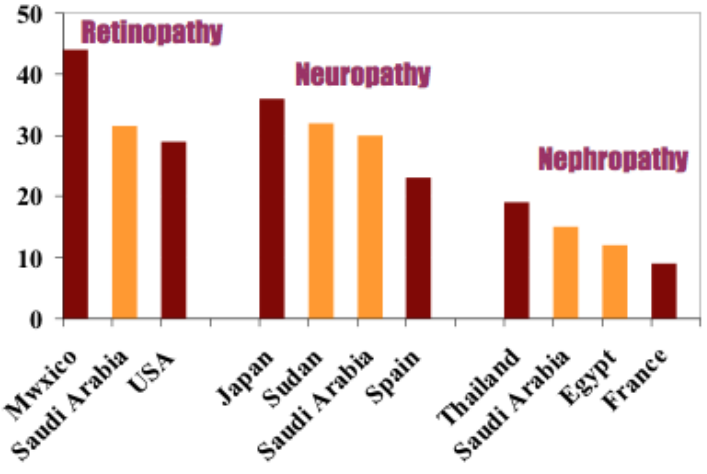
Diabetes Mellitus Prevalence	
United Arab Emirates (UAE)	15.7
Qatar	15
Kuwait	14.8
Saudi Arabia	12.3
Bahrain	11
Oman	10

Impaired Glucose Tolerance Prevalence	
United Arab Emirates (UAE)	13.2
Kuwait	12.8
Saudi Arabia	11.9
Bahrain	11
Qatar	11
Oman	10

❖ Diabetes Complications in the Gulf Countries :

Prevalence of microvascular complications:

Comparing data from Arab countries with data of the highest & lowest prevalence worldwide in the year 2000.
The major complications will soon be the highest in Arab countries due to the lack of prevention programs.

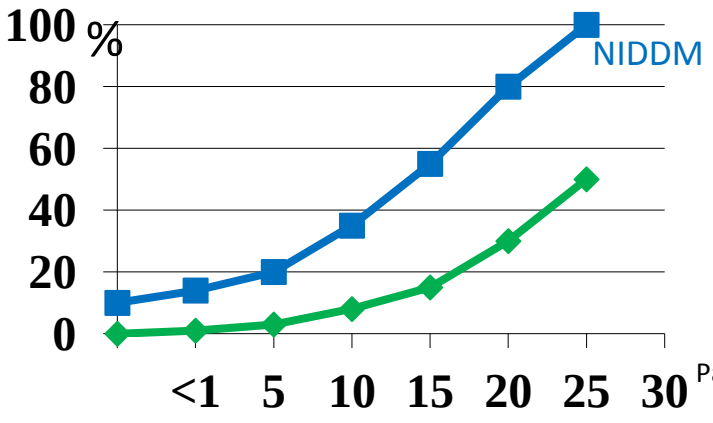


Neuropathy with Duration:

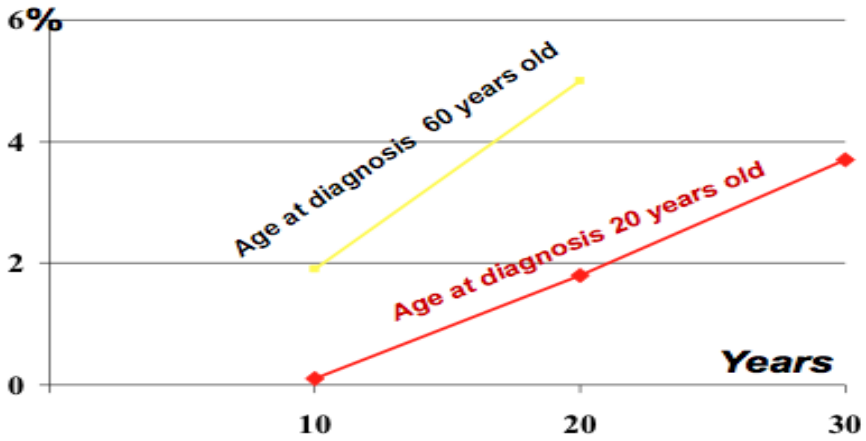
The chart shows that there is an increased risk of neuropathy with increase in disease duration.

25 years of NIDDM: 100% chance of neuropathy

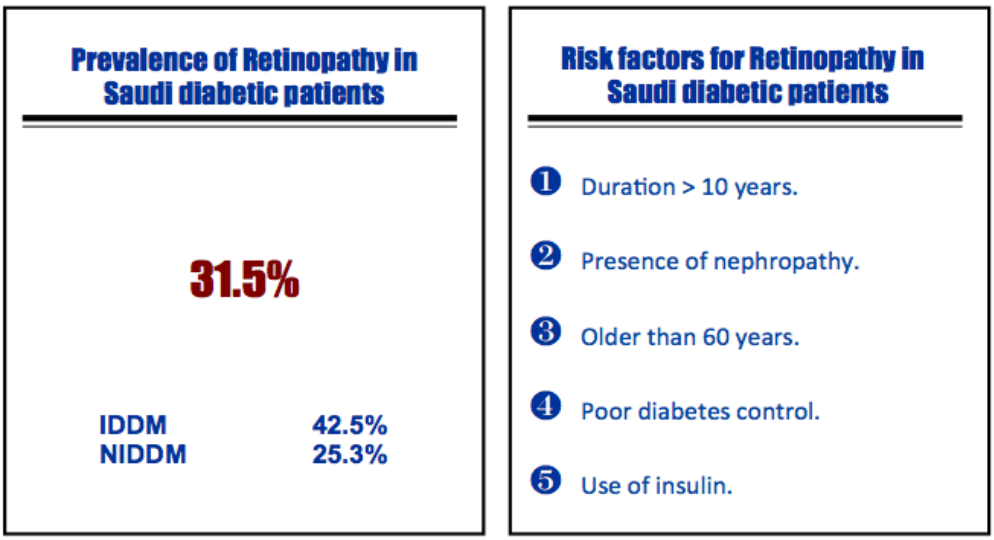
25 years of IDDM: 50% chance of neuropathy



