

MODULE 2-2012

DIABETES MELLITUS & COMPLICATIONS

MOH Diabetic Retinopathy
Screening Team
2012



Diabetes Mellitus- Introduction

- Disorder due to sustained hyperglycemia of varying severity secondary to lack or diminished efficacy of endogenous insulin.
- Can be classified into two types, with some degree of overlap.

Diabetes Mellitus (DM)

- *Type 1 diabetes*

(Insulin dependent DM)

- ages 10-20 years with acute polydipsia, polyuria, nocturia and weight loss.
- HLA-DR3 and DR4
- autoimmune destruction of pancreatic islet cells with total lack of insulin
- require insulin

- *Type 2 diabetes*

(non-insulin dependent)

- ages 30 and above
- obese
- relative deficiency of insulin
- often asymptomatic and discovered by chance
- oral hypoglycemia with/out insulin

DM : Diagnosis and Monitoring

- Fasting glucose > 7.0 mmol/l
- Random glucose > 11.1 mmol/l
- GTT is only done if :
 - Glucose level 6.1-6.9 mmol/L
- Glycosylated haemoglobin (HbA1c) reflects the average level of blood glucose over the preceding 3 months ($<6.5\%$)

Chronic Complication of Diabetes Mellitus

When to screen for complications



- Type 2 Diabetes:
 - ✓ when first diagnosed
- Type 1 diabetes:
 - ✓ 3 years after diagnosis

DM : systemic complications

Diabetic retinopathy

Leading cause of blindness in working-age adults¹



Diabetic nephropathy

Leading cause of end-stage renal disease²



Stroke

2- to 4-fold increase in cardiovascular mortality and stroke³



Cardiovascular disease

8/10 diabetic patients die from cardiovascular events⁴



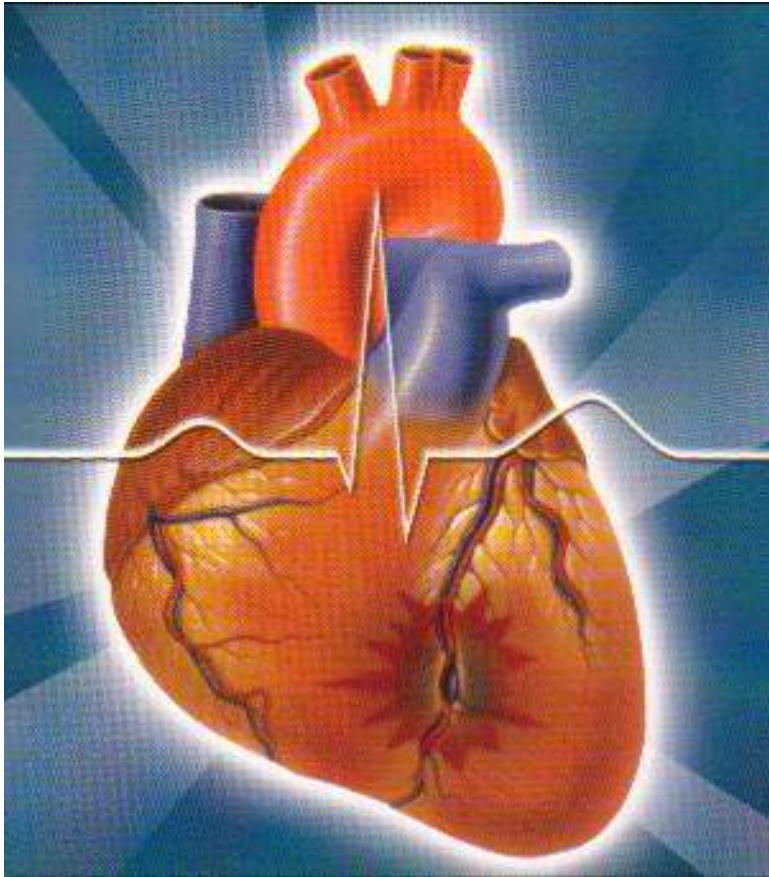
Diabetic neuropathy

Leading cause of non-traumatic lower extremity amputations⁵



1. Fong DS *et al. Diabetes Care* 2003; 26 (Suppl 1): S99–102; 2. Molitch ME *et al. Diabetes Care* 2003; 26 (Suppl 1): S94–8; 3. Kannel WB *et al. Am Heart J* 1990; 120: 672–6; 4. Gray RP, Yudkin JS. In: Pickup JC, Williams G, eds. *Textbook of Diabetes*. 2nd Edn. Oxford: Blackwell Science, 1997; 5. Mayfield JA *et al. Diabetes Care* 2003; 26 (Suppl 1): S78–9.

