Gestational Diabetes Mellitus

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Case problem

- A 22 y/o lady G2 L1 , 22 w, FBS = 90
- Family history of DM in her father
- BMI= 35

- ✓What we should do in next step ?
- ✓What is the best treatment?
- ✓What are the risk factors?
- ✓What are the risks to mother and her fetus?
- ✓What we should do after delivery?

Prevalence of GDM

- Gestational diabetes mellitus (GDM), is one of the most common endocrinopathies during pregnancy which is defined as glucose intolerance, with onset or first recognition during pregnancy.

- Although it is a well-known cause of pregnancy complications, its epidemiology has not been studied systematically

Epidemiology

- **GDM affecting between 4% and 18% of pregnancies**
  - **Maternal age and BMI**
  - **Racial and ethnic groups**
  - **screening strategies**
  - **testing methods**

Hyperglycaemia in pregnancy (HIP) (20-49 y)

Prevalence of gestational diabetes mellitus (GDM), %

Show 20 entries

Table search:

All regions

Sort by

Country/Territory	2000	2011	2021	2030	2045
Africa	N/A	N/A	13.0	N/A	N/A
Europe	N/A	N/A	15.0	N/A	N/A
Middle East and North Africa	N/A	N/A	14.1	N/A	N/A
North America and Caribbean	N/A	N/A	20.7	N/A	N/A
South and Central America	N/A	N/A	15.8	N/A	N/A
South-East Asia	N/A	N/A	25.9	N/A	N/A
Western Pacific	N/A	N/A	14.0	N/A	N/A

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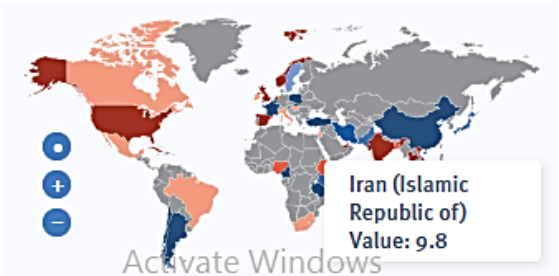
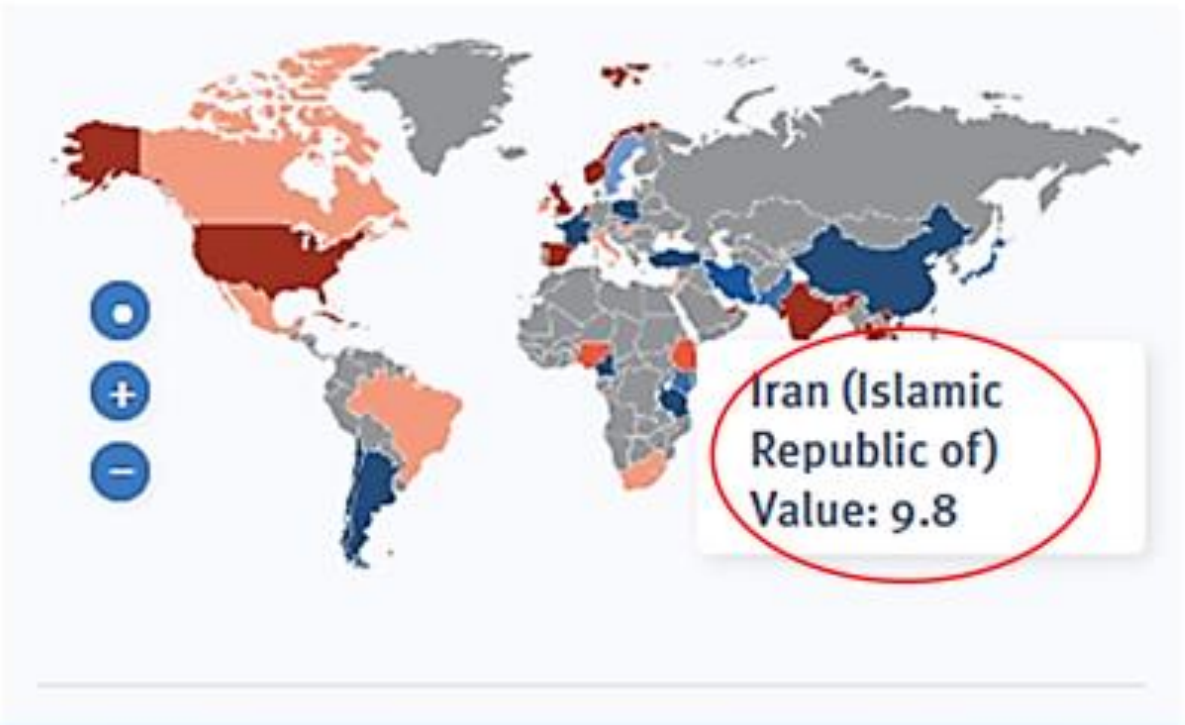
Estimate by Country/Territory



GDM in Iran



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Global prevalence of GDM

DIABETES RESEARCH AND CLINICAL PRACTICE 129 (2017) 173–181

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Prevalence of gestational diabetes mellitus in Europe: A meta-analysis

