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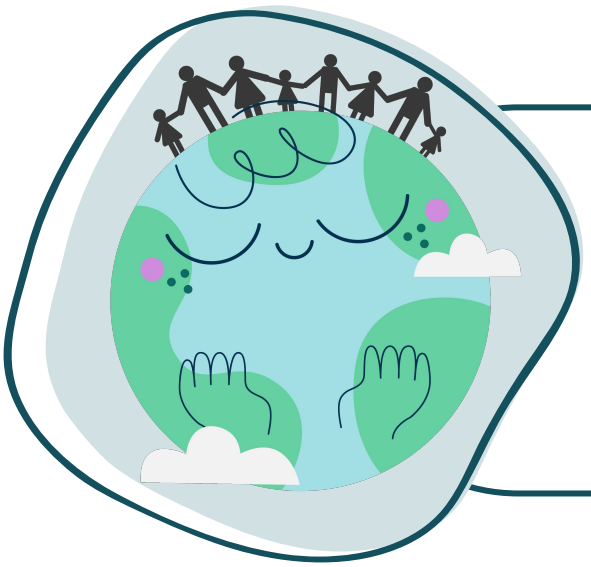


Diabetes

Objectives

- Understand global prevalence of diabetes.
- Understand the epidemiology of diabetes in KSA.
- List the risk factors of diabetes.
- List complications of diabetes.
- Discuss preventive measures within the framework of NCDs.
- Screening of Diabetes (438)
- Know preventive programs in KSA towards DM
- **OSCE**

Color Index

- Main text
- Males slides
- Females slides
- Doctor notes
- Important
- Textbook
- Golden notes
- Extra

Editing File

Diabetes Mellitus

Definition

A metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrates, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both.

★ Main types of diabetes

- **Type 1 diabetes** (5-10%)
  - Due to autoimmune β-cell destruction, usually leading to absolute insulin deficiency.
  - Usually affects younger age group (not always).
- **Type 2 diabetes** (90-95%) (More common in the clinic)
  - Due to a progressive loss of β-cell insulin secretion frequently on the background of insulin resistance (Especially among obese patient.).
  - Usually affects older age group (not always).
- **Gestational diabetes mellitus (GDM)**
  Diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation.
- **Specific types of diabetes due to other causes**
  e.g. maturity-onset diabetes of the young [MODY], and drug - chemical induced diabetes (such as with glucocorticoid use), disease of the exocrine pancreas
- **Impaired glucose tolerance (IGT) and impaired fasting glycaemia (IFG)**
  Intermediate conditions in the transition between normal blood glucose levels and diabetes (especially type 2)

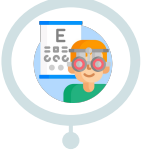
Symptoms

Increase frequency of urine (pee) especially nocturnal (polyurea especially nocturia waking the patient from sleep)

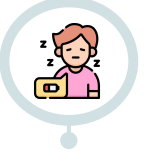
Increase thirst (polydipsia with excessive dryness of the mouth “dry oral mucous membrane”)

Increase appetite

Weight loss



Blurred vision



Easy Fatigability (tiredness or lethargic)

Tingling hands and feet (numbness or burning sensation) (One of the most common complains)

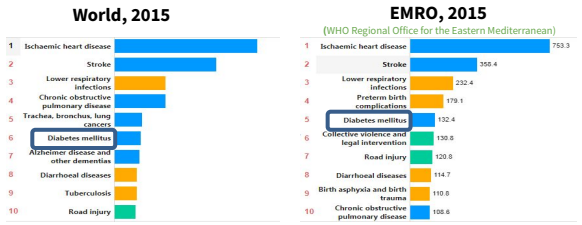
Slow healing wounds

Dry skin

Epidemiology

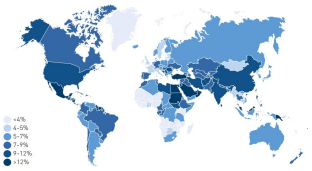
- The studies demonstrated varying prevalence rates in different geographical regions in the country, ranging from 18.2% (in 2004± 2005) in the study conducted in the Eastern province to 31.6% in 2011 in the study conducted in Riyadh.
- Number of people with diabetes has risen a lot in the past decade.
- In Saudi Arabia every 3rd person is now a diabetic.

Top 10 causes of death



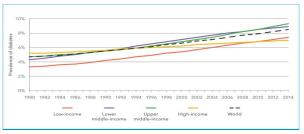
Crude death rates (per 100,000)

Estimated age-adjusted prevalence of diabetes in adults (20-79 years), 2017



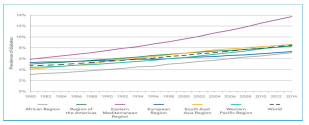
>12% in Saudi Arabia, East Asia as well as Southern and Northern America.

Trends in prevalence of diabetes, 1980–2014, by country income group



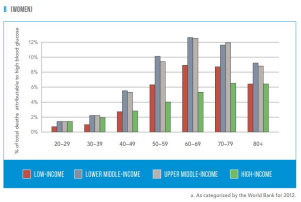
The global prevalence of diabetes among adults 18+ was 4.7% in 1980 and in 2014 it almost doubled. This increase was seen more in the middle and low income country. In high income countries it was stable (maintained) although they had a high prevalence they are controlling the incidence of diabetes due to various interventions.

