

DIABETE IN GRAVIDANZA: ISTRUZIONE PER LA GESTIONE

Sabato 2 Marzo 2024 Unahotels Thotel, Cagliari

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CAGLIARI, 2 MARZO 2024

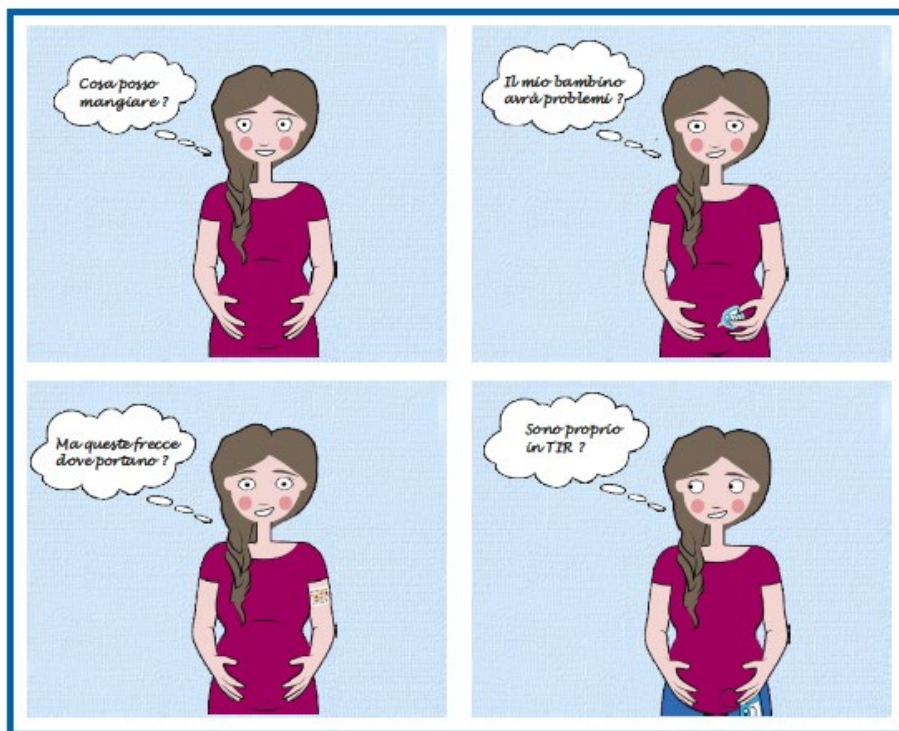


Follow up nel post partum e
prevenzione del Diabete mellito tipo 2:
una sfida possibile

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DISCLOSURE

La Prof.ssa Gloria Formoso dichiara di aver ricevuto negli ultimi due anni compensi o finanziamenti dalle seguenti Aziende Farmaceutiche e/o Diagnostiche:

- NOVONORDISK
- ELI LILLY
- SANOFI
- MOVI
- ASTRA-ZENECA

Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

GESTATIONAL DIABETE



PREVALENCE

MEAN 13% - 17 MILLION
(2-26%)