DM : Heart



- T2DM increase risk for CHD (2-4x)
- Thrombosis of the vessels
- Manifest as:
 - Angina
 - Myocardial infarct
 - Sudden death
- Silent MI – present with heart failure

DM : Kidney

- Nephropathy is the major cause of CKD
- Manifested by proteinuria
- Blood pressure & glycaemic control are crucial in preventing and retarding progression to CKD
- Referral to nephrologist should be made if $\text{Se Creatinine} > 200 \mu\text{mol/l}$



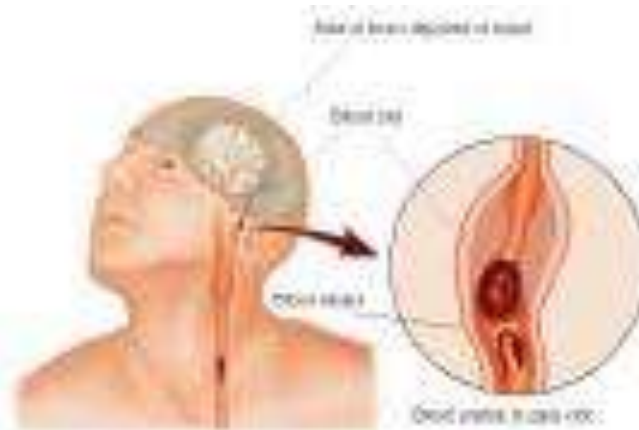
Normal Kidney



Bad kidney

DM : Brain

- Cerebral vascular accident (CVA)
 - Hemorrhagic
 - Thrombotic



DM : Foot complications

- Foot ulceration and amputation are the major cause of morbidity and mortality in diabetes
- Loss of peripheral sensation
- Minor injury → major effects
- Peripheral vascular disease → Gangrene