Trends in prevalence of diabetes, 1980–2014, by WHO region

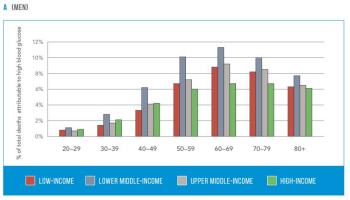


Despite the high income countries curve is maintained and the fact that the eastren mediterranean region has the majority of the high income countries still when comparing to other regions the prevalence per capita which means the total number of people living with this disease in the eastren mediterranean region is the highest.

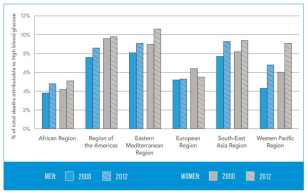
Percentage of all-cause deaths globally attributed to high blood glucose in women, 2012



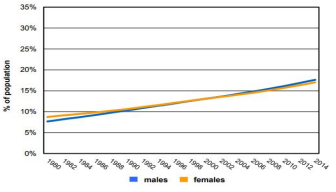
Percentage of all-cause deaths globally attributed to high blood glucose in men, 2012



Percentage of all deaths attributable to high blood glucose for adults aged 20–69 years, by WHO region and sex, 2000 and 2012



Trends in age-standardized prevalence of diabetes in Saudi Arabia



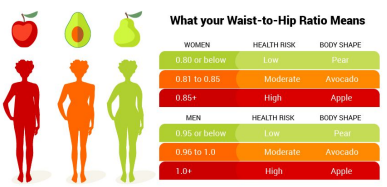
Estimated prevalence and number of people with diabetes (adults 18+ years)

WHO Region	Prevalence (%)		Number (millions)	
	1980	2014	1980	2014
African Region	3.1%	7.1%	4	25
Region of the Americas	5%	8.3%	18	62
Eastern Mediterranean Region	5.9%	13.7%	6	43
European Region	5.3%	7.3%	33	64
South-East Asia Region	4.1%	8.6%	17	96
Western Pacific Region	4.4%	8.4%	29	131
Total[a]	**4.7%**	**8.5%**	**108**	**422**

a. Totals include non-Member States. Source: IR

High blood glucose age-standardized mortality rates per 100000 by WHO region, age 20+, 2012

	Both sexes	Female	Male
African Region	111.3	110.9	111.1
Region of the Americas	72.6	63.9	82.8
Eastern Mediterranean Region	139.6	140.2	138.3
European Region	55.7	46.5	64.5
South-East Asia Region	115.3	101.8	129.1
Western Pacific Region	67	65.8	67.8

Risk factors	
Genetic factors	• May play a part in development of all types; autoimmune disease and viral infections may be risk factors in Type I DM. • Twin studies
Family history	• Compared with individuals without a family history of type 2 diabetes, individuals with a family history in any first degree relative have a two to three-fold increased risk of developing diabetes. • The **risk of type 2 diabetes is higher (five- to six fold) in those with both a maternal and paternal history of type 2 diabetes .** • The risk is likely mediated through genetic, anthropometric (body mass index, waist circumference), and lifestyle (diet, physical activity, smoking) factors. • Families whose at high risk and known to have history of diabetes the intervention should be as early as childhood and every pregnant and potentially conceivable woman in that family should get the proper education about breastfeeding and continuation of breastfeeding for 2 years, calorie concept and early weaning which means means the first soft food given to the baby so the mother should know what to give and what to avoid.
Obesity	• Contributes to the resistance to endogenous insulin. - RR risk of DM in <u>females</u> (the males have even higher numbers) (ref. BMI < 22) As the BMI increases the risk of DM development also increases. ○ 22-23 3.0 ○ 24-25 5.0 ○ > 31 40.0 (Colditz & al, Ann Int Med, 1995, 122; 481-6) • **The risk of impaired glucose tolerance (IGT) or type 2 diabetes rises with increasing body weight.** • The Nurses' Health Study demonstrated an approximately 100-fold increased risk of incident diabetes over 14 years in nurses whose baseline body mass index was >35 kg/m2 compared with those with BMI <22 . • The risk of diabetes associated with body weight appears to be modified by age. • Obesity acts at least in part by inducing resistance to insulin-mediated peripheral glucose uptake, which is an important component of type 2 diabetes. • Childhood obesity is a very important risk factor contributing to adult diabetes. • As mentioned in the maternal lecture breastfeeding is a simple intervention that can decrease childhood and adolescent obesity which eventually decreases adulthood diabetes and with a controlled diabetes the web of non-communicable diseases such as HTN, cardiovascular accidents and even cancer development later on will be decreased..
Fat distribution	• The distribution of excess adipose tissue is another important determinant of the risk of insulin resistance and type 2 diabetes. • The incidence of type 2 diabetes are highest in those subjects with central or abdominal obesity, as measured by waist circumference or waist-to-hip circumference ratio.  • Intra-abdominal (visceral) fat rather than subcutaneous or retroperitoneal fat appears to be of primary importance. • Nowadays we are focusing more on the hip-waist ratio more than the overall BMI. It's very important to know how to measure it and corresponds to the risk of DM development for the OSCE as mentioned in the obesity seminar. Remember in OSCE only measure if it is asked to measure if not don't measure even if the tape is on the table.

