UNIVERSITY-ORIENTED STUDENT NOTES

DIABETES MELLITUS

PROBLEM-BASED QUESTIONS

Case study 1

A 52-year-old obese urban male presents during an NCD screening camp with FPG 132 mg/dL…

Questions:

a) What is the diagnosis?

b) List modifiable risk factors.

c) Mention level of prevention applicable.

d) Outline community-level intervention.

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1. Definition

Diabetes Mellitus is a group of metabolic disorders characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both.

2. Magnitude of the Problem

- Global prevalence increasing (WHO)
- India among highest burden countries
- Urban > Rural
- Increasing in young adults

Public Health Impact:

- High morbidity
- Disability burden
- Economic strain

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3. Types

1. Type 1 DM
2. Type 2 DM (80–90%)
3. Gestational Diabetes Mellitus
4. Secondary Diabetes

4. Risk Factors

A. Non-Modifiable

- Age
- Family history
- Ethnicity

B. Modifiable

- Obesity (especially central obesity)
- Sedentary lifestyle
- High calorie diet

- Tobacco use
- Alcohol consumption

C. Social Determinants

- Urbanization
- Stress
- Socioeconomic changes

5. Natural History

Risk factors → Prediabetes → Asymptomatic stage → Clinical disease → Complications

(Represents Iceberg phenomenon)

6. Diagnosis (WHO Criteria)

- FPG ≥ 126 mg/dL
- 2-hour OGTT ≥ 200 mg/dL
- HbA1c ≥ 6.5%
- Random glucose ≥ 200 mg/dL + symptoms

7. Complications

Microvascular	**Macrovascular**
Retinopathy	Coronary artery disease
Nephropathy	Stroke
Neuropathy	Peripheral arterial disease

8. Screening

Annual screening for:

- Retina
- Urine microalbumin
- Foot examination
- Lipid profile
- Blood pressure

9. Management

Non-Pharmacological	**Pharmacological**
Diet modification	Metformin first line (Type 2)
Regular exercise	Insulin when required
Weight reduction	
Tobacco cessation	

10. Levels of Prevention

Primordial – Promote healthy lifestyle

Primary – Risk factor control

Secondary – Screening & early detection

Tertiary – Disability limitation

11. National Programme

NPCDCS:

- Screening at community level
- NCD clinics
- Health education
- Referral system

PROBLEM-BASED QUESTIONS

PBQ 1: Screening & Diagnosis

A 48-year-old urban male attends an opportunistic screening camp at a PHC. He is overweight (BMI 29 kg/m²), has a sedentary lifestyle, and his fasting plasma glucose is 132 mg/dL.

Questions:

a) What is the likely diagnosis?

b) Mention the diagnostic criteria for diabetes mellitus (any four).

c) List modifiable risk factors present in this patient.

d) Under which level of prevention does this intervention fall?

Model Answer:

a) Type 2 Diabetes Mellitus

b) WHO Diagnostic Criteria:

a) FPG ≥ 126 mg/dL
b) 2-hour OGTT ≥ 200 mg/dL
c) HbA1c ≥ 6.5%
d) Random plasma glucose ≥ 200 mg/dL + symptoms

c) Modifiable risk factors:

- Obesity
- Sedentary lifestyle
- Possibly unhealthy diet

d) Secondary prevention (early detection through screening)

PBQ 2: Iceberg Phenomenon & Natural History

In a rural community, only 5% of people are known diabetics, but a survey shows 12% have elevated blood glucose levels without symptoms.

Questions:

a) What epidemiological concept is illustrated here?

b) Draw the natural history of diabetes.

c) Why is screening necessary in this disease?

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Model Answer:

a) Iceberg phenomenon

b) Natural History: Risk factors → Prediabetes → Asymptomatic stage → Clinical stage → Complications

c) Screening is necessary because:

- Large proportion are asymptomatic
- Early detection prevents complications
- Reduces disability and economic burden

PBQ 3: Complications & Screening

A 60-year-old woman with 10-year history of diabetes presents with decreased vision and numbness in feet.

Questions:

a) Identify two chronic complications seen here.

b) Classify diabetic complications.

c) Mention screening tests and frequency for chronic complications.

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Model Answer:

a) Two chronic complications

- Diabetic retinopathy
- Diabetic neuropathy

b) Complications:

Microvascular – Retinopathy, Nephropathy, Neuropathy

Macrovascular – CAD, Stroke, PAD

c) Screening (Annually):

- Fundoscopy – yearly
- Urine microalbumin – yearly
- Foot examination – yearly
- Lipid profile – yearly
- BP – every visit

PBQ 4: Levels of Prevention

An urban slum population shows increasing obesity and sedentary behavior among adolescents.

Questions:

a) List levels of prevention applicable for diabetes in this community.

b) Give one example for each level.

c) Which level is most cost-effective for India?

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Model Answer:

a) Levels:

- Primordial
- Primary
- Secondary
- Tertiary

b) Examples:

Primordial – Promote healthy diet in schools

Primary – Weight reduction programs

Secondary – Screening camps

Tertiary – Management of complications

c) Primordial and Primary prevention (most cost-effective)

PBQ 5: National Programme

A 45-year-old woman is screened under a government NCD programme at a Health and Wellness Centre.

Questions:

a) Name the national programme addressing diabetes in India.

b) State its objectives (any two).

c) Mention the levels of healthcare involved.

d) Role of community health worker in diabetes control.

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Model Answer:

a) NPCDCS – National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke

b) Objectives:

- Early diagnosis through screening
- Health promotion
- Strengthening infrastructure for NCD care

c) Subcentre → PHC → CHC → District Hospital

d) Role of community health worker:

- Risk factor identification
- Community awareness
- Follow-up of diagnosed cases
- Lifestyle counseling