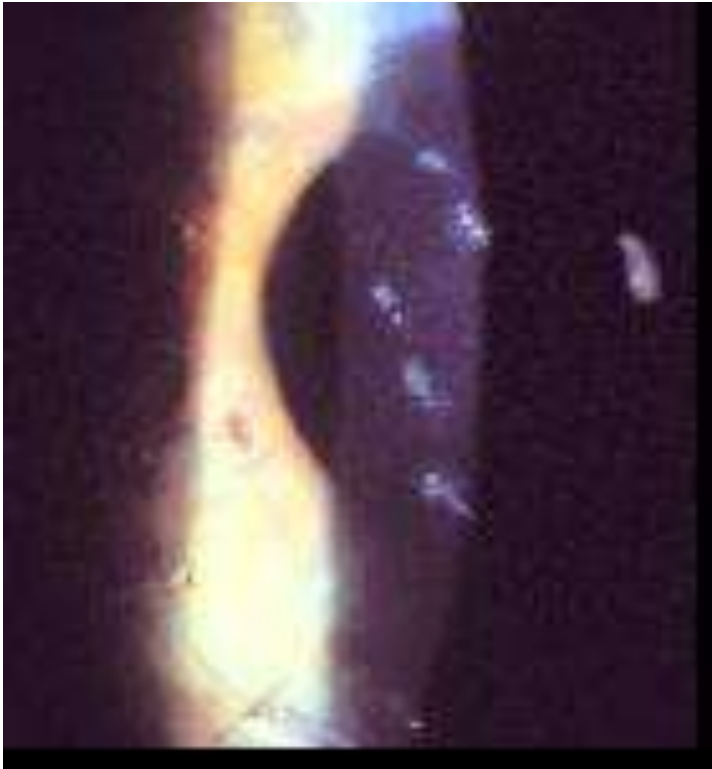


DM : neuropathy

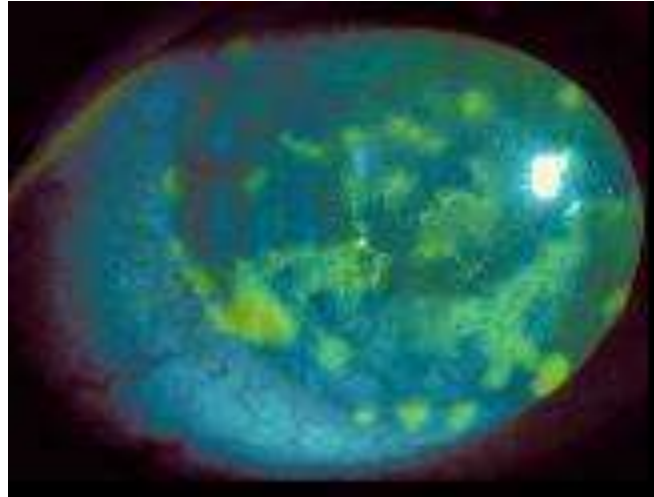
- Maybe asymptomatic
- 5 neuropathies in diabetes:
 1. distal symmetrical polyneuropathy
 2. proximal asymmetrical neuropathy
 3. autonomic neuropathy
 4. radiculopathy
 5. mononeuritis multiplex



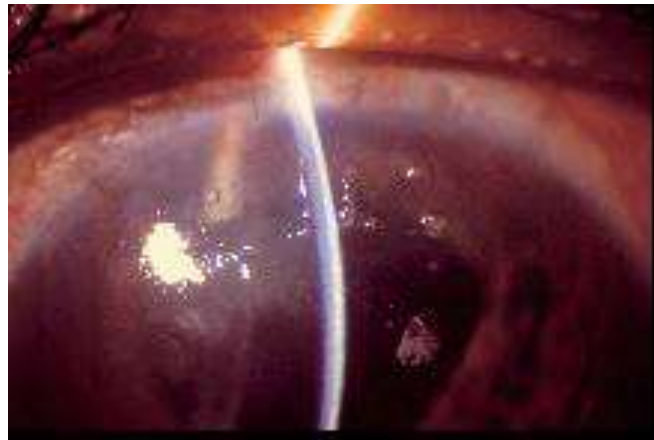
DM : Eye Complications



Dry eyes

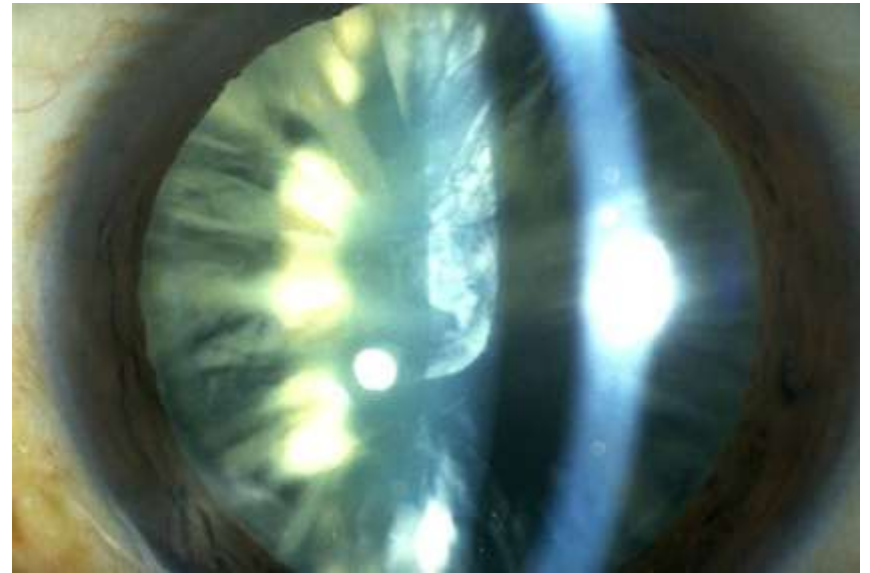


**Recurrent
erosions**



**Filamentary
keratitis**

DM : Eye Complications



Cataract

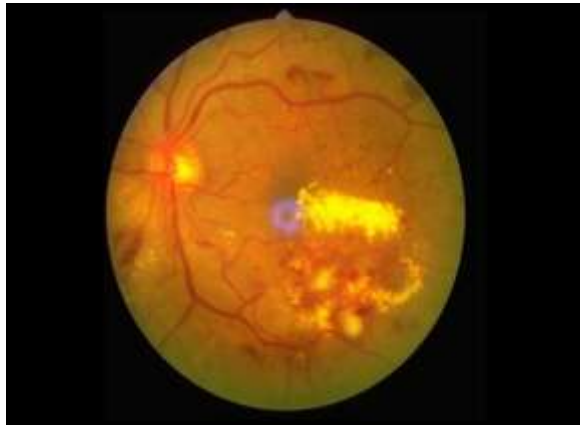
DM : Eye Complications



Infective keratitis/ corneal ulcer

DM : Eye Complications

Diabetic Retinopathy



DR and pregnancy

- DR progress rapidly during pregnancy
- Severe NPDR has higher risk
- PDR can bleed during delivery
- Macular edema can worsened
- In pre-existing DM - fundus examination should be done before, during (every trimester) and after delivery
- In Gestational DM – if it is diagnosed in the first trimester, screening should be done as per pre-existing DM