Risk factors	
Physical inactivity	Prolonged TV watching is associated with a significantly increased risk of type 2 diabetes. Men who watched TV more than 40 h per week had a nearly threefold increase in the risk of type 2 diabetes compared with those who spent less than 1 h per week watching TV.
Diet	• A number of dietary factors have been linked to an increased risk of type 1 diabetes, such as **low vitamin D consumption; early exposure to cow's milk or cow's milk formula; or exposure to cereals before 4 months of age.** However, none of these factors has been shown to cause type 1 diabetes. • Consumption of red meat, processed meat, and sugar sweetened beverages is associated with an increased risk of diabetes. • Increase consumption of fruits, vegetables, nuts, whole grains, and olive oil is associated with a reduced risk. • It is important to recognize that most studies have used food frequency questionnaires to capture dietary patterns and that none of the food stuffs examined can be considered in isolation. For example, higher meat intake always means more saturated fat intake, relatively lower fruit and vegetable intake, and frequently, higher BMI (body mass index).
Smoking	• Several large prospective studies have raised the possibility that cigarette smoking increases the risk of type 2 diabetes. In a meta-analysis of 25 prospective cohort studies, current smokers had an increased risk of developing type 2 diabetes compared with nonsmokers (pooled adjusted RR 1.4, 95% CI 1.3-1.6). • A definitive causal association has not been established, a relationship between cigarette smoking and diabetes mellitus is biologically possible based upon a number of observations: ○ Smoking increases the blood glucose concentration after an oral glucose challenge. ○ Smoking may impair insulin sensitivity. ○ Cigarette smoking has been linked to increased abdominal fat distribution and greater waist-to-hip ratio that may have an impact upon glucose tolerance.
Infections	A range of relatively rare infections and illnesses can damage the pancreas and cause type 1 diabetes.
Pregnancy	Pregnancy causes weight gain and increases levels of estrogen and placental hormones, which antagonize insulin. That's why we need to monitor and regulate the glucose level of a pregnant lady because gestational diabetes can develop into a full blown diabetes later on.
Medications	Drugs that are known to antagonize the effects of insulin: ○ Thiazide diuretics ○ Adrenal corticosteroids ○ Oral contraceptives
Physiological 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 resulting in lower levels of insulin in the body.

These numbers are very important and need to be embedded in your minds in order to label and assess each patient

Diabetes				
Fasting Plasma Glucose		2-h Plasma Glucose**		HbA1c
≥ 7.0 mmol/L(126 mg/dl)	**OR**	≥11.1 mmol/L (200 mg/dl)	**OR**	≥ 6.5% (The recent guidelines are more reliable on it as it gives you the 3 months control observation & one lab report is enough for diagnosis)

Impaired Glucose Tolerance (IGT) (Potential risk of developing diabetes if not controlled so we still have a chance in modifying the patient's lifestyle)		
Fasting Plasma Glucose		2-h Plasma Glucose**
< 7.0 mmol/L (126 mg/dl)	**AND**	≥ 7.0 and < 11.1 mmol/L (140 mg/dl and 200 mg/dl)

Impaired Fasting Glucose (IFG)		
Fasting Plasma Glucose		2-h Plasma Glucose**
6.1 to 6.9 mmol/L (110 mg/dl to 125 mg/dl)	**AND (if measured)**	≥11.1 mmol/L (200 mg/dl)

Gestational Diabetes Mellitus (GDM)		
One or more of the following:		
Fasting Plasma Glucose	1-h Plasma Glucose*	2-h Plasma Glucose**
5.1 - 6.9 mmol/L (92 - 125 mg/dl)	≥ 10.0 mmol/L (180 mg/dl)	8.5 - 11 mmol/L (153 - 199 mg/dl)

* Venous plasma glucose 2 hours after ingestion of 75 g oral glucose load
** Venous plasma glucose 1 hour after ingestion of 75 g oral glucose load

