

# **Diabetes Risk Factors and Prevention**

**Dr HUSSEIN SAAD**

**Assistant Professor and Consultant, MRCP (UK)  
Family and Community Medicine  
College of Medicine  
King Saud University**

# OBJECTIVES

- List the risk factors of diabetes
- List complications of diabetes
- Discuss preventive measures within the framework of NCDs
- Screening of Diabetes
- Prevention programs in KSA

# 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.

Incidence and prevalence rates of diabetes mellitus in Saudi Arabia: An overview

[Abdullellah Alotaibi LinPerry LeilaGholizadeh AliAl-Ganmi](#)

[Journal of Epidemiology and Global Health](#)

[Volume 7, Issue 4](#), December 2017, Pages 211-218

# CLASSIFICATION of DIABETES

- **Type 1 diabetes** (due to autoimmune  $\beta$ -cell destruction, usually leading to absolute insulin deficiency)
- **Type 2 diabetes** (due to a progressive loss of  $\beta$ -cell insulin secretion frequently on the background of insulin resistance)
- **Gestational diabetes mellitus (GDM)** (diabetes diagnosed in the second or third trimester of pregnancy that was not present prior to gestation)
- **Specific types of diabetes** due to other causes, e.g. maturity-onset diabetes of the young [MODY], and drug induced diabetes (such as with glucocorticoid use,)

# Criteria for the Diagnosis of Diabetes

- **FPG**: 126 mg/dL (7.0 mmol/L). Fasting for at least 8 h.
- **OR 2-h PP**: 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).
- In the **absence of unequivocal hyperglycemia**, diagnosis requires two abnormal test results from the same sample or in two separate test samples.

# Criteria for the Diagnosis of Prediabetes

- **Normal Fasting Plasma Glucose:**  $\leq 5.5$  mmol/L (99 mg/dL)
- **Prediabetes; Fasting Plasma Glucose:** **5.6 – 6.9** mmol/L  
(**100 - 125** mg/dL)
- **Prediabetes; A1C:** **5.7 – 6.4%**
- The person is at risk to develop diabetes mellitus

# Criteria for testing for diabetes in asymptomatic adults

7

- 1. Testing should be considered in **overweight** or **obese** adults who have one or more of the following risk factors:
  - a. First-degree relative with diabetes
  - b. History of CVD or Hypertension
  - c. Women with polycystic ovary syndrome
  - d. Physical inactivity
  - e. 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.
- 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

# ARE YOU AT RISK FOR TYPE 2 DIABETES?



## Diabetes Risk Test

- How old are you?**  
Less than 40 years (0 points)  
40—49 years (1 point)  
50—59 years (2 points)  
60 years or older (3 points)
- Are you a man or a woman?**  
Man (1 point)    Woman (0 points)
- If you are a woman, have you ever been diagnosed with gestational diabetes?**  
Yes (1 point)    No (0 points)
- Do you have a mother, father, sister, or brother with diabetes?**  
Yes (1 point)    No (0 points)
- Have you ever been diagnosed with high blood pressure?**  
Yes (1 point)    No (0 points)
- Are you physically active?**  
Yes (0 points)    No (1 point)
- What is your weight status?  
(see chart at right)**

Write your score  
in the box.

↓

  
  
  
  
  
  


Add up  
your score.

↓

### If you scored 5 or higher:

You are at increased risk for having type 2 diabetes. However, only your doctor can tell for sure if you do have type 2 diabetes or prediabetes (a condition that precedes type 2 diabetes in which blood glucose levels are higher than normal). Talk to your doctor to see if additional testing is needed.

Type 2 diabetes is more common in African Americans, Hispanics/Latinos, American Indians, and Asian Americans and Pacific Islanders.

Higher body weights increase diabetes risk for everyone. Asian Americans are at increased diabetes risk at lower body weights than the rest of the general public (about 15 pounds lower).