Prevention of Diabetic Complications



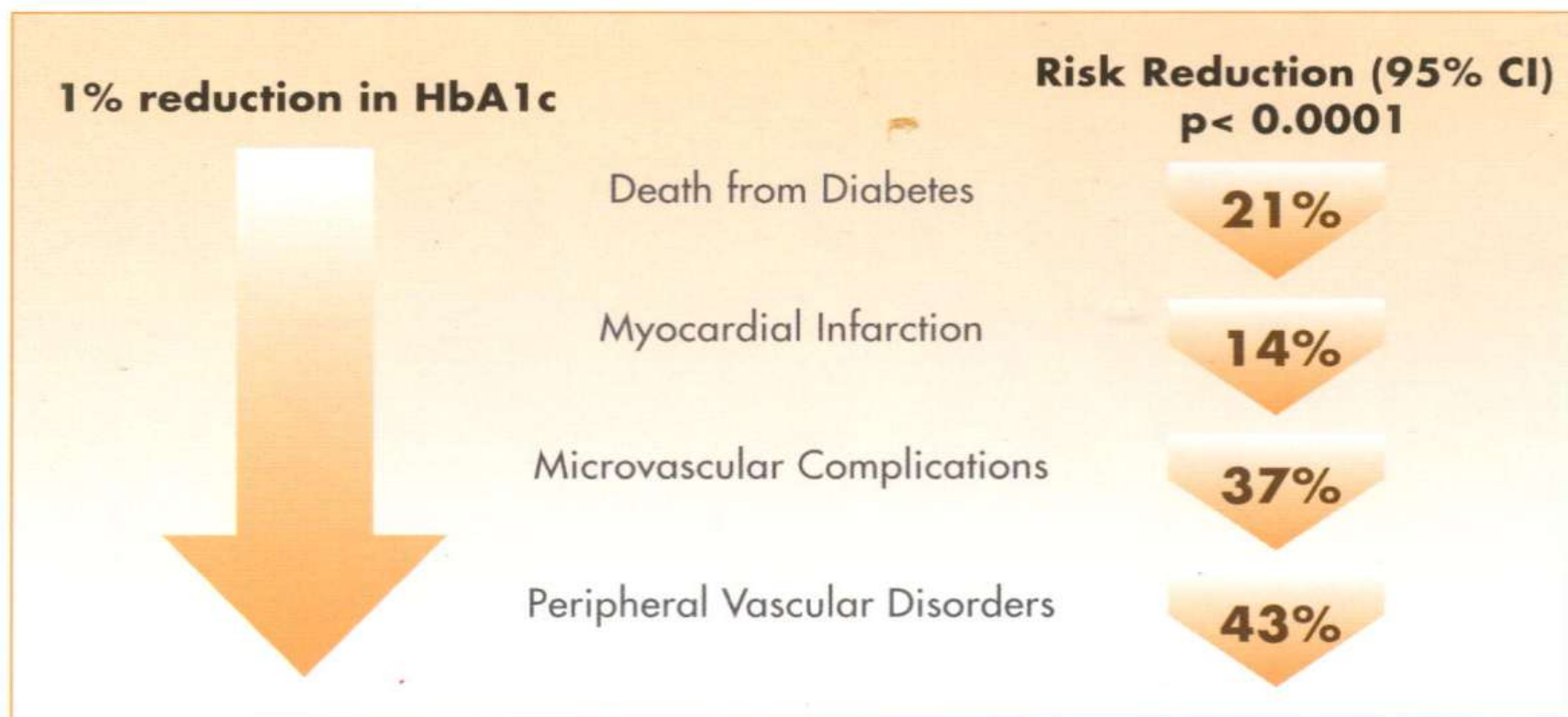
1. Control Glucose Level

Glycaemic measure	Target
Fasting Blood Glucose	4.4-6.1 mmol/L
Non-fasting Blood Glucose	4.4-8.0 mmol/L
HbA1c	< 6.5%

Importance of good glucose control !!!!!