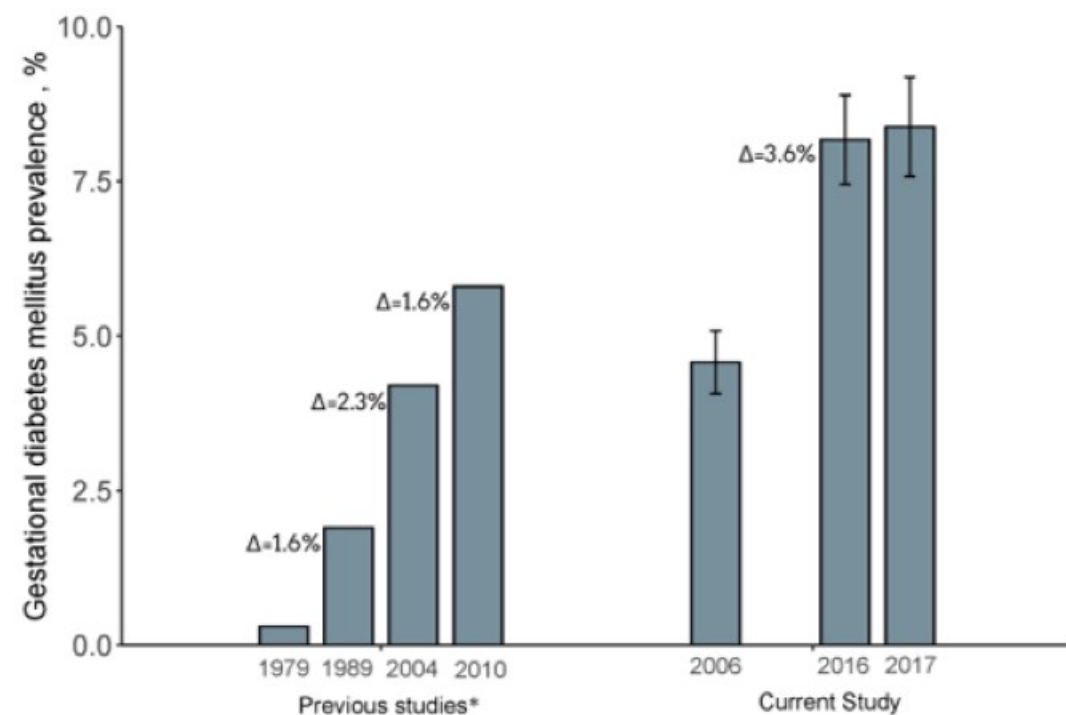
OBESITY



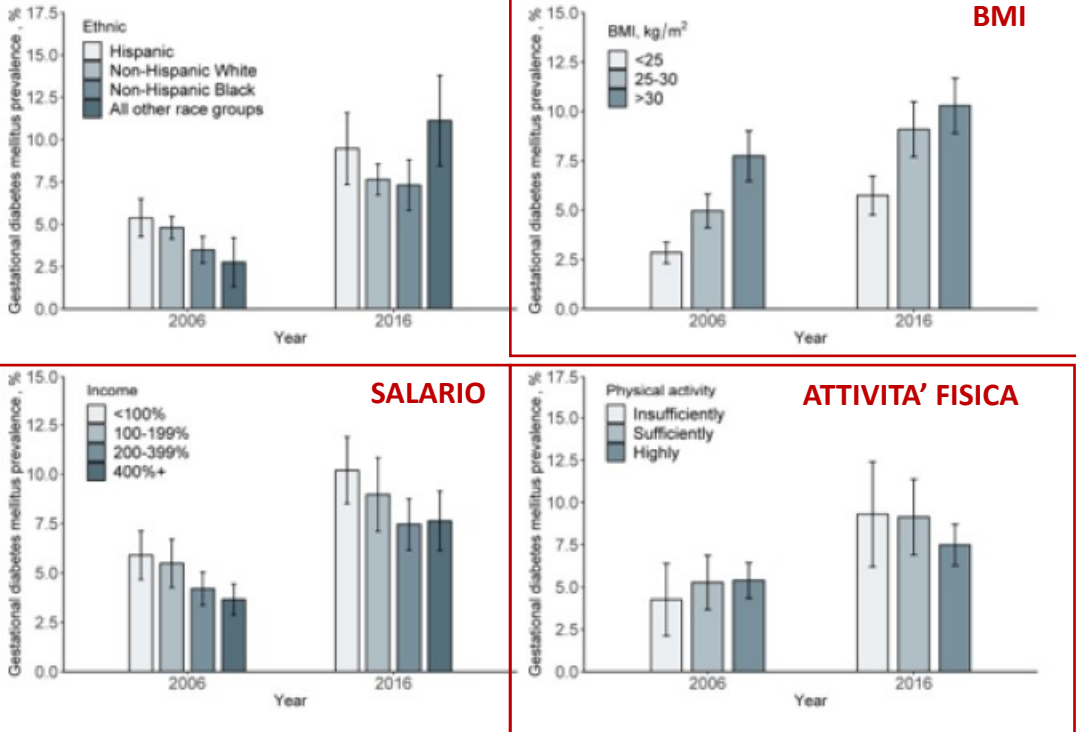
Prevalence and Trends in Gestational Diabetes Mellitus Among Women in the United States, 2006–2017: A Population-Based Study

GDM prevalence in 2006, 2016, and 2017 on the base of the The National Health Interview Survey (NHIS); n= 37. 357