Claire E. Eades*, Dawn M. Cameron, Josie M.M. Evans

Faculty of Health Sciences and Sport, University of Stirling, United Kingdom

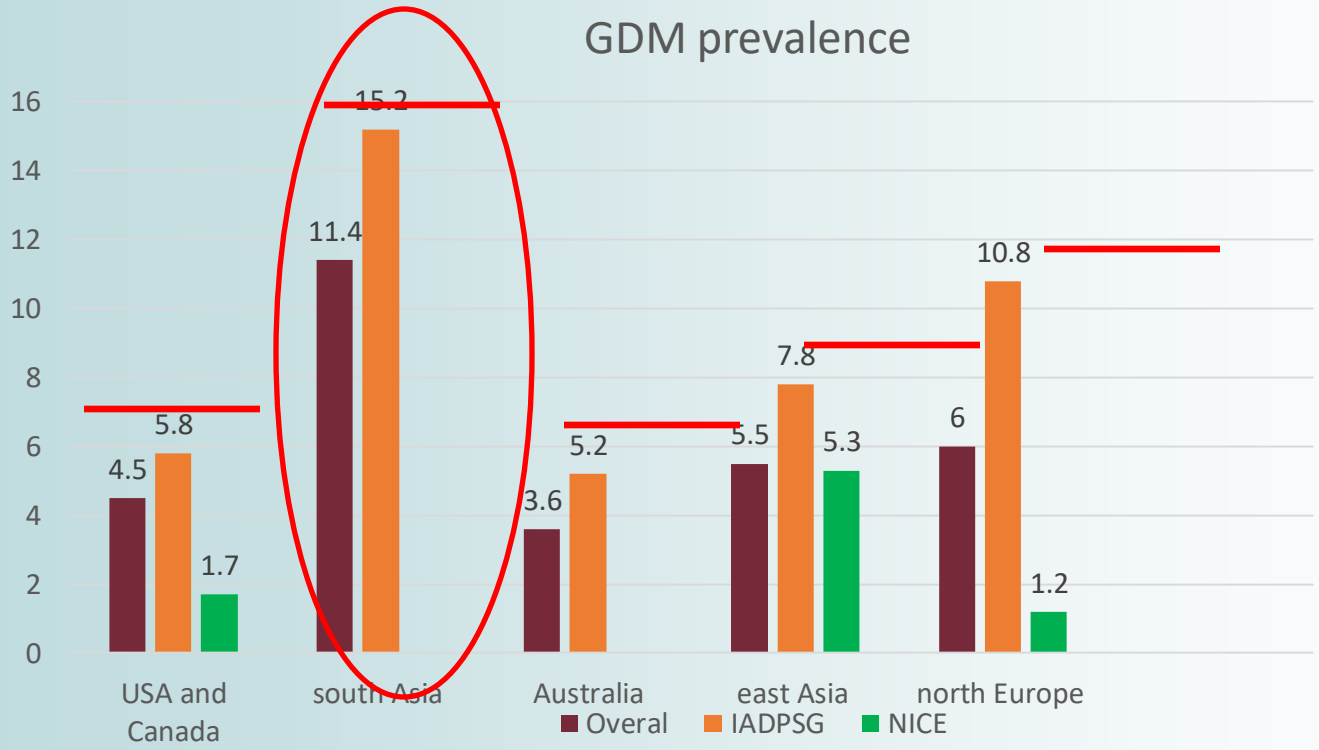
Overall Prevalence of GDM **5.4% (3.8–7.8)**

Mean prevalence of GDM by several moderator variables.

Variable	k	n	Prevalence	95% CI
Mean age (years)				
30.7 and below	9	122,648	4.3%	2.3–8.0
30.8 and above	9	43,327	9.6%	6.7–13.7
Diagnostic criteria				
NDDG	4	11,927	5.3%	2.7–10
Carpenter Coustan	15	47,502	6.9%	5.4–8.7
EASD 2 h only	4	299,153	1.4%	0.9–2.2
IADPSG	10	46,557	14.1%	8.9–21.5
Area of Europe				
Northern	15	1,708,137	2.3%	1.3–3.8
Western	9	26,346	7.3%	4.6–11.3
Southern	18	47,783	9.6%	7.3–12.6
Year data collection started				
1980–1989	2	2824	0.9%	0.1–10
1990–1999	14	1,508,604	2.9%	1.9–4.5
2000–2009	13	233,199	6.9%	4.3–10.8
2010–2016	9	34,343	11.1%	5.7–20.6

Worldwide prevalence of GDM: Meta-analysis of population based studies

(Pooled Prevalence: 0.044,95% CI:0.043-0.044)



Data from 51 population-based studies which included 5,349,476 pregnant women

Iranian Journal of Public Health
TUMS
This Journal | Search | Aims and Scope | Author Guidelines | Submit a Manuscript

Iran J Public Health. 2015 Aug; 44(8): 1036–1044.