Lessons from UKPDS:

BETTER CONTROL MEANS FEWER COMPLICATIONS¹



REMEMBER!!!!

- Control of blood glucose **ONLY** is not enough
- Must reduce other risk factors.



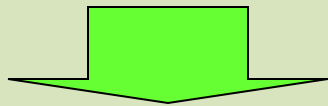
2. Ensure normal Blood Pressure

BP target:

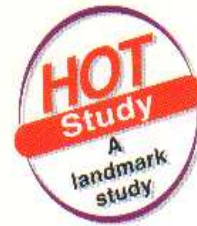
- **130/80 mmHg :**
no albuminuria
- **125/75 mmHg :**
presence of
albuminuria



**Reduction of diastolic
pressure : 90....80mmHg**

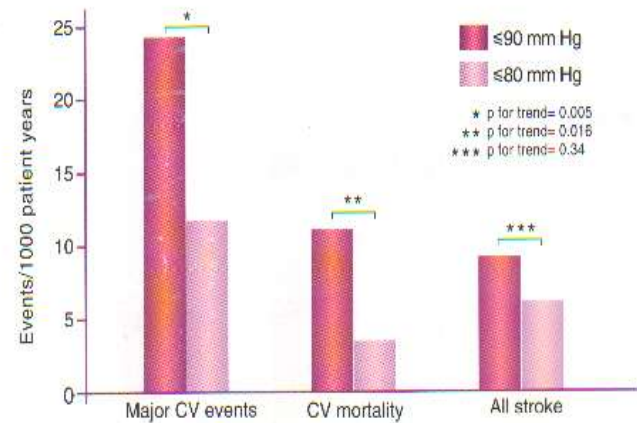


**51% reduction in heart /
vascular disease**



**Significant benefits from active blood pressure
reduction in diabetics**

**Subgroup of 1501 diabetes mellitus patients on
Plendil® as baseline therapy**



3. Lower Cholesterol level

- **LDL** : ≤ 2.6 mmol/L
- **TG** : ≤ 1.7 mmol/L
- **HDL** : ≥ 1.1 mmol/L

How? :