**For more information, visit us at [diabetes.org](http://diabetes.org) or call 1-800-DIABETES (1-800-342-2383)**

Height	Weight (lbs.)		
4' 10"	119-142	143-190	191+
4' 11"	124-147	148-197	198+
5' 0"	128-152	153-203	204+
5' 1"	132-157	158-210	211+
5' 2"	136-163	164-217	218+
5' 3"	141-168	169-224	225+
5' 4"	145-173	174-231	232+
5' 5"	150-179	180-239	240+
5' 6"	155-185	186-246	247+
5' 7"	159-190	191-254	255+
5' 8"	164-196	197-261	262+
5' 9"	169-202	203-269	270+
5' 10"	174-208	209-277	278+
5' 11"	179-214	215-285	286+
6' 0"	184-220	221-293	294+
6' 1"	189-226	227-301	302+
6' 2"	194-232	233-310	311+
6' 3"	200-239	240-318	319+
6' 4"	205-245	246-327	328+
	(1 Point)	(2 Points)	(3 Points)

You weigh less than the amount in the left column (0 points)

Adapted from Bang et al., Ann Intern Med 151:775-783, 2009. Original algorithm was validated without gestational diabetes as part of the model.

### Lower Your Risk

The good news is that you can manage your risk for type 2 diabetes. Small steps make a big difference and can help you live a longer, healthier life. If you are at high risk, your first step is to see your doctor to see if additional testing is needed. Visit [diabetes.org](http://diabetes.org) or call 1-800-DIABETES (1-800-342-2383) for information, tips on getting started, and ideas for simple, small steps you can take to help lower your risk.



Visit us on Facebook  
[Facebook.com/AmericanDiabetesAssociation](https://www.facebook.com/AmericanDiabetesAssociation)



# Prevention or Delay Development of Diabetes

9

The Diabetes Prevention Program Several major randomized controlled trials, including:

- 1. Diabetes Prevention Program (DPP),
  - 2. Finnish Diabetes Prevention Study (DPS),
  - 3. Da Qing Diabetes Prevention Study (Da Qing study)
- 
- ❑ 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** (1). The DPP demonstrated that an intensive lifestyle intervention could reduce the incidence of type 2 diabetes by **58%** over **3 years**.

# Prevention or Delay Development of Diabetes

10

## 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. (Evidence: A)

# Healthy Nutrition

Encourage:

- Whole grains, legumes, nuts, fruits and vegetables.
- 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.

# Healthy Nutrition

- A referral to **dietitian** 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

- ▶ 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 Cessation

- ▶ 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.

# Pharmacologic Interventions

- ➔ **Metformin** therapy for prevention of type 2 diabetes should be considered in those with prediabetes, especially for those who are obese.
- ➔ **Metformin** and **intensive lifestyle modification** led to an equivalent **50%** reduction in diabetes risk.

# Complications of DM

- ➔ 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**.



# Complications of DM

## Chronic kidney disease

- 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**.

# Complications of DM

## 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 for Retinopathy:

- Adults with type 1 diabetes should be referred to an ophthalmologist within **5 years** after the onset of diabetes. **B**
- Patients with type 2 diabetes should be referred to an ophthalmologist **at the time** of the diabetes diagnosis. **B**

# Complications of DM

## Neuropathy

### ➤ Screening

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

## Foot care & Diabetic foot

- ▶ Perform a comprehensive foot evaluation at least **annually** to identify risk factors for ulcers and amputations. **B**
- ▶ 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**

# 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.

# Referral of diabetic patients:

- **To Eye Clinic:** ( DM type 2 “first visit” and DM type 1 “after 5 years of diagnosis.
- **To Dietitian:** for all
- **To Diabetic Educator:** when start insulin or shift to Penfill injections.
- **To Specialty Clinics:** like nephrology when indicated
  
- All patients on insulin will be offered a **Glucometer for home monitoring.**
  
- **Multidisciplinary approach** for DIABETIC PATIENTS  
(Physician, clinical pharmacist, health educator and nutritionist)

# The National Executive Plan Includes Seven Objectives:

23

- ❑ **First Objective:** the primary prevention from the second type of diabetes, and diminishing incidence rates of the disease through addressing the risk factors causing the disease.
- ❑ **Second Objective:** secondary prevention from the second type of diabetes through the early detection of the disease and its complications.
- ❑ **Third Objective:** advancing quality of the health services delivered to the patients suffering from diabetes and its complications.
- ❑ **Fourth Objective:** 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.
- ❑ **Fifth Objective:** improving on the research tools and studies related to the disease.
- ❑ **Sixth Objective:** enabling diabetics and their families to contribute to controlling diabetes and its complications.
- ❑ **Seventh Objective:** community participation in controlling diabetes.

## 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.



# 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.



**THANK YOU**