PMCID: PMC4645723
PMID: 26587467

Prevalence and Risk Factors of Gestational Diabetes in Iran: A Systematic Review and Meta-Analysis

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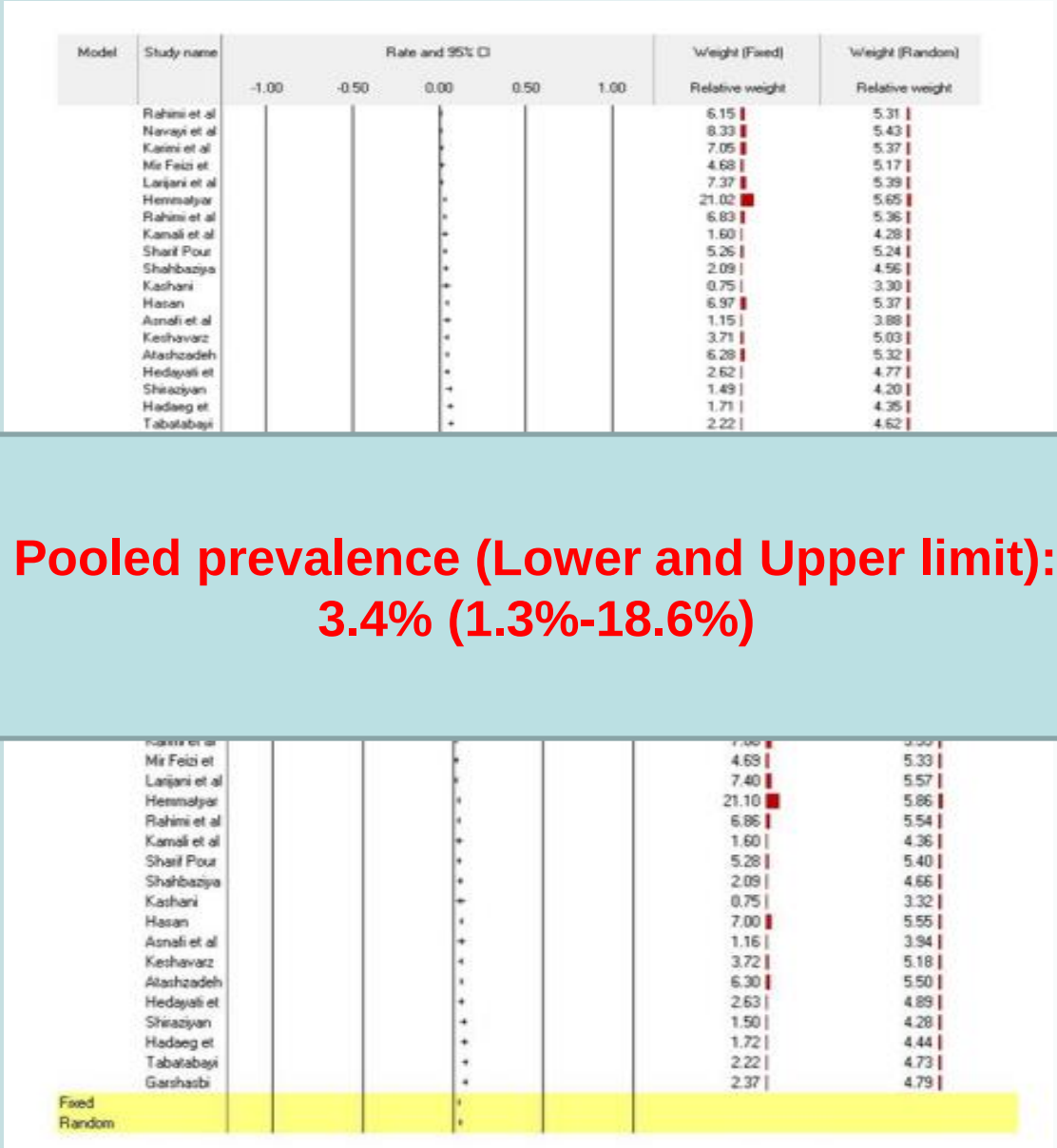

Pooled prevalence (Lower and Upper limit): 3.4% (1.3%-18.6%)

TERMINOLOGY

- Historically, the term "gestational diabetes" has been defined as onset or first recognition of abnormal glucose tolerance during pregnancy
- The American College of Obstetricians and Gynecologists (ACOG) continues to use this terminology

TERMINOLOGY

- In recent years, "gestational diabetes" describes diabetes diagnosed during the second half of pregnancy, and
- terms such as "overt diabetes" or "diabetes mellitus in pregnancy" to describe diabetes diagnosed by standard nonpregnant criteria early in pregnancy, when the effects of insulin resistance are less prominent.

Cause

- Insulin resistance related to the metabolic changes of *late pregnancy* increases insulin requirements and may lead to hyperglycemia or IGT.