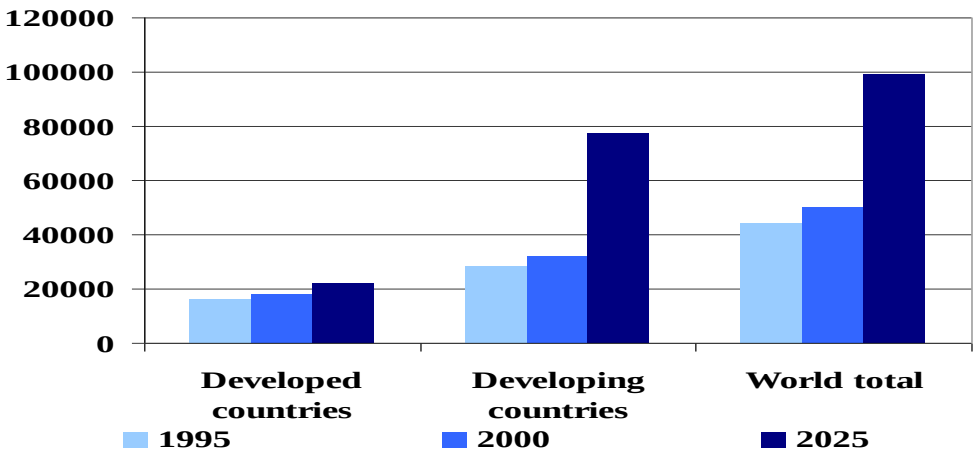
Blindness with Duration:



Retinopathy:



Prevenence of Retinopathy Compared in the Years (1995, 2000, 2025)



Diabetes in the Gulf countries:

Diabetes is the **leading cause** for:

- Blindness
- End Stage Renal failure (ESRF)
- Ischemic Heart Disease (IHD)
- Cerebral Vascular Accidents (CVA)
- Amputation

Risk Factors:

Risk factors for Type 2 DM are complex including **obesity, genetic and lifestyle factors (overfeeding and sedentary lifestyle).** There are patho-physiological changes (weight gain insulin resistance and reduction of insulin secretion) that may lead to glucose intolerance and diabetes.

1- Obesity: contributes to the resistance to endogenous insulin.

- Relative risk of Diabetes Mellitus in females (reference BMI < 22)

BMI	Relative risk
22 - 23	3
24 - 25	5
> 31	40

2- 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.

3- Exercise:

- Vigorous exercise > 1 / week = 25% risk reduction
- Watching TV 2-10 hours per week: Relative Risk = 1.66 of having DM compared with 0-1 hour per week .

4- Genetic factors :

May play a part in development of all types

Autoimmune disease and viral infections may be risk factors in Type I DM.

5- Pregnancy:

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

6- Medications:

Some medications are known to antagonize the effects of insulin: thiazide diuretics, adrenal corticosteroids, and oral contraceptives.

7- Infection or illness:

A range of relatively rare infections and illnesses can damage the pancreas and cause type 1 diabetes.

e.g. Mumps, Cytomegalovirus (CMV) , EPV.

SUMMARY:

Types of diabetes:

1. Type 1 diabetes
2. Type 2 diabetes
3. Prediabetes
4. Gestational Diabetes
5. Secondary Diabetes.

Diagnosis:

1- Symptoms:

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

2- Biochemical tests:

- Random plasma glucose
  > 200 mg/dl (>11.1m mol/dl) .

- Fasting plasma glucose (FBS)
  Non diabetic: < 110 mg/dl (6.1m mol/dl)

  Glucose Intolerance: 110 -125 mg/dl (6.1-6.9 m mol/dl)

  Diabetic: >126 mg/dl (>7 m mol/dl)

- Oral glucose tolerance test – 2 hour glucose post 75 gm glucose
  Non-diabetic: < 7.8 mmol/L

  Glucose Intolerance: ≥ 7.8 mmol/L and < 11.1 mmol/L

  Provisional Diagnosis of Diabetes: ≥ 11.1 mmol/L

Epidemiology of Diabetes:

Prevalence is increasing worldwide. Mostly in DEVELOPING countries.

Complications:

Cardiovascular , eyes, renal (hypertension, renal failure), feet (ulcers, peripheral neuropathy), skin, infections, sexual, psycho-sexual, depression, quality of life, premature mortality.

Risk Factors:

1. Obesity
2. Emotional and physiological stress
3. Sedentary lifestyle
4. Genetic Factors
5. Pregnancy
6. Medications
7. Infections or illness

QUESTIONS:

Q1: Most common cause of death in diabetes:

a. **Renal failure**
b. **Cardiovascular disease**
c. **Neuropathy**

Q2: The estimated rise in diabetic patients is seen:

a. **Equally worldwide**
b. **Highest in developed world**
c. **Highest in developing world.**

Q3: The high rate of microvascular complications seen in diabetic patients in the gulf is most likely due to:

a. **High genetic susceptibility**
b. **Lack of prevention programs**

Q1: B

Q2: C

Q3: B