- **Avoid fatty high cholesterol foods**
- **Medication : Statin / Fibrate**

4. Stop SMOKING

- Important factor in reducing risk of heart & vascular diseases

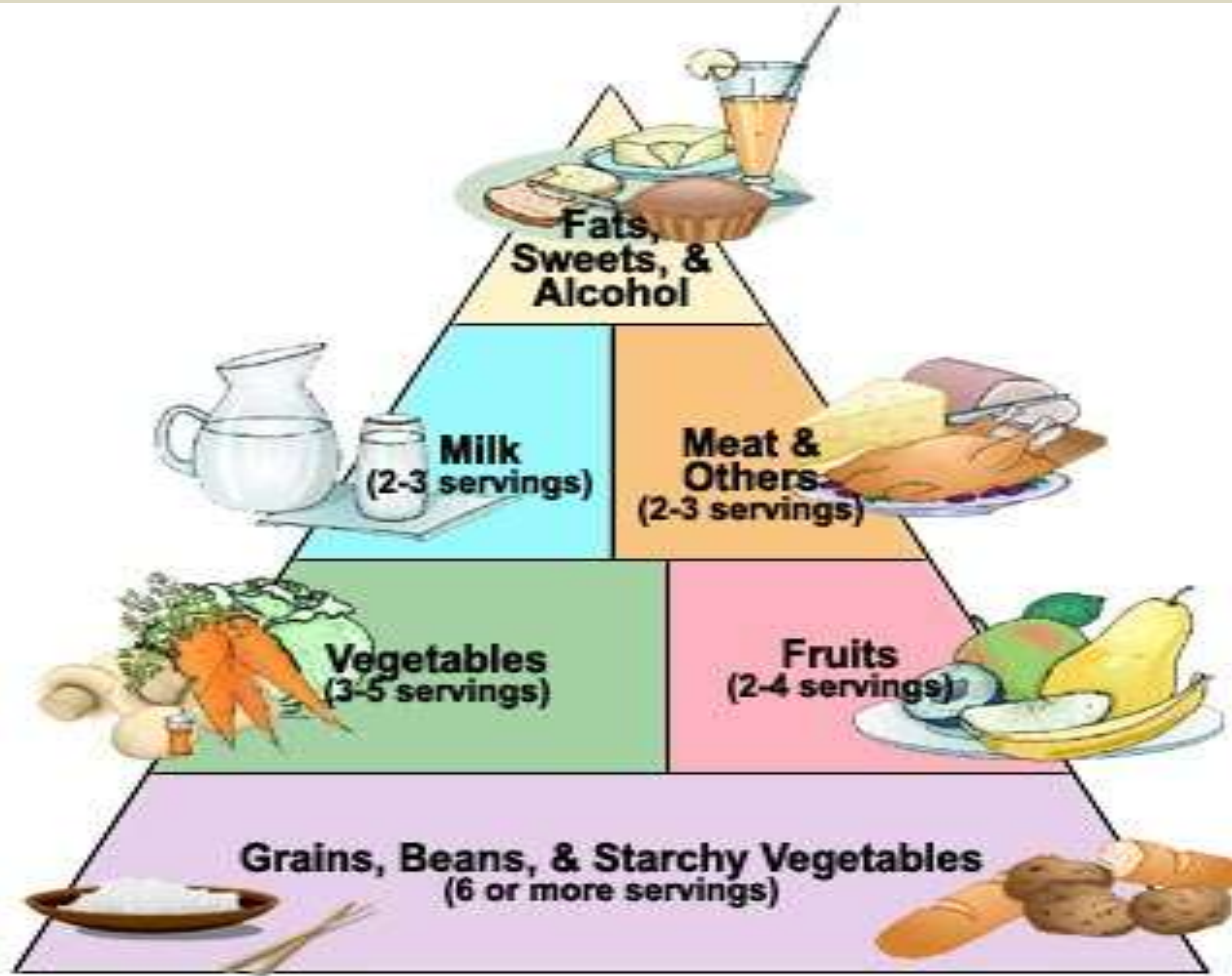


5. Exercise

- Reduce weight
 - Exercise 30 min 5 times a week
1. Better diabetes control
 2. Reduce risk of heart and vascular diseases



6. Healthy Diet



Terlalu Rendah ??



Lapar



Pening



Mengantuk



Penglihatan kabur



Cepat marah



Kuat berpeluh



Bergigil

Terlalu Tinggi ??



Letih / Tidak
bermaya



Mengantuk



Dahaga



Mulut rasa
kering

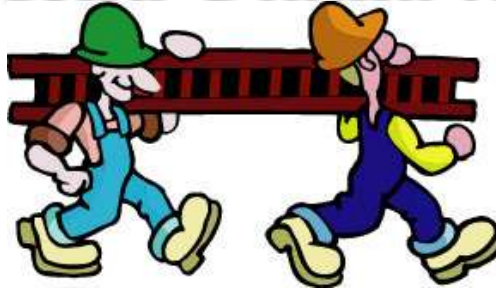


Kerap
buang
air kecil

Apakah yang Boleh Saya Lakukan? Jadi,



Waktu Makan Menu UtamaPerlu Tetap



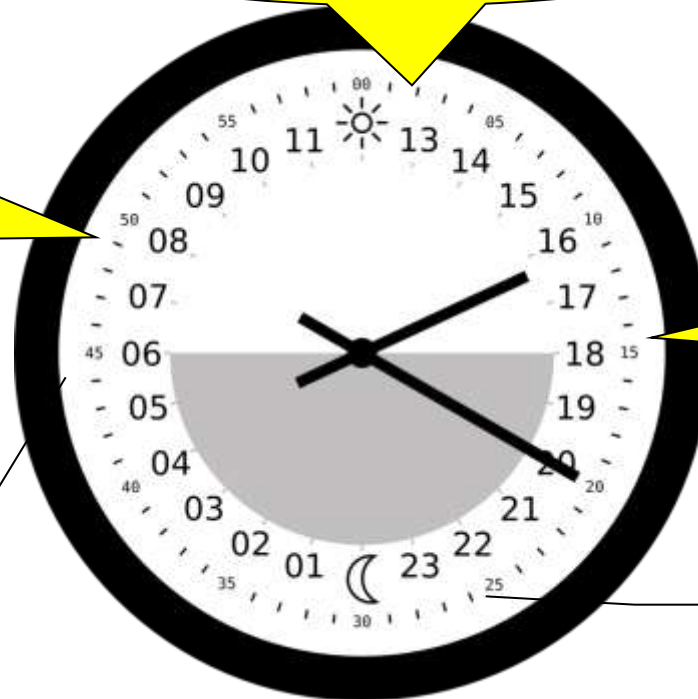
1pm T/hari

7 am
Sarapan

7pm
Petang

6am
Bangun

11pm
Tidur



Makan Secara Tetap



- Jangan tinggalkan mana-mana waktu **makan utama**.
- **Bangun** daripada tidur, segerakan makan (1/2 -1 jam selepas bangun).
- Sebelum **tidur**, makan.