Box 1 | Risk factors for GDM

- Overweight or obesity (body mass index (BMI) ≥25 kg m^{-2})
- Advanced age
- Non-white ancestry
- Family history of type 2 diabetes mellitus
- Previous history of gestational diabetes mellitus (GDM)
- Parity (number of pregnancies >20 weeks)
- Male fetus
- Multiple pregnancy
- Genetic factors
- Polycystic ovary syndrome
- Cigarette smoking
- Psychosocial factors (for example, depression in pregnancy)
- Unhealthy dietary factors before pregnancy
- Physically inactive lifestyle before and during pregnancy

Hyperglycemia And Pregnancy Outcome study

HAPO Study

Table 2 | Outcomes from the HAPO study and the HAPO-FUS

Outcome	GDM[a] (%)	Non-GDM (%)	Statistical significance
Perinatal outcomes[b]			
Pre-eclampsia	9.1	4.5	$P<0.001$
Preterm delivery (<37 weeks)	9.4	6.4	$P<0.001$
Primary caesarean delivery	24.4	16.8	$P<0.001$
Shoulder dystocia or birth injury	1.8	1.3	$P<0.01$
Birthweight greater than ninetieth percentile	16.2	8.3	$P<0.001$
Neonate percentage body fat greater than ninetieth percentile	16.6	8.5	$P<0.001$
Cord blood C-peptide level greater than ninetieth percentile	17.5	6.7	$P<0.001$
Clinical neonatal hypoglycaemia	2.7	1.9	$P<0.001$
Admission to newborn intensive care	9.1	7.8	$P<0.01$
Long-term outcomes[c]			
Maternal diabetes	10.7	1.6	$P<0.001$
Maternal pre-diabetes	41.5	18.4	$P<0.001$
Offspring overweight or obesity	39.5	28.6	$P<0.001$
Offspring obesity	19.1	9.9	$P<0.001$
Offspring percentage body fat greater than eighty-fifth percentile	21.7	13.9	$P<0.001$
Offspring impaired fasting glucose (ADA threshold of ≥5.6 mmol l^{-1})	9.2	7.4	Not significant
Offspring impaired glucose tolerance	10.6	5.0	$P<0.001$
Offspring diabetes	0.3	0.2	Not significant

Preconception counselling

- Starting at puberty and continuing in all people with diabetes and childbearing potential, preconception counseling should be incorporated into routine diabetes care. A

- Family planning should be discussed, and effective contraception (with consideration of long-acting, reversible contraception) should be prescribed and used until an individual's treatment plan and A1C are optimized for pregnancy. A

Preconception counselling

- Preconception counseling should address the importance of achieving glucose levels as close to normal as is safely possible, ideally A1C <6.5% to reduce the risk of congenital anomalies, preeclampsia, macrosomia, preterm birth, and other complications. A

Time of screen

- Because of the number of pregnant women with undiagnosed type2 diabetes, it is reasonable to test women with risk factors for type 2 diabetes at their initial prenatal visit, using standard diagnostic criteria

- Before 15 weeks of gestation, test women with risk factors B and consider testing all women E for undiagnosed diabetes at the first prenatal visit using standard diagnostic criteria, if not screened preconception.
- Screen for early abnormal glucose metabolism using fasting glucose of 110–125 mg/dL (6.1 mmol/L) or A1C 5.9–6.4% (41–47 mmol/mol). B

- Screen for gestational diabetes mellitus at 24–28 weeks of gestation in pregnant women not previously found to have diabetes or high-risk abnormal glucose metabolism detected earlier in the current pregnancy. A

Risk factors for Prediabetes and T2D

- First-degree relative with diabetes
- High-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- History of CVD
- Hypertension (≥140/90 mmHg or on therapy for hypertension)
- HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
- Women with polycystic ovary syndrome
- Physical inactivity
- Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)

- **First prenatal visit**

  - **Measurement of FPG, A1C, or RPG**

✓ **Overt Diabetes:**

- **FPG ≥ 126 mg/dL** (Fasting is defined as no caloric intake for at least 8 h)
- **A1C ≥ 6.5%**
- **RPG ≥ 200 mg/dL**

Definition

- Women diagnosed with diabetes by standard diagnostic criteria in the first trimester should be classified as having preexisting pregestational diabetes(type 2 diabetes or, very rarely, type 1 diabetes or monogenic diabetes)

- GDM is diabetes that is first diagnosed in the second or third trimester of pregnancy that is not clearly either preexisting type 1 or type 2 diabetes

IADPSG and ADA criteria for a positive two-hour 75-gram oral glucose tolerance test for the diagnosis of gestational diabetes

Two hour 75-gram oral glucose tolerance test	
Fasting	≥92 mg/dL (5.1 mmol/L)
OR	
One-hour	≥180 mg/dL (10.0 mmol/L)
OR	
Two-hour	≥153 mg/dL (8.5 mmol/L)

The diagnosis of gestational diabetes is made at 24 to 28 weeks of gestation when one or more plasma glucose values meets or exceeds the above values.

ADA: American Diabetes Association; IADPSG: International Association of the Diabetes and Pregnancy Study Groups.

Screening for and diagnosis of GDM two-step strategy

Two-step strategy

Step 1: Perform a 50-g GLT (nonfasting), with plasma glucose measurement at 1 h, at 24–28 weeks of gestation in women not previously diagnosed with diabetes.

If the plasma glucose level measured 1 h after the load is ≥ 130 mg/dL, 135 mg/dL, or 140 mg/dL (7.2 mmol/L, 7.5 mmol/L, or 7.8 mmol/L, respectively), proceed to a 100-g OGTT.

