

May I have your attention, please...

ABSTRACT: India is expected to have the largest number of Type 2 Diabetics by 2025 - a whopping 65 million! It is imperative for all practitioners to realize that diabetes is NOT just a number; it is a disease that leads to premature cardiovascular destruction!

The issue is full of detailed articles on most aspects of type 2 diabetes. Here are some significant facts about the disease and is intended as a ready reckoner.



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DEFINITION

➤ 'Diabetes mellitus is a state of chronic hyperglycaemia which may result from many environmental and genetic factors, often acting jointly'

WHO Expert Committee on Diabetes Mellitus 1980

➤ Diabetes is a state of premature cardiovascular death, associated with chronic (lasting a lifetime) hyperglycaemia and may also be associated with blindness and renal failure

Miles Fisher, Dublin 1996

SCREENING

➤ Fasting blood sugar and not HbA1C is the preferred diagnostic test for diabetes in children and non-pregnant adults.

➤ Screening for pre-diabetes and type 2 diabetes in asymptomatic people should be considered in adults (< 45 yr of age) with

- ❖ a BMI of 23 kg/m² or more and
- ❖ 1 or more other risk factors (1 first degree relative/ HTN).

➤ Otherwise, screening for ALL should begin at age 45 years. If results are normal, testing should be repeated at intervals of 2-3 years or less.

SCREENING IN CHILDREN – Consider it at age 10 or at onset of puberty (if earlier) if they are overweight and have another risk factor for diabetes, eg:

- ❖ First-degree relative (parent or sibling) with diabetes
 - ❖ Maternal history of diabetes or gestational diabetes
- If test is normal, repeat every 2-3 years

WHO TO SCREEN?

- +ve Family history
- BMI > 27 kg/m² (cut off 23kg/m²)
- Past h/o IGT
- H/o Hypertension
- HDL < or = 35 & TG > or = 250
- H/o Gestational DM OR H/o Large baby >9 lbs

CRITERIA FOR DIAGNOSIS OF TYPE 2 DM (ADA 1997)

➤ Symptoms of DM plus random plasma glucose concentration > or = 200 mg/dl

OR

➤ FBS > or = 126 mg/dl (venous blood, after overnight fasting)

OR

➤ Two hour PG > or = 200 mg/dL during an OGTT as described by WHO

PRE-DIABETES (IGT – IMPAIRED GLUCOSE TOLERANCE & IFG – IMPAIRED FASTING GLUCOSE)

- Impaired glucose tolerance (IGT) - 2 hour PG > or = 140 and < 200 mg / dl IGT is associated with severe
- ❖ Insulin resistance

- ❖ Metabolic abnormalities
- IGT is a known risk factor for diabetes and coronary heart disease.
- Impaired Fasting Glucose (IFG) values of > or = 100 mg/dl < 126 mg/dL
- Those with pre-diabetes should be monitored yearly for development of diabetes. (as against 2-3 yr of those with NORMAL levels ie FBS < 100 and PPBS < 140)
- Target HbA1C goal for non-pregnant adults is generally less than 7%, or less than 6% without significant hypoglycemia, for selected patients.

RECOMMENDED VALUE OF BODY LIPIDS (ATP III CLASSIFICATION)

- Cholesterol values
 - ❖ Desirable < 200 mg/ dL
 - ❖ Borderline high 200 -239 mg/ dL
 - ❖ High > 240 mg/ dL
- Triglyceride → 0-150 mg/ dl
- Cholesterol HDL → 40-60 mg/ dl
- Cholesterol LDL
 - ❖ < 100 mg/dl → Optimal value (for diabetics)
 - ❖ < 100 -129 mg/dl → Near Optimal or Above Optimal
 - ❖ < 130 - 159 mg/dl → Borderline high
 - ❖ < 160 - 189 mg/dl → High
 - ❖ > or = 190 - mg/dl → Very high

MONITORING OF DIABETES

- Use a combination of HbA1c results and patient's self-monitoring results
- Frequency of follow-up should be based on the clinical situation, treatment regimen, and judgment of the clinician

HBA1C ESTIMATION

- ❖ For patients meeting targets: > twice a year
- ❖ For patients not meeting targets or whose treatment has changed: 4 times a year

SELF MONITORING OF BLOOD GLUCOSE

- Allows patients to become involved in evaluating their individual response to therapy

and assessing whether targets are being achieved

- Results can be useful in
 - ❖ Preventing hypoglycemia
 - ❖ Adjusting medications
 - ❖ Adjusting diet and physical activity

EXERCISE GUIDELINES

- Basic ACSM guidelines
 - ❖ Daily or 4-6 days in a week
 - ❖ 20-60 minutes/ day
- Recent research guidelines
 - ❖ In Type II diabetics, short bouts after eating!
 - ❖ 1 hour of exercise requires 15 additional grams of carbohydrates
 - ❖ Reduce level of obesity
 - ❖ Resistance (weight) training
 - ❖ Monitor blood glucose prior, during and post workout.

