

Babylon University – College Of Medicine  
Department of Community Medicine

*Lectures in Community Medicine  
For 4<sup>th</sup> Stage Students  
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2010 – 2011*

## **Lecture 35**

# **Epidemiology of Diabetes Mellitus**

### **Definition:**

It is a heterogeneous group of disorders characterized by hyperglycemia, and disturbances of carbohydrate, fat and protein metabolism with absolute or relative deficiency of insulin action and or secretion.

### **General Epidemiological Characteristics:**

- It affects large number of people; 230 millions are expected to be affected in 2010 and 300 million in 2025.
- It affects all ethnic and socioeconomic groups.
- Incidence and prevalence are highly varied between and within countries 20-60 folds difference.
- Considerable impact on economic and social condition.
- DM is an important cause of premature death and causes serious health consequences.
- It is important RF of CHD.
- CHD is the leading cause of death among diabetics.
- In developing countries, the incidence and prevalence of Type 2 DM are rapidly increasing mostly due to modernization of life style.
- In developing countries, mortality from acute complications is high due to lack of basic requirements.

Prevalence of DM based on stepwise survey in the *Eastern Mediterranean region*:

❖ Iraq	10.4%
❖ Jordan	12%
❖ Iran	10.3%
❖ Saudi Arabia	23%
❖ United Arab Emirates	25%
❖ Kuwait	24%

**Classification of DM:**

A- Primary

- Type 1 insulin dependent (IDDM)
- Type 2 non insulin dependent (NIDDM)
- Impaired glucose tolerance IGT

B- Secondary:

- Malnutrition related
- Gestational DM

NIDDM is the commonest form contributing to 90-95% patient load.

**Etiology:**

Agent factors:

- ❖ Pancreatic disorders.
- ❖ Defect in the formulation of insulin (Acromegaly, Cushing's syndrome, and hyperthyroidism).
- ❖ Destruction of Beta cells (Viral infection, Chemical).
- ❖ Medications (corticosteroids, thiazide, phenytoin)

Host factors:

- ❖ Age: usually manifests above 40 years in type 2 DM. Start early around 10 years in type 1DM.
- ❖ Sex: risk is equal in both sexes.
- ❖ Sedentary lifestyle: lack of exercise alters interaction between insulin and its receptors leading to NIDDM.
- ❖ Viral infections: such as Mumps, Rubella, Cocksakie B4, Epstein-Barr virus.
- ❖ Obesity: produce resistance to action of insulin.

- ❖ Physical stress, surgery, trauma.
- ❖ Genetic factors: IDDM shows strong association with HLA haplotypes DR3 and DR4.
- ❖ DIET: Bovine serum albumin (major constituent of cows' milk).
- ❖ Chemicals: nitrosamine, Alloxan, Streptolysin. Rodenticide.

Environmental factors:

Multiple factors like occupation, economic status, educational levels, urbanization and changes in the lifestyle are clearly implicated in diabetes mellitus. The earlier belief that DM is a disease of the upper socioeconomic class is no longer true.

Diabetes mellitus has almost equal prevalence in all cross section of the society.

DM is not a disease that can be cured; it is a lifelong metabolic disorder that is manageable only by sustained metabolic control. Perhaps no other disease requires a longer and closer doctor patients understanding than DM and greater patient participation in its management.

**PRIMARY PREVENTION OF TYPE 1 DM:**

It should be done before onset of type 1 pathological process. i.e.: before development of immunological markers

It is still **EXPERIMENTAL**

Because of the very low prevalence, it required screening test of high specificity and sensitivity, inexpensive and easy to perform.

**Screening includes:**

- ❖ Family history
- ❖ Genetic markers (HLA)
- ❖ Immunological risk markers
- ❖ Metabolic risk factor

**Screening**

Screening is costly and technically difficult

Those have these factors have 10 folds excess risk

Still 95-97% of them do not develop the disease later

### **Primary Prevention Strategy**

- ❖ Deprivation of cow milk protein in the neonatal and early infancy.
- ❖ Administration of free radical scavenger.
- ❖ Allowing B-cell rest by administration of early insulin treatment.
- ❖ Encouraging the development of Antigen tolerance by administration of early insulin treatment.
- ❖ Immunosuppression or Immunomodulation

### **PRIMARY PREVENTION OF TYPE 2 DM**

No population based studies on primary prevention of type 2 DM. Prevention should be based on efforts to decrease insulin resistance and promotion of insulin secretion.

#### **Life-style measures that decrease insulin resistance:**

- ❖ Correction and prevention of obesity.
- ❖ Avoidance of high fat diet.
- ❖ Encouraging using unrefined sugar and soluble fibers.
- ❖ Avoidance or cautious use of diabetogenic drugs.
- ❖ Encourage physical activity.

### **SECONDARY PREVENTION OF TYPE 2 DM**

**Aims** at retarding progression of DM, decreases risk or severity of complications and so decreases premature morbidity and mortality

- ❖ Screening for undetected DM
- ❖ Control of hyperglycemia, and other metabolic abnormalities
- ❖ Correction of other cardiovascular risk factors (smoking, dyslipidemias, obesity).

#### **Screening approaches:**

- ❖ Population approach
- ❖ Selective screening: on high risk individuals
- ❖ Opportunistic screening: most appropriate and highly cost effective

### **TERTIARY PREVENTION OF TYPE 2 DM**

**Aims** at decreasing morbidity and mortality by delaying or arresting the complications

Good glycemic control (by intensive treatment, frequent monitoring of blood glucose level) slow or arrest development of early microvascular complications

### **EDUCATION OF DIABETIC PATIENTS**

It is the **corner stone** of DM management

It covers:

- ❖ Self care.
- ❖ Changing behavior to prevent and control of complications.
- ❖ Encourage interaction with health care providers.

### **Contents of Educational Program**

Nature of disease, types, clinical presentation, diagnosis, complications, types of treatment, side effects, exercise, self monitoring, avoidance and recognition of hypoglycemia, and hyperglycemia, foot care, pregnancy and obstetric care, avoidance of smoking, cardiovascular risk factors, need for follow up, self management skills and attitudes.

Active participation of the family is vital in DM management

### **Types of education methods**

- ❖ Individual counseling
- ❖ Group teaching
- ❖ Educational materials: posters, pamphlets, books...
- ❖ Special educational programs are needed for special groups as children and pregnant women