Step 2: The 100-g OGTT should be performed when the patient is fasting.

The diagnosis of GDM is made if at least two* of the following four plasma glucose levels (measured fasting and 1 h, 2 h, 3 h during OGTT) are met or exceeded:

	Carpenter-Coustan (86)	or	NDDG (87)
• Fasting	95 mg/dL (5.3 mmol/L)		105 mg/dL (5.8 mmol/L)
• 1 h	180 mg/dL (10.0 mmol/L)		190 mg/dL (10.6 mmol/L)
• 2 h	155 mg/dL (8.6 mmol/L)		165 mg/dL (9.2 mmol/L)
• 3 h	140 mg/dL (7.8 mmol/L)		145 mg/dL (8.0 mmol/L)

NDDG, National Diabetes Data Group. *ACOG notes that one elevated value can be used for diagnosis (82).

Glycated hemoglobin (A1C)

- ✓ No threshold for glycated hemoglobin (A1C) in the second and third trimesters had both good sensitivity and specificity as a screening test for gestational diabetes.

Hemoglobin A1c in GDM

- A1c levels fall during normal pregnancy due to physiological increase in red blood cell turnover
- A1c can be used to monitor control, but should be used as a secondary measure of glycemic control in pregnancy, after self-monitoring of blood glucose
- A1c of < 6% in 2nd and 3rd trimesters → lowest risk for large-for-gestational age infants, pre-term delivery and pre-eclampsia.

راهنمای غربالگری، تشخیص و درمان دیابت قبل و حین بارداری

انجمن متخصصین غدد درون ریز و متابولیسم ایران

انجمن زنان و زایمان ایران

انجمن پریناتولوژی ایران

تشخیص دیابت قبل از بارداری

- برای تمام خانم هایی که دیابت شناخته شده نداشته و برای ارزیابی قبل از بارداری مراجعه می نمایند، درصورت وجود عوامل خطرساز یا صلاحدید پزشک معالج باید اندازه گیری گلوکز سرم/ پلاسمای ناشتا)حداقل ۸ ساعت از آخرین وعده غذایی(انجام شود.

عوامل خطر ابتلا به دیابت بارداری
۱. تاریخچه قبلی دیابت بارداری
۲. سابقه دیابت نوع ۲ در بستگان درجه اول
۳. اختلال تحمل گلوکز شناخته شده
٤. چاقی (نمایه توده بدن (BMI) بیشتر از ۳۰)
٥. کم تحرکی
٦. سابقه ابتلا به سندرم تخمدان پلی کیستیک
۷. سابقه هیپرتانسیون
۸. تری گلیسرید > ۲۵۰ میلی گرم در دسی لیتر ، HDL < 40 میلی گرم در دسی لیتر
۹. سابقه تولد نوزاد ماکروزوم (وزن بالای ٤۰۰۰ گرم و یا وزن بالاتر از صدک ۹۷) یا پیامدهای بد بارداری
۱۰. سابقه IUFD (مرگ داخل رحمی جنین)

تشخیص دیابت قبل از بارداری

- برای تمام خانم هایی که دیابت شناخته شده نداشته و برای ارزیابی قبل از بارداری مراجعه می نمایند، درصورت وجود عوامل خطرساز یا صلاحدید پزشک معالج باید اندازه گیری گلوکز سرم/ پلاسمای ناشتا)حداقل ۸ ساعت از آخرین وعده غذایی(انجام شود
- معیار تشخیص دیابت در این گروه همانند غیر باردار می‌باشد.

گلوکز پلاسمای/سرم ناشتا[1] (FPG)	کمتر از ۱۰۰ میلی گرم در دسی لیتر	طبیعی
	بیش از ۱۰۰ تا ۱۲۵ میلی گرم در دسی لیتر	اختلال تحمل گلوکز ناشتا (IFG)
	مساوی یا بیشتر از ۱۲۶ میلی گرم در دسی لیتر	دیابت قندی

❖ تشخیص قطعی دیابت وقتی مسجل است که FPG حد اقل در **دو نوبت** باید مساوی یا بیشتراز ۱۲۶ میلی گرم در دسی لیتر باشد.

درصورتیکه آزمایش انجام شده نشاندهنده اختلال تحمل گلوکز باشد اقدام بعدی چیست؟

- اگر چه برخی از مطالعات **قند خون ناشتای بین ۹۲ تا ۱۰۰ میلی گرم** در دسی لیتر را غیرطبیعی می دانند و این محدوده را می توان معادل اختلال تحمل گلوکز یا قندخون بینابینی درنظر گرفت ولی هنوز شواهدی مبنی بر ایجاد مالفورماسیونهای جنینی و از دست رفتن جنین در این محدوده قندخون وجود ندارد. با این وجود **اصلاح شیوه زندگی** توصیه و **آزمایش قندخون ناشتا یکماه بعد تکرار می شود**

- جایگاه Hb A1c در تشخیص دیابت بارداری: با توجه به اینکه اندازه گیری هموگلوبین گلیکوزیله هنوز در کشور استاندارد نشده اندازه گیری این شاخص برای تشخیص دیابت توصیه نمی شود.