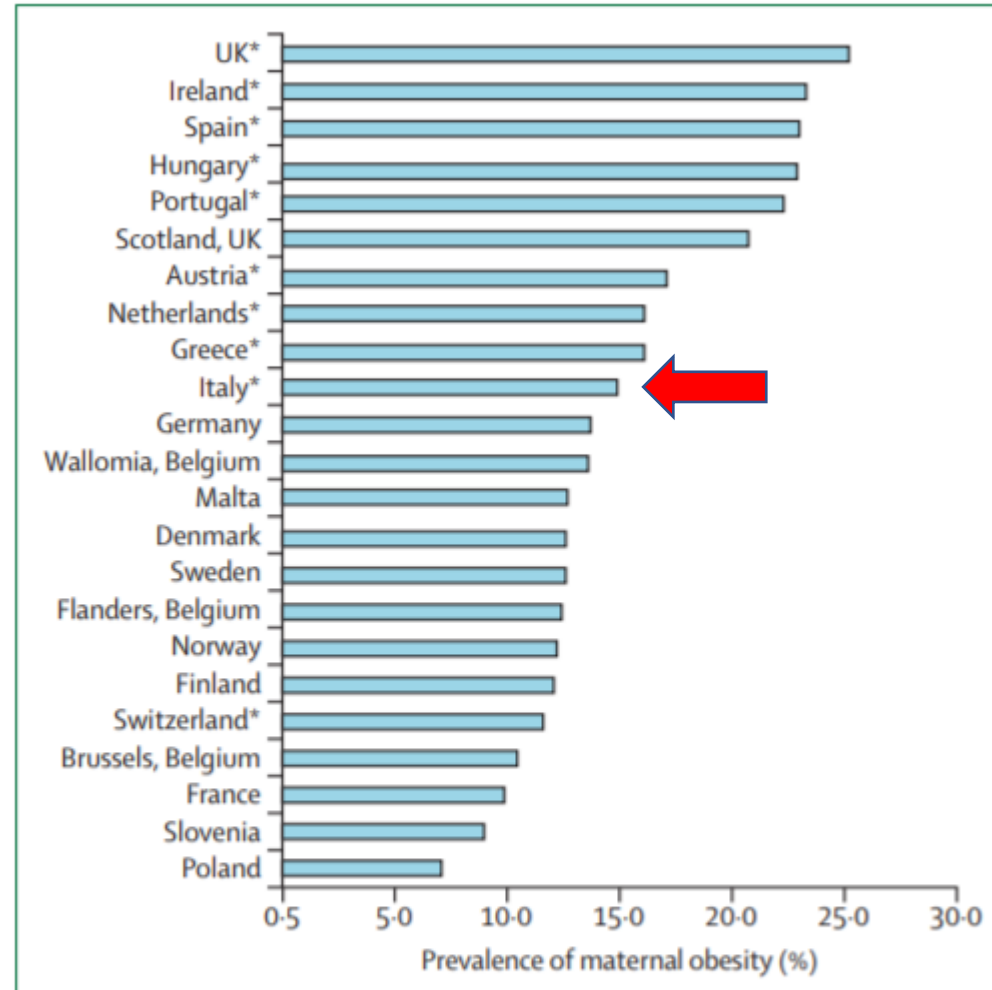
Prevalence of Gestational diabetes mellitus in 2006, 2016, and 2017



Prevalence of Gestational diabetes mellitus in 2006 and 2016 by demographic variables



Distribution of maternal obesity



Prevalence of obesity among women of reproductive age varies in other high income countries.

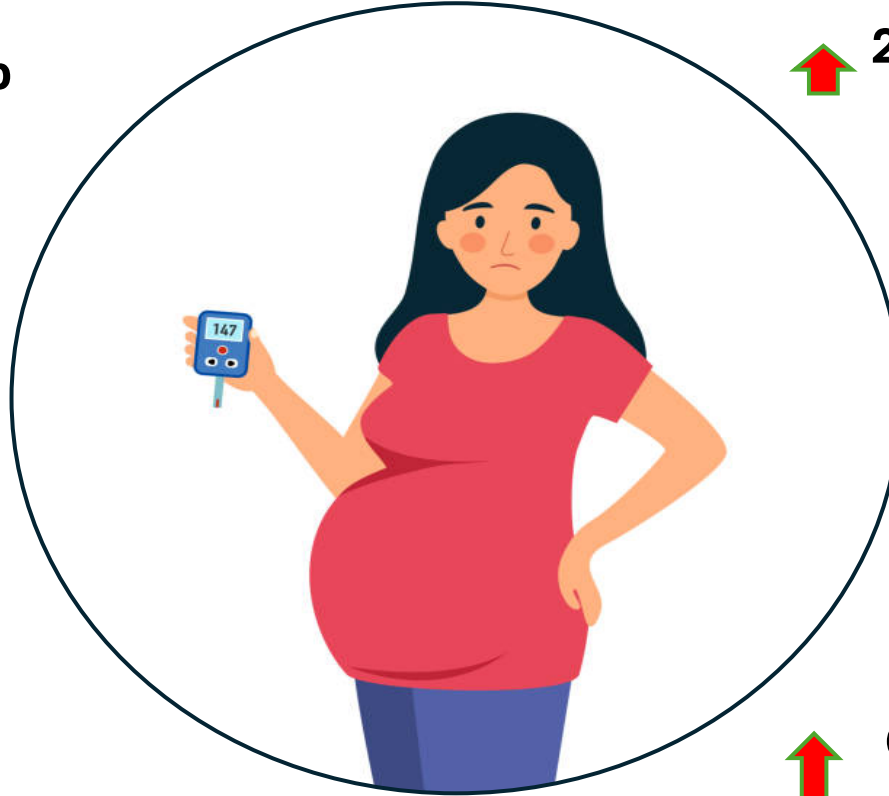
Figure 2: Distribution of maternal obesity from Euro-Peristat database and WHO