Criteria for the diagnosis

438: No reference values will be given during the OSCE

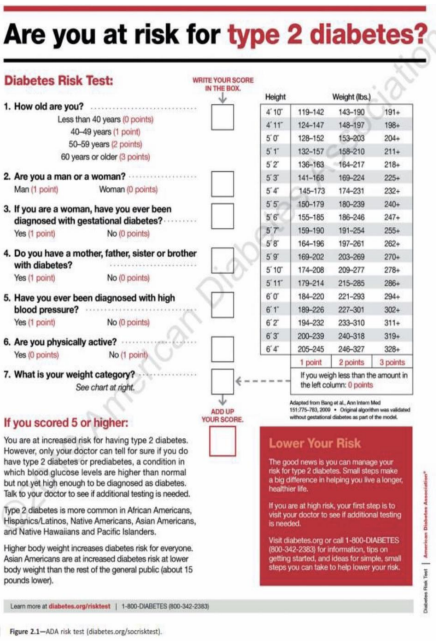
Normal	Prediabetes	Diabetes
- **Fasting Plasma Glucose (FPG):** ≤ 5.5 mmol/L (99 mg/dL) - **2-h PP:** < 140 mg/dl (7.8 mmol/L)	- **Fasting Plasma Glucose (FPG):** 5.6 – 6.9 mmol/L (100 - 125 mg/dL) - **2-h PP:** 140- 199 mg/dl (7.8-11 mmol/L) - **HbA1C:** 5.7 – 6.4% - The person is at risk to develop diabetes mellitus	- **Fasting Plasma Glucose (FPG):** 7.0 mmol/L (126 mg/dL) Fasting for at least 8 h. **OR** - **2-h PP** (2 hours postprandial) **:** 200 mg/dL (11.1 mmol/L). **OR** - **A1C:** 6.5%. **OR** - In a patient with **classic symptoms of hyperglycemia** and a **random plasma glucose** 200 mg/dL (11.1 mmol/L) [1]. - In the **absence of unequivocal hyperglycemia**, diagnosis requires **two** abnormal test results from the **same sample** or in **two separate test samples**. (2 FPG / 2 A1C / FPG and A1C/ FPG and 2hpp)

- To convert the value to mmol/L divide by 18 and vice versa. In KKUH the values are usually in mmol/L and all the values mentioned in the table are from the latest American Diabetic Association guidelines.
- **439:** In the OSCE and exam the numbers will be mentioned in all units so feel free to memorize the numbers in the unit that you're most comfortable with..

1. In symptomatic patients one random plasma glucose reading is sufficient to diagnose diabetes.

★ Criteria for testing for diabetes in asymptomatic adults

1. Testing should be considered in **overweight** or **obese** adults who have **one or more of the following risk factors:**
   - First-degree relative with diabetes.
   - History of CVD or Hypertension. (Premature death because of CVD such as MI at a young age)
   - Women with polycystic ovary syndrome.
   - Physical inactivity.
   - Conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)
2. Patients with prediabetes should be tested yearly.
3. Women who were diagnosed with GDM should be followed up with a gestational practitioner and test even after delivery.
4. For all other patients, testing should begin at age 45 years.
5. If results are normal, testing should be repeated at a **minimum of 3-year intervals.**



Can be distributed on the world's diabetes day for awareness and educational purposes.

Key facts

- The number of people with diabetes has risen from 108 million in 1980 to 422 million in 2014.
- The global prevalence of diabetes* among adults over 18 years of age has risen from 4.7% in 1980 to 8.5% in 2014.
- Diabetes prevalence has been rising more rapidly in middle- and low-income countries.
- Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke and lower limb amputation.
- In 2015, an estimated 1.6 million deaths were directly caused by diabetes. Another 2.2 million deaths were attributable to high blood glucose in 2012**.
- Almost half of all deaths attributable to high blood glucose occur before the age of 70 years. WHO projects that diabetes will be the seventh leading cause of death in 2030.
- Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes.
- Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications

* Defined as FBG ≥ 7 mmol/L, or on medication for raised blood glucose, or with a history of diagnosis of diabetes.

** High blood glucose is defined as a distribution of FBG in a population that is higher than the theoretical distribution that would minimize risks to health (derived from epidemiological studies). High blood glucose is a statistical concept, not a clinical or diagnostic category.

★ Common diabetes complications

Cardiovascular events (Cardiovascular disease)(CVD)

- Premature vascular ischemia.
- Adults with diabetes historically have 2-3 times higher rate of cardiovascular disease
  (CVD) than adults without diabetes.
- The risk of cardiovascular disease increases continuously with rising fasting plasma glucose levels, even before reaching levels sufficient for a diabetes diagnosis.
- Almost 7 in 10 people with diabetes over age 65 will die of some type of heart disease. About 1 in 6 will die of stroke.
- After 10 years of observational follow-up of the UKPDS, those originally randomized to intensive glycemic control had significant long-term reductions in MI (15% with sulfonylurea or insulin as initial pharmacotherapy, 33% with metformin as initial pharmacotherapy) and in all-cause mortality (13% and 27%,respectively).
- DM increase risk of CVD

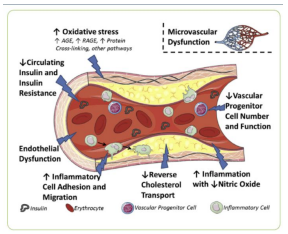
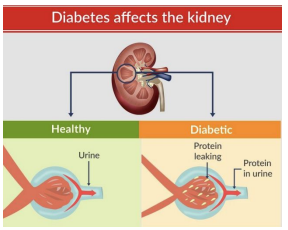


Figure1: Relationships between cardiovascular disease and diabetes.