غربالگری سه ماهه دوم

- چنانچه غربالگری زنان باردار در اوایل بارداری منفی باشد تکرار غربالگری دو مرحله ای بین هفته ۲۴ الی ۲۸ بارداری ضروری است.
- تمام زنان بارداری که در بررسیهای ابتدایی قندخون طبیعی داشته اند بایستی از نظر دیابت بارداری بین هفته ۲۴ تا ۲۸ مورد بررسی قرار گیرند.

- **در این زمان، کارگروه استفاده از روش دو مرحله ای را پیشنهاد می کند:**
- **در مرحله اول تست GCTبا ۵۰ گرم پودر گلوکز محلول در آب انجام می شود.**

تفسیر نتایج آزمایش GCT در هفته ۲٤ الی ۲۸ بارداری برای خانم های بدون سابقه دیابت و بدون عامل خطر		
GCT با ۵۰ گرم محلول گلوکز خوراکی، اندازه گیری گلوکز پلاسما یک ساعت بعد	کمتر از ۱۴۰ میلی گرم در دسی لیتر	طبیعی
	مساوی یا بیشتر از ۲۰۰ میلی گرم در دسی لیتر	دیابت بارداری
	۱۴۰ تا ۱۹۹ میلی گرم در دسی لیتر	با ۱۰۰ گرم محلول گلوکز OGTT انجام

تفسیر آزمون دو مرحله ای

- چنانچه گلوکز پلاسمای یک ساعت بعد بین ۱۴۰ تا ۱۹۹ میلی گرم در دسی لیتر باشد، باید برای بیمار تست تحمل گلوکز خوراکی انجام شود. برای انجام این تست پس از یک ناشتای شبانه حد اقل ۸ ساعته ، مقدار ۱۰۰ گرم محلول گلوکز به فرد خورانده می شود و ۱ ، ۲ و ۳ ساعت بعد گلوکز پلاسما/سرم اندازه گیری می گردد.

تفسیر آزمون دو مرحله ای

- چنانچه گلوکز پلاسمای یک ساعت بعد بین ۱۴۰ تا ۱۹۹ میلی گرم در دسی لیتر باشد، باید برای بیمار تست تحمل گلوکز خوراکی انجام شود. برای انجام این تست پس از یک ناشتای شبانه حد اقل ۸ ساعته ، مقدار ۱۰۰ گرم محلول گلوکز به فرد خورانده می شود و ۱ ، ۲ و ۳ ساعت بعد گلوکز پلاسما/سرم اندازه گیری می گردد.

fasting	95
1 h	180
2 h	155
3 h	140

Significance

- Several adverse outcomes have been associated with diabetes during pregnancy:
  - Preeclampsia
  - Hydramnios
  - Macrosomia and large for gestational age infant
  - Fetal organomegaly (hepatomegaly, cardiomegaly)
  - Maternal and infant birth trauma
  - Operative delivery
  - Perinatal mortality
  - Neonatal respiratory problems and metabolic complications (hypoglycemia, hyperbilirubinemia, hypocalcemia, erythrocytosis)

Significance

- Long-term, women with gestational diabetes are at increased risk of developing type 2 diabetes and cardiovascular disease

Significance

- Their offspring are also at risk of long-term sequelae, such as obesity and metabolic syndrome
- Gestational diabetes and the combination of obesity and diabetes (gestational or pregestational) have been associated with an increased risk of autism in offspring.

Significance

- Treatment of gestational diabetes can reduce the risk of some pregnancy complications (eg, preeclampsia) and adverse neonatal outcomes (eg, macrosomia)

- **In addition, if the mother is hyperglycemic during organogenesis, such as women with known or unknown overt diabetes, the risks of miscarriage and congenital anomalies are increased.**

NUTRITIONAL THERAPY

- Patients with GDM should receive nutritional counseling by a registered dietitian (when possible) upon diagnosis and be placed on an appropriate diet.

Approaches for risk reduction

- In overweight and obese women, weight loss before pregnancy can reduce the risk of developing gestational diabetes.
- However, the efficacy of an exercise program of brisk walking, stair climbing, or other vigorous activity before pregnancy and in early pregnancy for reducing diabetes risk in all women has not been proven.

Approaches for risk reduction

- In nonpregnant women, regular moderate exercise lowers the risk of developing type 2 diabetes compared with being sedentary.
- Whether exercise alone or in combination with diet lowers the risk of developing gestational diabetes is unclear, as meta-analyses of randomized trials have reported conflicting findings.

Approaches for risk reduction

- In particular, beginning an exercise program in pregnancy may be too late to impact risk of gestational diabetes
- Smoking cessation should be encouraged in all patients, and may reduce diabetes risk.

Approaches for risk reduction

- In addition to exercise, a healthy diet and smoking cessation before pregnancy are healthy behaviors that may be associated with reduced risk of developing gestational diabetes
- However, a healthy diet can promote weight loss before pregnancy and reduce excessive weight gain during pregnancy, which is beneficial in overweight and obese women.