Cara makan yang baik

Makan **Kerap** tetapi **Sederhana**



7am
Sarapan



10 am
Minum



1pm
T/hari



4 pm
Minum



7pm
Petang

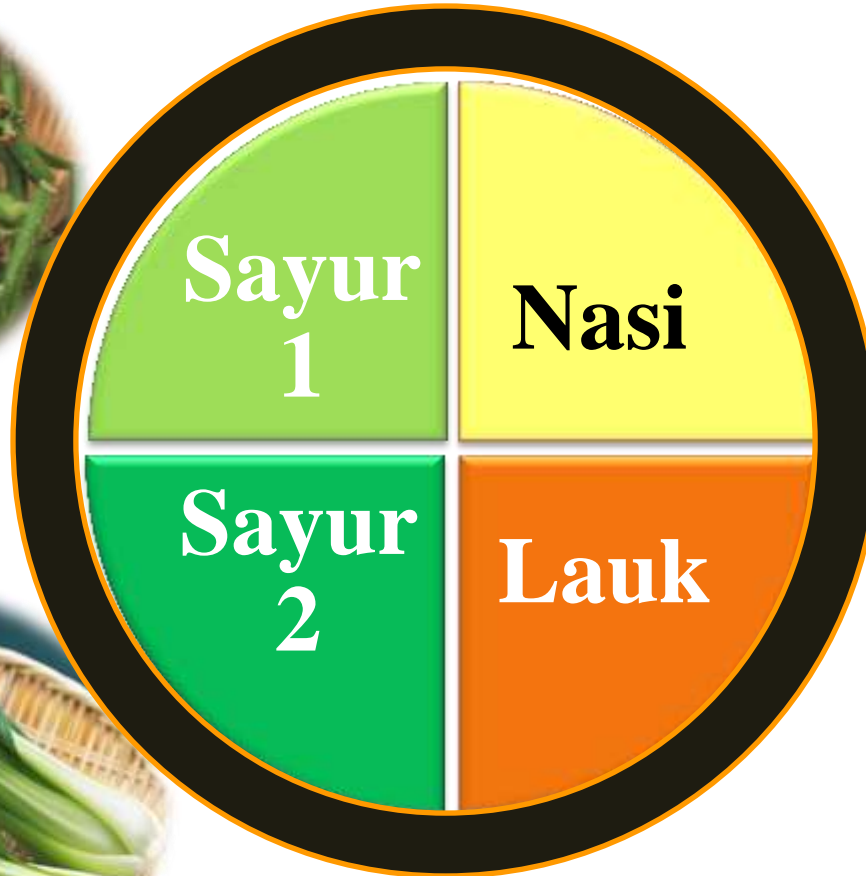


10 pm
Minum

Ambil 2 Hidangan Sayur-sayuran



$\frac{1}{2}$ cawan



$1-1\frac{1}{2}$ cawan



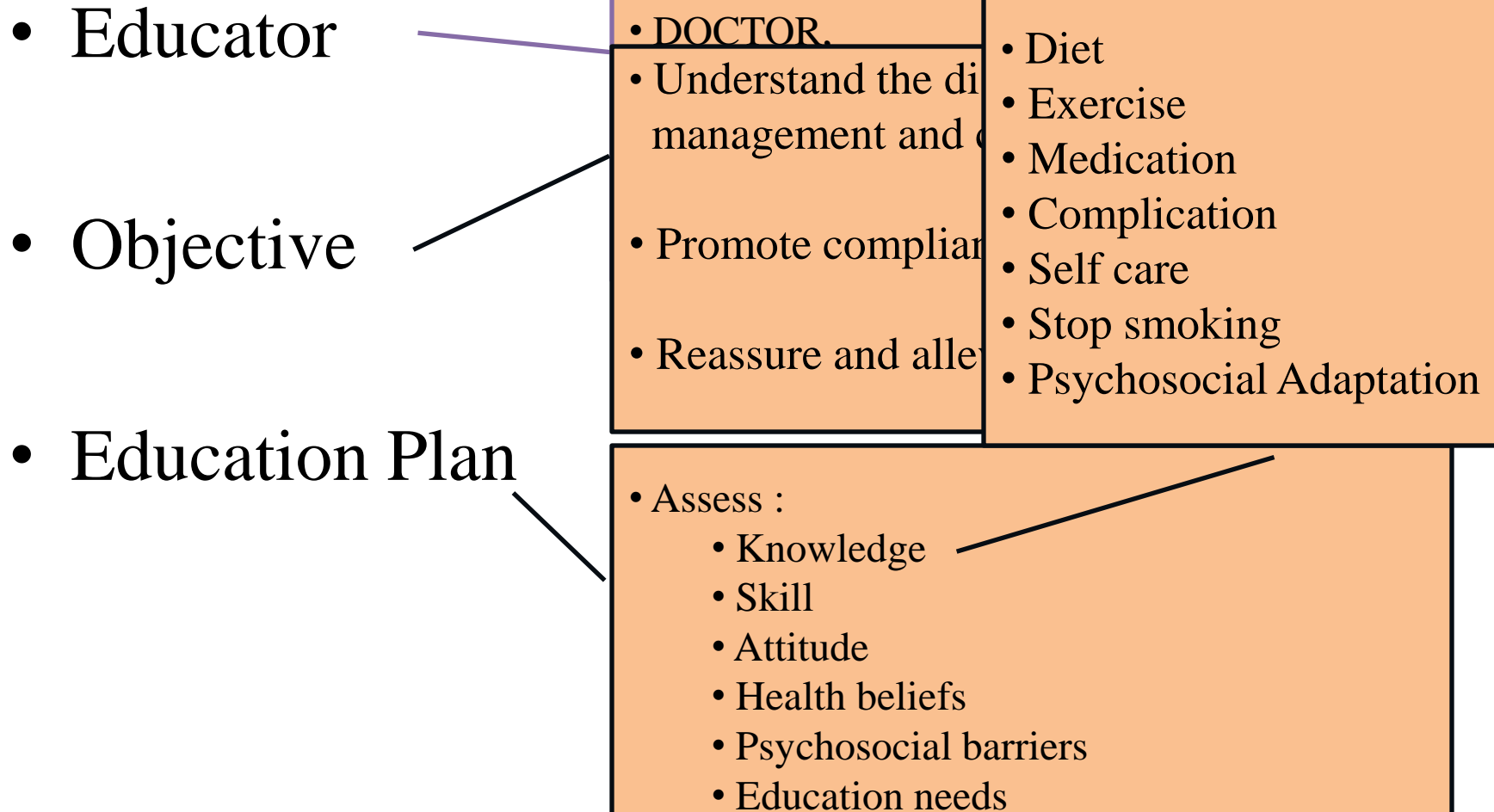
$\frac{1}{2}$ cawan



1 ketul

- ✓ **Makan secara seimbang, sederhana dan sihat**
- ✓ **Amalkan hidangan kecil tetapi kerap**
- ✓ **Amalkan makan ikut masa dan ikut saiz hidangan yang disarankan**
- ✓ **Amalkan hidangan yang tinggi serat**
- ✓ **Lakukan pemeriksaan aras glukosa darah secara berkala**

7. Education



Summary :Targets for Control

	Units	Ideal
Glycaemic Control		
Fasting	mmol/L	4.4 – 6.1
Non-fasting	mmol/L	4.4 – 8.0
HbA1c	%	< 6.5
Lipids		
Triglycerides	mmol/L	≤ 1.7
HDL-cholesterol	mmol/L	≥ 1.1
LDL-cholesterol	mmol/L	≤ 2.6
Body mass index ¹⁵	kg/m ²	< 23
Blood Pressure¹²		
Normal Renal Function	mm Hg	$\leq 130/80$
Renal Impairment	mm Hg	$\leq 125/75$

Reminder

assessment	When
➤ Urine examination : <ul style="list-style-type: none">• proteinuria	yearly
➤ Renal function examination : <ul style="list-style-type: none">• BUSE / Creatinine	yearly
➤ Fasting serum lipid	yearly
➤ Eye examination	yearly
➤ ECG	Yearly/PRN
➤ Foot examination : <ul style="list-style-type: none">• neurovascular• ulcer/corn	yearly Each visit
➤ BP/weight	Each visit
➤ Patient Education	Each visit

CONCLUSIONS

Early detection and effective risk factor management would avoid diabetic complications and reduce morbidity & mortality impact

Thank You