Obesity defined as BMI of more than 30 kg/m². *From WHO database (2009; includes all women aged 20 years or above as proxy for maternal obesity. Reproduced from Devlieger and colleagues, with permission from Elsevier.⁹

GDM RELATED LONG TERM OUTCOMES

↑ 50% of women develop T2D in 10 years
Highest incidence within 5 years after GDM

↑ 10 fold increase lifetime risk for T2D



↑ 2-fold greater risk for elevated BMI
>3-fold greater risk for an abnormal OGTT

↑ High-risk cardiometabolic profile

↑ Obesity and diabetes in the offspring

Type 2 diabetes mellitus after gestational diabetes

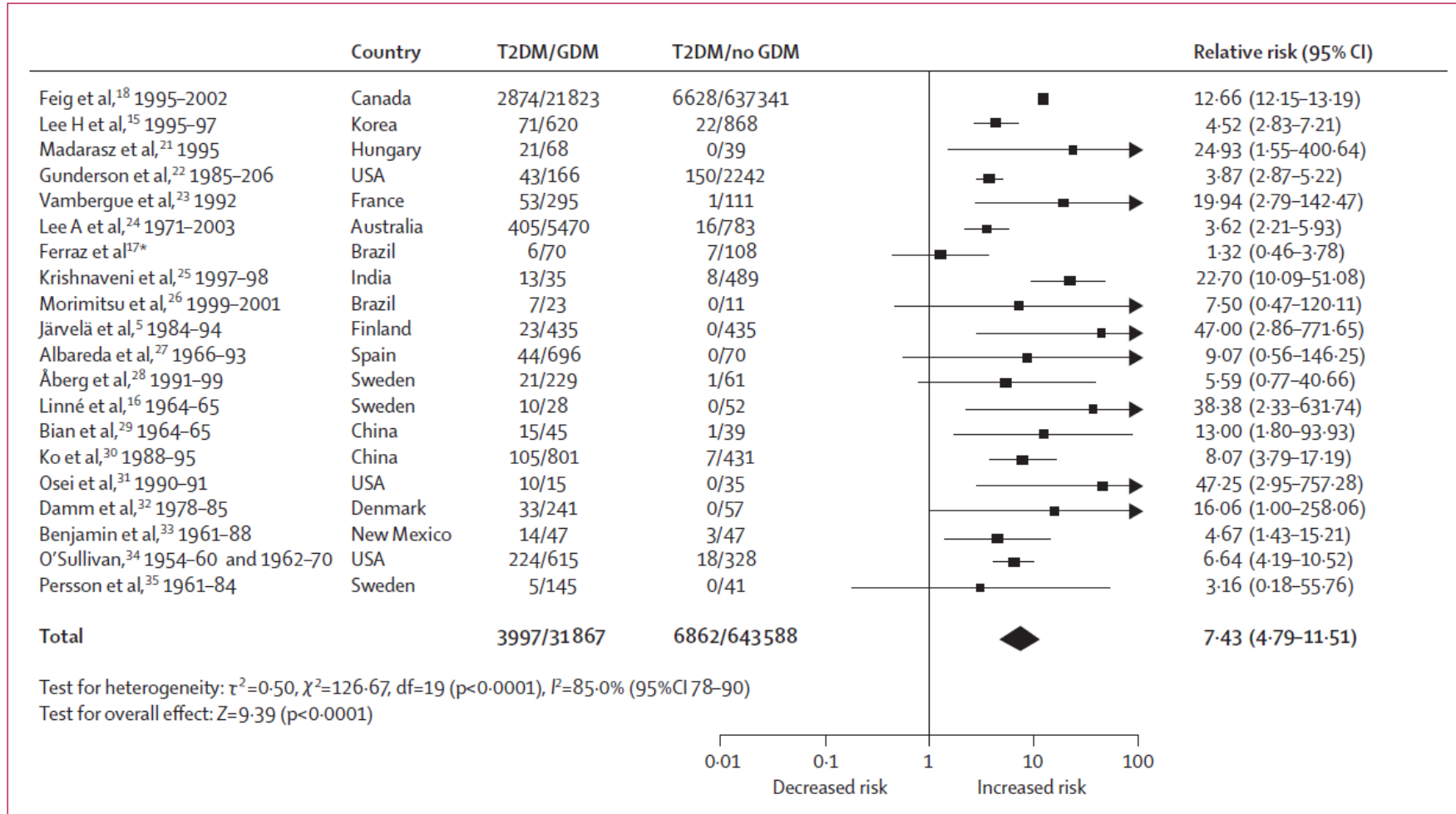


Figure 2: Risk of type 2 diabetes mellitus (T2DM) after gestational diabetes mellitus (GDM)

x-axis is log scale. Each solid square represents a relative risk. Horizontal lines indicate 95% CIs. df=degrees of freedom. *Dates not available.