NUTRITIONAL THERAPY

- The goals of medical nutritional therapy are to:
  - .Achieve normoglycemia
  - .Prevent ketosis
  - .Provide adequate weight gain based on maternal body mass index (BMI)
  - .Contribute to fetal well-being

NUTRITIONAL THERAPY

- **The American Diabetes Association (ADA) recommends that nutrition therapy for GDM provide adequate nutrition to promote fetal and maternal well-being while achieving normoglycemia with absence of ketosis, and providing adequate energy levels for appropriate weight gain in pregnancy**
- **In clinical practice, women often require 1800 to 2500 kcal per day**

- **For women who are at ideal body weight during pregnancy, the caloric requirement is 30 kcal/kg/day;**
- **for women who are overweight, the caloric requirement is 22 to 25 kcal/kg/day; and**
- **For morbidly obese women, the caloric requirement is 12 to 14 kcal/kg/day (present pregnant weight),**
- **But obese women should consume a minimum of 1800 calorie/day to prevent ketosis**

- For those women who are underweight, the caloric requirement may be up to 40 kcal/kg/day to achieve recommended weight gains, blood glucose goals, and nutrient intake.

- **A typical meal plan for women with GDM includes three small-to-moderate sized meals and two to four snacks.**
- **Many women will need individual adjustment (ie, 15 to 30 g of carbohydrate at breakfast or other meals), depending on postprandial glucose levels, which are directly dependent upon the carbohydrate content of the meal or snack**
- **The postprandial glucose rise, can be blunted if the diet is carbohydrate restricted.**

- **An overall low glycemic index diet in which carbohydrate sources are mainly comprised of fruits, vegetables, and whole grains, with low consumption of flour-based products (eg, bread and other baked products) and potatoes has a favorable effect on postprandial blood glucose concentrations and significantly lowered the need for insulin therapy**

- **The remaining calories come from protein (20 percent of total calories) and fats (40 percent of total calories; saturated fat intake should be <7 percent of total calories).**
- **Protein intake should be distributed throughout the day, and included in all meals and snacks to promote satiety and provide adequate calories.**
- **A bedtime snack may be needed to prevent accelerated (starvation) ketosis overnight.**

EXERCISE

- Exercise that increases muscle mass appears to improve glycemic control primarily from increased tissue sensitivity to insulin.
- As a result, both fasting and postprandial blood glucose concentrations can be reduced and, in some women with GDM, the need for insulin may be obviated

EXERCISE

- ADA encourages a program of moderate exercise as part of the treatment plan for women with GDM and no medical or obstetrical contraindications to this level of physical activity.

GLUCOSE MONITORING

- When initially diagnosed with GDM, patients are asked to measure their blood glucose concentration at least four times daily (fasting and one or two hours after the first bite of each meal)
- Multiple daily measurements allow recognition of women who should begin an anti-hyperglycemic agent.

GLYCEMIC GOALS IN PREGNANCY

- Fasting, pre-prandial, and postprandial blood glucose monitoring are recommended in individuals with diabetes in pregnancy to achieve optimal glucose levels.

Glucose goals are:

- fasting plasma glucose <95 mg/dL
- and either 1-h postprandial glucose <140 mg/dL
- or 2-h postprandial glucose <120 mg/dL

ADA 2024

GLYCEMIC GOALS IN PREGNANCY

- Due to increased red blood cell turnover, A1C is slightly lower during pregnancy in people with and without diabetes.

- Ideally, the A1C goal in pregnancy is <6%

- if this can be achieved without significant hypoglycemia, but the goal may be relaxed to <7% if necessary to prevent hypoglycemia. B

ADA 2024

MANAGEMENT OF GESTATIONAL DIABETES MELLITUS

- Lifestyle behavior change is an essential component of management of gestational diabetes mellitus (GDM) and may suffice as treatment for many individuals. Insulin should be added if needed to achieve glycemic goals. A

- Insulin is the preferred medication for treating hyperglycemia in GDM.

ADA 2024

MANAGEMENT OF GESTATIONAL DIABETES MELLITUS

- Metformin and glyburide, individually or in combination, should not be used as first-line agents, as both cross the placenta to the fetus. A

- Other oral and noninsulin injectable glucose-lowering medications lack long-term safety data. E

MANAGEMENT OF GESTATIONAL DIABETES MELLITUS

- Metformin, when used to treat polycystic ovary syndrome and induce ovulation, should be discontinued by the end of the first trimester. A

HTN

- In pregnant individuals with diabetes and chronic hypertension, a blood pressure threshold of 140/90 mmHg for initiation or titration of therapy is associated with better pregnancy outcomes than reserving

- Treatment for severe hypertension, with no increase in risk of small-for gestational-age birth weight. A There are limited data on the optimal lower limit, but therapy should be deintensified for blood pressure <90/60 mmHg. E

HTN

- A blood pressure target of 110–135/85 mmHg is suggested in the interest of reducing the risk for accelerated maternal hypertension. A

- Potentially harmful medications in pregnancy (i.e., ACE inhibitors, angiotensin receptor blockers, statins) should be stopped prior to conception and avoided in sexually active individuals of childbearing potential who are not using reliable contraception. B

PHARMACOLOGIC THERAPY

- Insulin is considered the treatment of choice

- Oral anti-hyperglycemic agents might be a reasonable alternative for women who fail nutritional therapy and refuse to take, or are unable to comply with, insulin therapy.