End stage renal disease (Chronic Kidney Disease) (CKD)



- First acute renal failure in which the patient will need hemodialysis for the rest of his life which has a tremendous cost then it might develops to chronic renal failure which needs kidney transplantation.
- Pooled data from 54 countries show that at least 80% of cases of end-stage renal disease (ESRD) are caused by diabetes, hypertension or a combination of the two.
- The proportion of ESRD attributable to diabetes alone ranges from 12–55%.
- **The incidence of ESRD is up to 10 times as high in adults with diabetes as those without.**
- **Optimize glucose control** to reduce the risk or slow the progression of chronic kidney disease. A
- **Optimize blood pressure control** to reduce the risk or slow the progression of chronic kidney disease. A

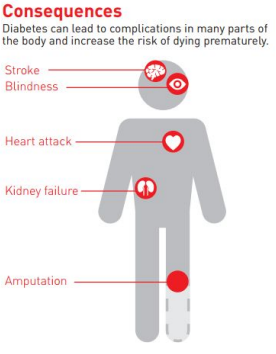
Screening by:

- Albumin/Creatinine Ratio to detect Microalbuminuria beside Renal function tests.
  - Normal levels → once a year
  - Abnormal levels → more than once a year, depending on the patient status.

Neuropathy

Screening by the GP no need for referral to neurology:

- All patients should be assessed for diabetic peripheral neuropathy starting **at diagnosis of type 2 diabetes** and **5 years** after the diagnosis of **type 1 diabetes** and at least annually thereafter. B

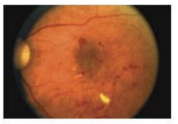


★ Complications of DM

Loss of vision (Diabetic retinopathy)

- Regular screening needs to be done for these patients and hospital care for these patients has been immensely high as when comparing with the normal population.
- Diabetic retinopathy caused 1.9% of moderate or severe visual impairment globally and 2.6% of blindness in 2010.
- Studies suggest that prevalence of any retinopathy in persons with diabetes is 35% while proliferative (vision-threatening) retinopathy is 7%.
- However, retinopathy rates are higher among: people with type 1 diabetes; people with longer duration of diabetes; Caucasian populations; and possibly among people of lower socioeconomic
status


A normal retina.


A retina showing signs of diabetic retinopathy.

- **Optimize glycemic control** to reduce the risk or slow the progression of diabetic retinopathy. A
- **Optimize blood pressure** and **serum lipid control** to reduce the risk or slow the progression of diabetic retinopathy. A

Screening by referring them to the ophthalmology clinic:

- Adults with type 1 diabetes should be referred to an ophthalmologist within **5 years** after the onset of diabetes. B (Because the symptoms presents shortly after the onset of insulin deficiency)
- Patients with type 2 diabetes should be referred to an ophthalmologist **at the time** of the diabetes diagnosis. B (Because the pathological process (hyperglycemia) started years ago)

Lower extremity amputation (Diabetic care & diabetic foot)

- Non Healing wounds cause gangrene which eventually cause amputation.
- Diabetes appears to dramatically increase the risk of lower extremity amputation because of infected, non-healing foot ulcers.
- Rates of amputation in populations with diagnosed diabetes are typically 10 to 20 times those of nondiabetic populations.
- Encouragingly several studies show a 40% to 60% reduction in rates of amputations among adults
with diabetes during the past 10–15 years in western countries.

- Perform a comprehensive foot evaluation at least **annually** to identify risk factors for ulcers and amputations. B (However, in each visit ask about the feet and maybe do a general inspection)
- The examination should include inspection of the skin,assessment of foot deformities, neurological assessment (monofilament testing with pinprick, temperature, vibration), and vascular assessment including pulses in the legs and feet. B

Referral of diabetic patients to:

Eye Clinic	Diabetic Educator	Dietitian	Specialty Clinics
DM type 2 “first visit” and DM type 1 after 5 years of diagnosis	For all and especially when start insulin or shift to Penfill injections.	For all.	Like nephrology when indicated

- All diabetic patients especially on insulin will be offered a **Glucometer for home monitoring.**
- Target levels::
  - Post-prandial s180 mg/dl (if above, increase the bolus insulin by 2 unit for 3 day and check again)
  - Fasting s 130 mg/dl (if above, increase the basal insulin by 2 unit for 3 day and check again).
- **Multidisciplinary approach** for DIABETIC PATIENTS (Physician, clinical pharmacist, health educator and nutritionist)

Prevention - Type 2 diabetes

Modifiable factors	Not modifiable factors
Being overweight or obese	Genetics
Unhealthy diet	Ethnicity
Insufficient physical activity	Age
Smoking	

Population-based prevention

A life-course approach to preventing diabetes

- Taking a life-course perspective is essential for type 2 diabetes prevention.
- Early in life, when eating and physical activity habits are formed and when the long-term regulation of energy balance may be programmed, there is a critical window for intervention to mitigate the risk of obesity and type 2 diabetes later in life.
- Recognize the increasing risk that comes with advancing age, and the need to identify the unique needs for risk reduction in older adults.

Improving early childhood nutrition

Strategies to improve early childhood nutrition aimed at improving maternal health and nutritional status and infant and young child feeding practices, focusing on the first 1000 days from a woman's pregnancy to her child's second birthday.