Type 2 diabetes mellitus after gestational diabetes

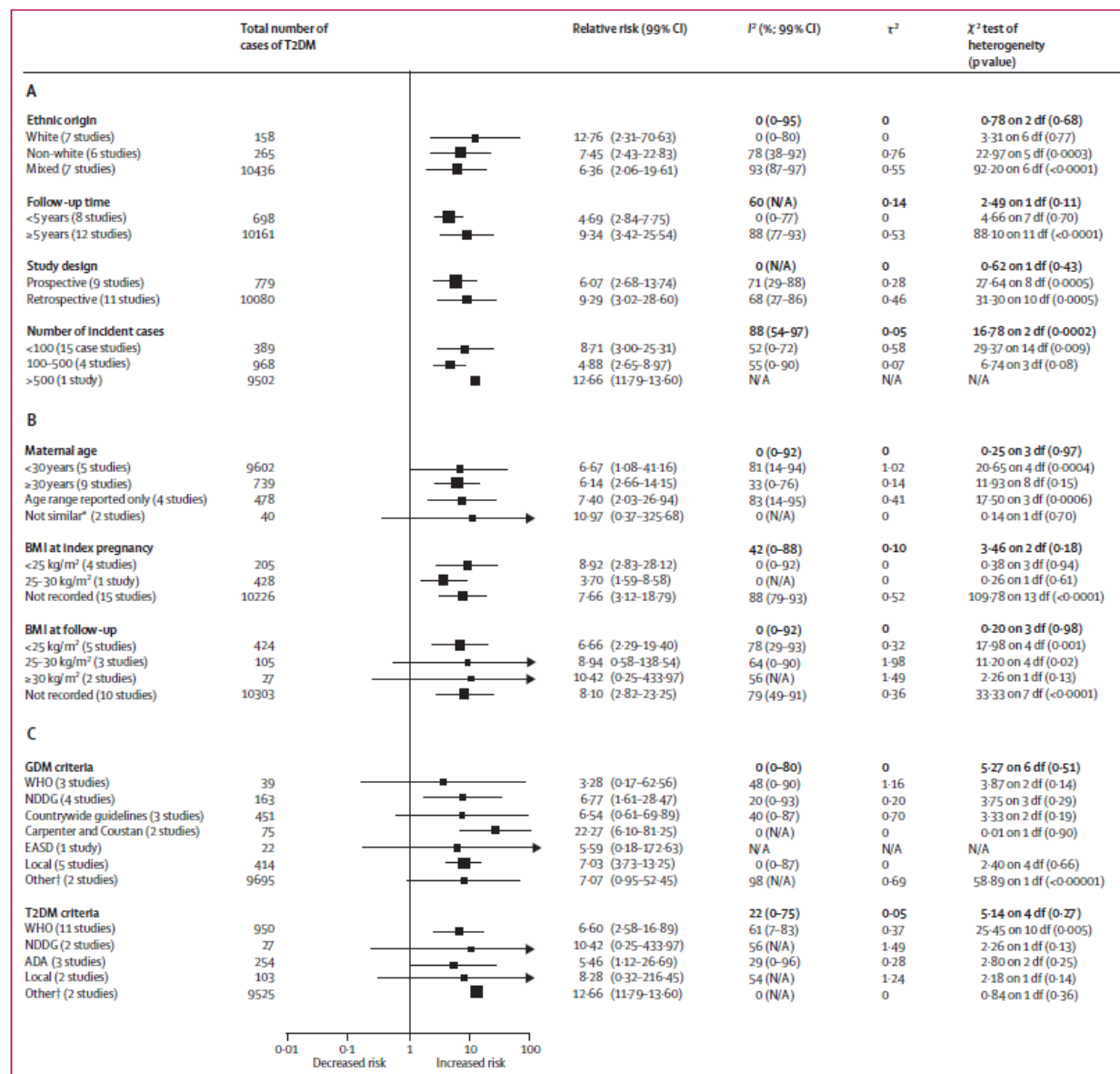
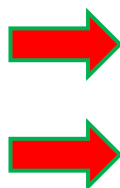


Figure 4: Risk of type 2 diabetes mellitus (T2DM) grouped by study characteristics (A), participant characteristics (B), and diagnostic criteria (C)
x-axis is log scale. Each solid square represents a relative risk. Horizontal lines indicate 99% CIs. ADA=American Diabetes Association. BMI=body-mass index. df=degrees of freedom. EASD=European Association for Study of Diabetes. GDM=gestational diabetes mellitus. N/A=heterogeneity not applicable because one study analysed. NDDG=National Diabetes Data Group. *Average ages of women with and without GDM were not similar; therefore effect of maternal age could not be assessed. †Includes databases and obstetric reports (table).