PHARMACOLOGIC THERAPY

- While metformin has advantages over glyburide, metformin users are more likely to require supplemental insulin to maintain euglycemia than glyburide users
- In the United States, such therapy has not been specifically approved for treatment of GDM by the FDA.
- The American Diabetes Association suggests use of insulin over metformin or glyburide

Sulfonylureas in GDM

- Known to cross placenta
- Associated with increased neonatal hypoglycemia
- Glyburide associated with higher rate of neonatal hypoglycemia and macrosomia than insulin or metformin
- Long-term safety data for offspring not available

Metformin in GDM

- Crosses the placenta
- Advantages over glyburide:
- Lower mean birth weight in offspring
- Lower risk of macrosomia
- Less maternal weight gain
- Compared to insulin: Lower risk of neonatal hypoglycemia and less maternal weight gain
- Metformin may slightly increase risk of prematurity
- Long-term metabolic influence on offspring is unknown

Due to the potential for growth restriction or acidosis in the setting of placental insufficiency,

- metformin should not be used in women with hypertension or preeclampsia or at risk for intrauterine growth restriction.

Insulin in GDM

- Does not cross the placenta
- Frequent titration of insulin needed to match changing requirements during pregnancy due to progressive increase in insulin resistance
- Frequent self-monitoring of BG is crucial

Insulin in GDM Management

- For fasting hyperglycemia, NPH or insulin detemir can be started at bedtime.
- For postprandial hyperglycemia, prandial coverage should be started before the meal.
- Rapid-acting insulin analogs lispro and aspart are preferred over regular insulin.

POSTPARTUM CARE

- Insulin resistance decreases dramatically immediately postpartum, and insulin requirements need to be evaluated and adjusted as they are often roughly half the prepregnancy requirements for the initial few days postpartum. C

- A contraceptive plan should be discussed and implemented with all people with diabetes of childbearing potential. A

POSTPARTUM CARE

- Screen individuals with a recent history of GDM at 4–12 weeks postpartum, using the 75-g oral glucose tolerance test and clinically appropriate nonpregnancy diagnostic criteria. B

- Individuals with overweight/ obesity and a history of GDM found to have prediabetes should receive intensive lifestyle interventions and/or metformin to prevent diabetes. A

POSTPARTUM CARE

- Breastfeeding efforts are recommended for all individuals with diabetes. A Breastfeeding is recommended for individuals with a history of GDM for multiple benefits, A including a reduced risk for type 2 diabetes later in life. B
- Individuals with a history of GDM should have lifelong screening for the development of type 2 diabetes or prediabetes every 1–3 years. B

POSTPARTUM CARE

- Individuals with a history of GDM should seek preconception screening for diabetes and preconception care to identify and treat hyperglycemia and prevent congenital malformations. E

Risk factors for Prediabetes and T2D

- First-degree relative with diabetes
- High-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
- History of CVD
- Hypertension (≥140/90 mmHg or on therapy for hypertension)
- HDL cholesterol level <35 mg/dL (0.90 mmol/L) and/or a triglyceride level >250 mg/dL (2.82 mmol/L)
- Women with polycystic ovary syndrome
- Physical inactivity
- Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)

Follow-up and prevention of type 2 diabetes

- An abnormal fasting plasma glucose level is diagnostic (diabetes if ≥126 mg/dL, impaired fasting glucose (IFG) if 100 to 125 mg/dL);
- Impaired glucose tolerance (IGT) is diagnosed if the two-hour value is 140 to 199 mg/dL.
- Collectively, IFG and IGT are known as "prediabetes."

توصیه های پس از زایمان

- برای همه **خانم های مبتلا به دیابت** بارداری در فاصله هفته ۶ تا ۱۲ پس از زایمان آزمون تحمل گلوکز خوراکی OGTTبا مصرف ۷۵ گرم گلوکز نمونه گیری ناشتا و دوساعته درخواست گردد.

قند خون ناشتا (میلی گرم در دسی لیتر)	≤۹۹	طبیعی
	۱۰۰-۱۲۵	پره دیابتیک
	≥۱۲۶	دیابتیک
قند خون ۲ ساعت پس از مصرف گلوکز (میلی گرم در دسی لیتر)	<۱۴۰	طبیعی
	۱۴۰-۱۹۹	پره دیابتیک
	≥۲۰۰	دیابتیک

Follow-up and prevention of type 2 diabetes

- Women with prediabetes should be counseled about their subsequent risk for developing overt diabetes and referred for discussion of management options (eg, lifestyle modification such as medical nutritional therapy, indications for metformin).

Follow-up and prevention of type 2 diabetes

- Women with overt diabetes mellitus should receive appropriate education and treatment.
- They should also be given advice regarding contraception and the planning of future pregnancies.
- In addition, women with prediabetes or overt diabetes should be counseled regarding the importance of good metabolic control prior to any future pregnancies.

THANKS FOR YOUR KIND ATTENTION