COMPLICATIONS- Diabetes cripples more than it kills. Complications set in slowly but once apparent are irreversible. As per the new definition, type 2 diabetes is a vascular disease; thus most complications are due to destruction of vessels.

ACUTE COMPLICATIONS

HYPOGLYCEMIA: common causes

- ❖ Taking more exercise than usual
- ❖ Delay or omission of a snack or main meal
- ❖ Administration of too much insulin
- ❖ Eating insufficient carbohydrate
- ❖ Over-indulgence in alcohol
- ❖ Mistake in diabetic drug dosage

CHRONIC COMPLICATIONS

- **MICROVASCULAR (Microangiopathy)**
 - ❖ CAUSE - Chronic hyperglycemia
 - ❖ EFFECT -
 - o Neuropathy
 - ◆ Peripheral neuropathy
 - ◆ Impotence
 - ◆ Constipation (autonomic neuropathy)

- o Nephropathy → CRF
- o Retinopathy → blindness
- o Impaired wound healing
- **MACROVASCULAR (Macroangiopathy)**
 - ❖ Cause
 - ◆ impaired fibrinolysis
 - ◆ increased oxidation
 - ◆ dyslipidaemia
 - ❖ EFFECT – Atherosclerosis
 - ◆ Cardiovascular
 - Atherosclerosis &/or damage to small vessels
 - Heart attack
 - Stroke
 - Poor perfusion of extremities; poor wound healing
 - Gangrene → toe/ limb amputations

PROFILE FOR EARLY DETECTION OF COMPLICATIONS:
All diabetics MUST be subjected to this profile at least once a year.

- ❖ CBC
- ❖ S Creatinine
- ❖ Microalbuminuria
- ❖ Lipids
- ❖ Fundus examination
- ❖ ECG/ TMT/ 2 D Echo
- ❖ Detailed examination of pulse including peripheral pulses, BP & neuropathy

TARGETS OF CONTROL IN A DIABETIC: Just controlling of blood sugar does not reduce incidence of complication. One must attempt near normalcy in the following parameters:

- ◆ FBS < 120
- ◆ PPBS < 140
- ◆ Hb1Ac < 7 %
- ◆ HDL > 40
- ◆ LDL < 100
- ◆ Triglyceride < 150
- ◆ BMI < 23
- ◆ WHR < 0.85
- ◆ No symptoms
- ◆ No malaise

GESTATIONAL DIABETES MELLITUS (GDM)

- GDM is defined as any degree of glucose intolerance with onset or first recognition during pregnancy.

American Diabetes Association. (2002). Gestational diabetes mellitus.

(Position statement). Diabetes Care, 25: S94-96.

- Affects 7% of all pregnancies
- Women with pre-existing diabetes are not considered to have GDM
- 90% of women with GDM have normal glucose levels after delivery
- Usually appears between 24-28 weeks gestation

RISK FACTORS FOR GDM

- Obesity before pregnancy
- First-degree family member with diabetes
- Past history of abnormal glucose tolerance
- Past history of bad obstetric history (BOH)

DIAGNOSIS

OGTT (Oral Glucose Tolerance Test) is recommended.

MATERNAL COMPLICATIONS

- Growth and maturation of the fetus; crucial in the third trimester
- Higher risk of
 - ❖ Hypertension
 - ❖ Pre-eclampsia
 - ❖ Infections
 - ❖ Caesarean section
 - ❖ Future diabetes

FETAL COMPLICATIONS

- Macrosomia
- Neural tube defects
- Neonatal hypoglycemia
- Hypocalcemia
- Hypomagnesemia

LONG TERM RISKS

- Mothers have increased risk of developing Type 2 diabetes later in life
- Offspring have increased risk of obesity, glucose intolerance and diabetes