CV RISK after gestational diabetes

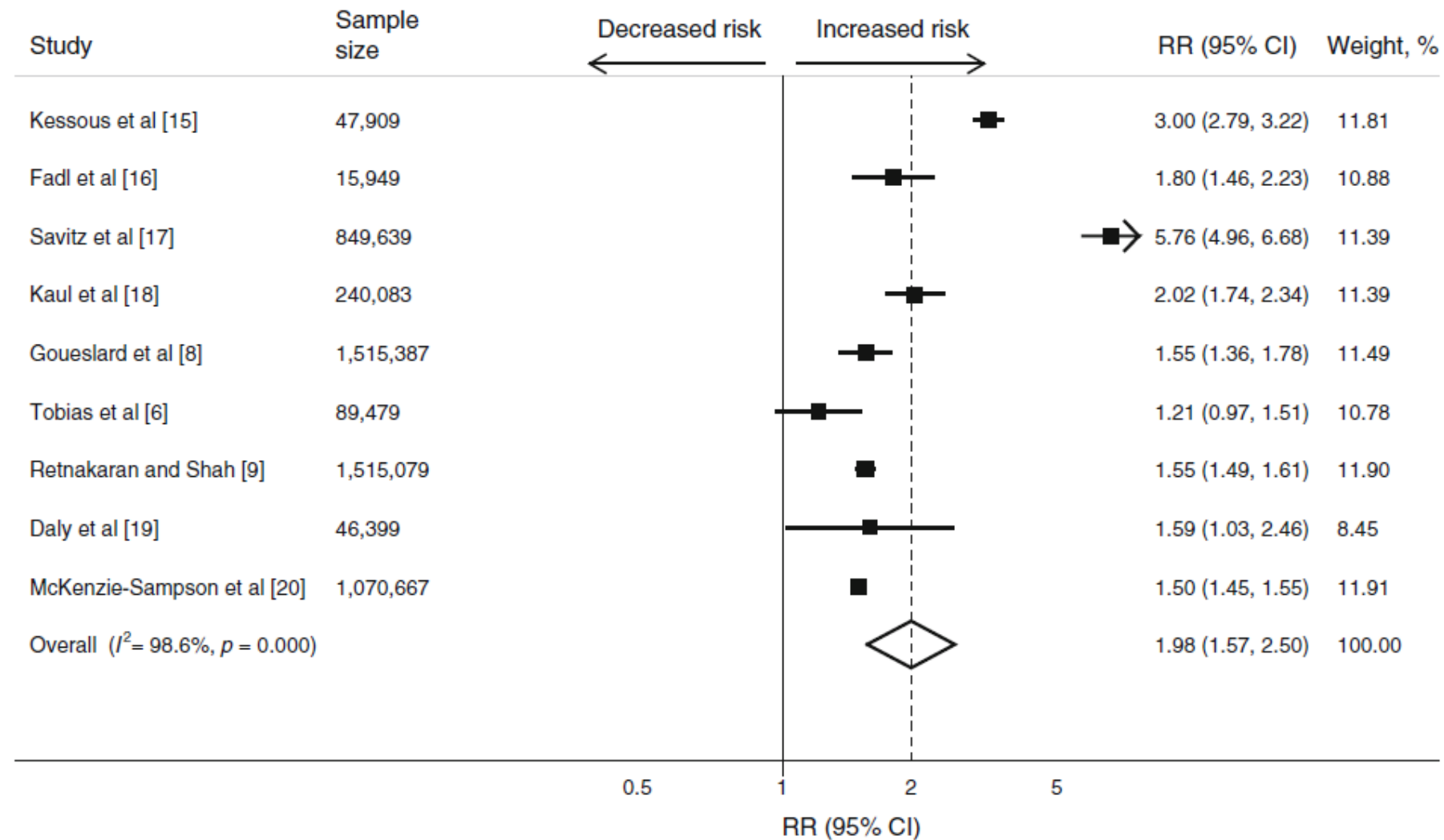