- Promoting the nutritional well-being of pregnant women
- Promotion of breastfeeding, including the implementation of the Code of Marketing of Breast Milk Substitutes
- **Exclusive breastfeeding up to 6 months of age**
- Breastfeeding until babies are 2 years of age or more
- A variety of safe, nutritious and adequate foods at 6 months of age to complement breastfeeding
- Preventing the consumption of foods that are high in energy, fats, sugars and sodium
- Facilitating physical activity

Supportive environments for physical activity

- The physical or built environment plays an important role in facilitating physical activity for many people.
- Urban planning and active transport policies can ensure that walking, cycling and other forms of non-motorized transport are accessible and safe for all.
- The physical environment can also provide sports, recreation and leisure facilities, and ensure there are adequate safe spaces for active living for both children and adults.

REGULAR PHYSICAL ACTIVITY THROUGHOUT THE LIFE-COURSE ENABLES PEOPLE TO LIVE BETTER AND LONGER LIVES

- The poorest groups in society, especially women, may have less time and fewer resources to participate in leisure-time activity, making policy interventions that target active transport and incidental physical activity throughout the day much more important.
- Promotion of stair use – including placement of physical activity promotion messages on stairs – as part of a workplace programme has been shown to increase awareness and use of stairs.
- The sports sector can encourage regular structured activities, especially among children and adolescents, and can strengthen the link between physical activity, sports and health.
- Partnerships with communities, the private sector and nongovernmental organizations can also contribute to developing facilities for physical activity.

Prevention - Type 2 diabetes

Population-based prevention	
Settings-based interventions	• Interventions reach families and communities where they live, study, work and play. • Should be comprehensive, make use of existing programmes when possible and focus on actions that do not require additional resources. • **A whole-of-school approach that focuses on improving both diet and physical activity.** • Successful school-based physical activity interventions should result in consistent improvements in the knowledge, attitudes and behaviour of children and, when tested, in physical and clinical outcomes. • Workplace interventions addressing diet and physical activity can be effective in changing behaviours and health related outcomes. • **Healthy eating messages in cafés and restaurants have been shown to stimulate consumption of healthy food – provided that healthy food items are made available.** • Workplaces can help develop environments that are conducive to physical activity at work and provide incentives and opportunities for active commuting to and from work. • Workplaces may offer their employees free or discounted vouchers for physical activity facilities.
Fiscal, legislative and regulatory measures for healthy diet	• **Fiscal measures** - Policies that increase the price of foods high in fat, sugar and salt can decrease their consumption. • **Trade and agricultural policies that promote healthy diets** - In 2000 Fiji banned the supply of high-fat mutton flaps under the Trading Standards Act. - Changes in agricultural subsidies to encourage fruit and vegetable production can be beneficial in increasing their consumption and improving diet. • **Regulation of marketing of foods high in sugars, fats and salt.** - Marketing of foods and non-alcoholic beverages influences children's knowledge, attitudes, beliefs and preferences. - Nutrition labelling is a regulatory tool that can guide consumers towards healthier food choices. Nutrition labelling comprises nutrient declarations and supplementary nutrition information
Education, social marketing and mobilization	• Consumer awareness and knowledge of healthy diet and physical activity can be achieved through sustained media and educational campaigns. • These campaigns have greater impact and are more cost-effective when used within multicomponent strategies. • For example, a social marketing campaign in Tonga using netball has resulted in increased participation both in netball and leisure-time physical activity by women.
Preventing diabetes in people at high risk	
Intensive behavioral interventions for people with IGT	
Pharmacological interventions for people with IGT	

Prevention or delay development of diabetes

The Diabetes Prevention Program (several major randomized controlled trials), including:

Diabetes Prevention Program (DPP)	Finnish Diabetes Prevention Study (DPS)	Da Qing Diabetes Prevention Study (Da Qing study)

- All focus on lifestyle behavior changes (modify diet, salt restriction, carbohydrates restriction, be active, be proactive, decrease alcohol, decrease smoking). This is the most beneficial in preventing diabetes.
- All demonstrated that **lifestyle/ behavioral therapy** featuring an individualized reduced calorie meal plan is highly effective in preventing type 2 diabetes and improving other cardiometabolic markers (such as blood pressure, lipids, and inflammation).
- The strongest evidence for diabetes prevention comes from the **DPP trial**. The DPP demonstrated that an intensive lifestyle intervention could reduce the incidence of type 2 diabetes **by 58% over 3 years.**

❖ LIFESTYLE INTERVENTIONS

- Refer patients with prediabetes to an intensive behavioral lifestyle intervention program.
- Based on the Diabetes Prevention Program (DPP) to achieve PREVENTION OR DELAY OF TYPE 2 DIABETES and maintain 7 - 10% loss of initial body weight and increase **moderate-intensity physical activity (such as brisk walking) to at least 150 min/week** i.e. at least 30 min, 5 days a week. In case of CVD the intensity needs to be a bit lowered. (Evidence: A)

Health nutrition OSCE

Encourage:

- Whole grains, legumes, nuts, fruits, vegetables, and meat with no fat
- **Minimize;** refined and processed foods, like rice, white bread, sugary drinks, …
- The use of nonnutritive sweeteners may have the potential to reduce overall calorie and carbohydrate intake if substituted for caloric (sugar) sweeteners.
- **A referral to dietitian (even when you give them diet advice)** is essential to assess the overall nutrition status of, and to work collaboratively with, the patient to create a personalized meal plan that considers the individual's health status, skills, resources, food preferences, and health goals to coordinate and align with the overall treatment plan including physical activity and medication.

Physical activity and tobacco cessation OSCE

- Just as **150 min/week** of **moderate intensity physical activity,** such as **brisk walking,** showed beneficial effects in those with prediabetes.
- Moderate intensity physical activity has been shown to improve insulin sensitivity and reduce abdominal fat.
- Tobacco Smoking may **increase the risk of type 2 diabetes;** therefore, evaluation for tobacco use and referral for tobacco cessation, if indicated, should be part of routine care for those at risk for diabetes. We don't expect you to counsel unless it's a separate OSCE station but always give a brief advice

Pharmacological interventions

- **Metformin** therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those who are obese and hypertensive.
- **Metformin** and **intensive lifestyle modification** led to an equivalent **50%** reduction in diabetes risk.
- Metformin works on the peripheral muscles and increases the absorption of glucose.
- Metformin dosage 500 mg BID (one in the morning and one in the evening with the meals so the patient eats half the meal then takes the medication and complete the other half and that won't cause any bloating, diarrhea, gases, GI irritation nor upper GI burning) then reassess after 6 months if the levels doesn't decrease then we go to second line drugs "you won't be asked about dosages it's just for your knowledge and you don't need to know drugs other than metformin"

Extra slide from 438's team

The National Executive Plan Includes Seven Objectives:

1. The **primary prevention** from the second type of diabetes, and diminishing incidence rates of the disease through addressing the risk factors causing the disease.
2. **Secondary prevention** from the second type of diabetes through the early detection of the disease and its complications.
3. **Advancing quality** of the health services delivered to the patients suffering from diabetes and its complications.
4. Developing ways of **detecting and following up**, and assessing patients through Diabetics' Registration Program, extent of adherence to the work quality levels, annual follow-up registers, patients' interviews, and healthcare registers of patients.
5. Improving on the **research tools and studies** related to the disease.
6. Enabling diabetics and their families to **contribute** to controlling diabetes and its complications.
7. **Community participation** in controlling diabetes.

Saudi Efforts in preventing and controlling diabetes

Prevention / Health Services in Saudi Arabia

Specialized Centers:

The Ministry of Health (MOH) adopted implementing an objective method in all the fields of health services providing: prevention, treatment, and rehabilitation, through a network of integrated facilities.

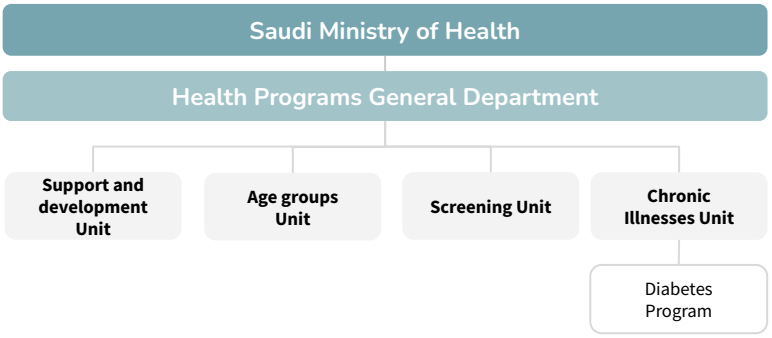
- Thus, it established 20 specialized centers for treating diabetics, and eight new more centers are underway across the Saudi Arabia's regions.
- Further, the MOH is working on enhancing the health awareness of each diabetic or anyone vulnerable to develop the disease, and providing the best health and education services.

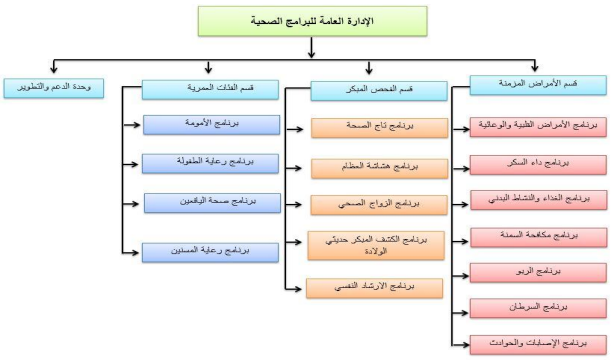
There are multiple sectors serving people with diabetes in Saudi Arabia both in the private and public sectors at primary, secondary, and third level preventions.

Examples:

- Saudi Charitable Association of Diabetes.
- The Ministry of Health.
- National Guard Health Affairs.
- The Saudi Society of Endocrinology and Metabolism [under the umbrella of the Saudi Commission for Health Specialties.]

We will zoom on the most prominent entity, the Ministry of Health.





You can imagine how important it is for the country to prevent this disease because they have a specific program only to target this disease.