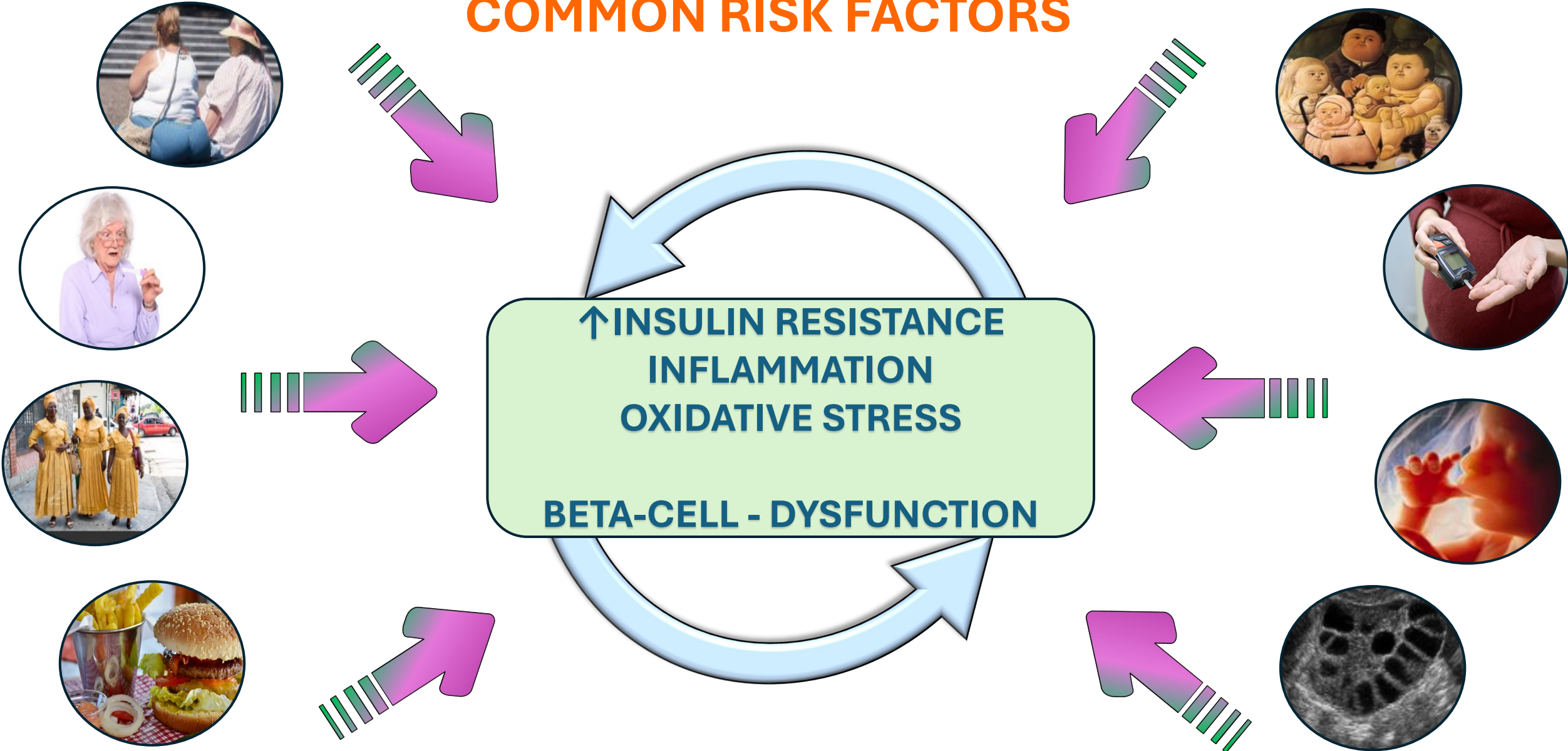