World Diabetes Day

- The Ministry of Health (MOH) is interested annually in marking the World Diabetes Day, falling on the fourteenth of November of each year.
- This is with the aim of achieving the general goals in terms of boosting up and carrying out the prevention policies and controlling diabetes and its complications.
- Supporting the national initiatives for diabetes control and its complications, and highlighting the importance of evidence- based education with regard to treating diabetes and preventing from its complications.

Saudi Efforts in preventing and controlling diabetes

National Preventive Programs

- The cornerstone of a national preventive program would be the PHCCs.
- However, quality of care at the PHCCs is unsatisfactory.
- A comprehensive review of primary healthcare in Saudi Arabia found that access to health education was limited and referrals to specialist hospitals were low.
- Patients' follow-up system was ineffective.
- Multiple problems with poor quality and time for health education, poor counseling, lack of trust in health-care providers, and difficulty in understanding instructions from health providers due to poor communication.

National Diabetes Prevention and Control Program

The program's goals:

- Suggest research pertaining to diabetes.
- Work on creating a national registry for diabetes in Saudi Arabia.
- Suggest collaborations and coordination efforts on a local level, Gulf region level, and international level to achieve set goals.
- Suggesting preventive and curative diabetes programs, as well as overlook their execution and development.
- Create sub-committees to follow up on created programs.
- Study reports form sub-committees, finalize them, and develop recommendations.
- Take decisions and develop recommendation in issues raised to the program.

http://www.ndpcp-moh.com/

Twitter account:
@NDPCP_MOH

Global efforts

Global action plan for the prevention and control of non-communicable diseases 2013-2020

The WHO had nations sign:
GLOBAL ACTION PLAN FOR THE PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES 2013-2020

From the goals

- Halt the rise in diabetes and obesity.
- A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases (80% of the global deaths are related to these 4 diseases)

Sustainable development goals by the UN

The Sustainable Development Goals (SDGs)

- A collection of 17 global goals set by the United Nations.
- The third goal is : Good health and well being.

Dr's example: A patient came to you saying that for the last 6 weeks I've been feeling very tired, started to have a burning fingers and hands with tingling, I'm eating too much and feeling thirsty and having difficulty healing. How will you approach this patient?

1. Take history with emphasizing on the family history and risk factors (smoking, stressful job, HTN, How is he healthwise, obese, BMI and hip-waist ratio) all that needs to be taken into consideration.
2. Investigation (HbA1c of 6.5%) → High level: star metformin with lifestyle modification with counseling
3. Follow up the patient after 6 months for reevaluation

Quiz

MCQ

1- According to new World Health Organization diabetes management guidelines, what is the best diagnostic criterion of diabetes?

A- Oral glucose tolerance test
B- Random blood sugar
C- Urine analysis
D- Glycosylated hemoglobin

2- Which of the following WHO regions was the prevalence of DN the highest from 1980 to 2014?

A- America
B- South east Asia
C- Eastren Mediterranean
D- Western pacific

3- Which of the following confirmed values meet the diagnostic threshold for diabetes?

A- Random glucose > 160 mg/dl
B- 2 hour postprandial glucose ≥ to 126 mg/dl
C- Fasting blood glucose ≥ 126 mg/dl
D- Fasting blood glucose equal to or greater than 140 mg/dl

4- Keeping your diabetes under control early on will help you prevent more health problems later. People with diabetes are at higher risk for which of these?

A- Heart disease
B- Cancer
C- Nerve damage
D- A and C

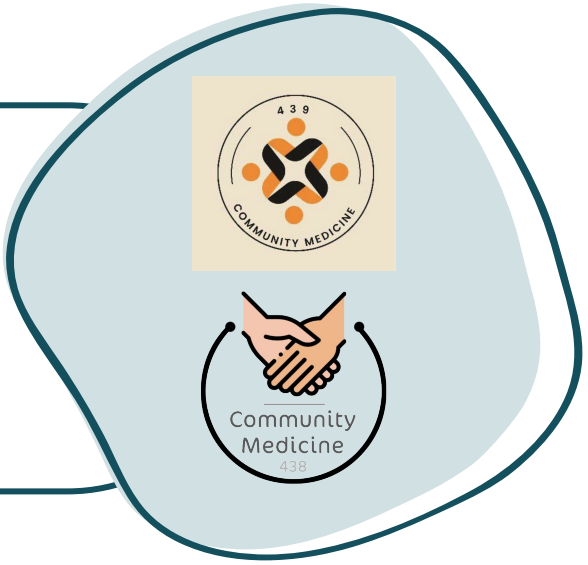
5- Prediabetes is the term used for individuals that do not meet the criteria for diabetes but are too high to be considered normal. Which of the following statement accurately characterize prediabetes?

A- Fasting blood glucose from 120-180 mg/dL
B- Fasting blood glucose from 126-140 mg/dL
C- Fasting blood glucose from 100-125 mg/dL
D- All of the above

Answers

Q1	Q2	Q3	Q4	Q5
D	C	C	D	C

Thank You and Good Luck



438

439

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Wish you all the best!