Fig. 1 Meta-analysis of the association between GDM and the risk of cardiovascular events. Weights are from random-effects analysis

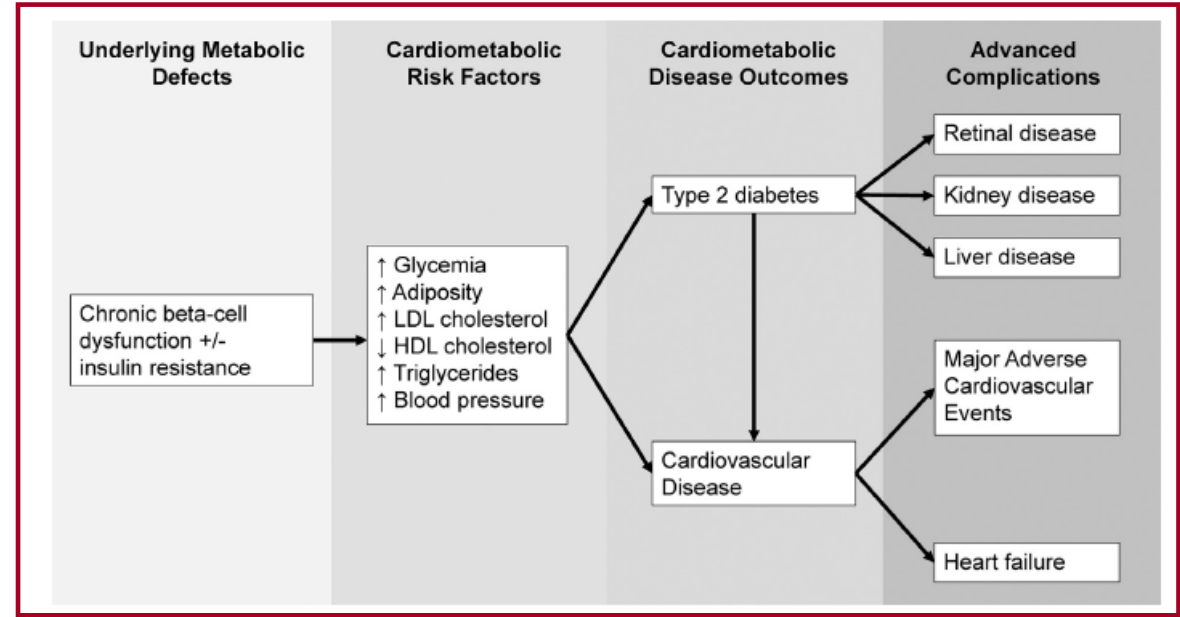
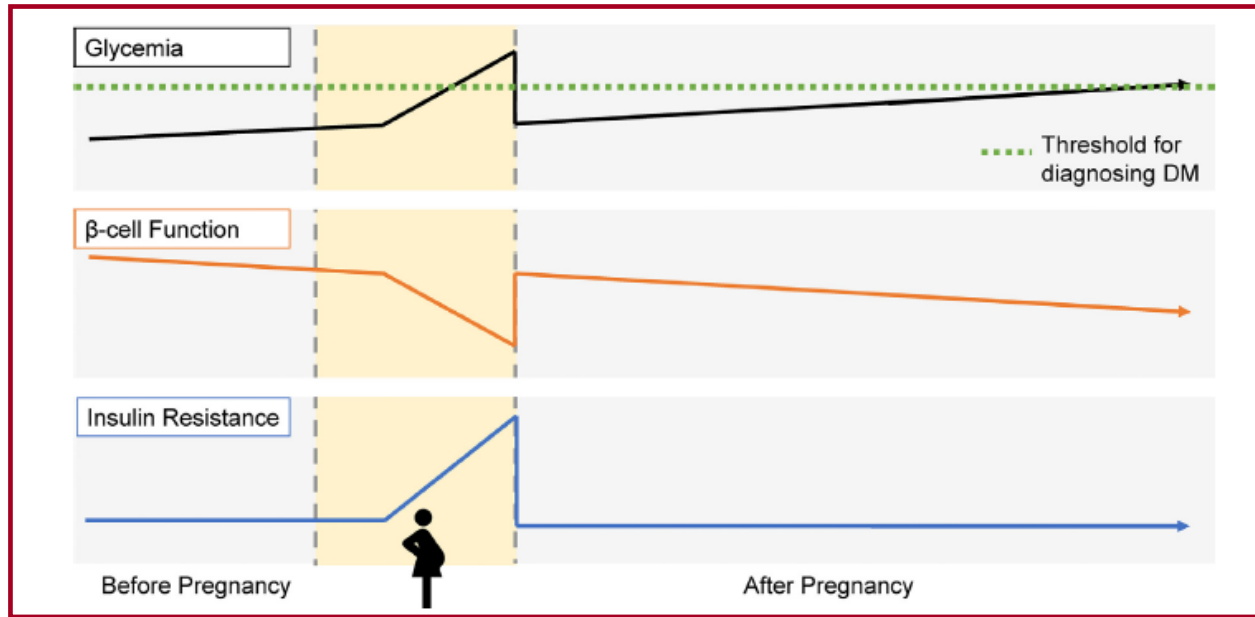
TABLE 1 Long-term complications of gestational diabetes

Complications for women	Complications for the offspring
Hypertension	Childhood obesity
Type 2 diabetes	Excess abdominal adiposity
Vascular dysfunction	Metabolic syndrome
Nonalcoholic fatty liver disease	Hyperinsulinemia
Dyslipidemia	Disordered glucose regulation in adolescents
Chronic inflammation	Higher blood pressure
Chronic kidney disease	Possible early-onset cardiovascular disease
Ischemic heart disease	Possible attention deficit hyperactivity disorder and autism spectrum disorders
	Earlier onset type 2 diabetes
	Higher risk of GDM in female offspring

OBESITY – GDM- T2D COMMON RISK FACTORS



The life course perspective of gestational diabetes: An opportunity for the prevention of diabetes and heart disease in women



Women with GDM have a chronic beta-cell defect that leads to rising glycemia even before pregnancy. When pregnant, insufficient beta-cell compensation for the insulin resistance of the latter half of gestation yields the hyperglycemia by which GDM is identified. Upon delivery and abatement of the insulin resistance of pregnancy, glycemia initially improves. However, the ongoing deterioration of beta-cell function leads to rising glycemia over time that may ultimately reach the diagnostic threshold for diabetes.

Metabolic defects, an adverse cardiometabolic risk factor profile worsens overtime, elevating lifetime risks of cardiometabolic disease outcomes and associated advanced complications.

“ pregnancy can be viewed as a life event that is superimposed upon existing tracks of cardiometabolic risk and enables the identification of women are already on a high-risk track (i.e. those who develop GDM)”.

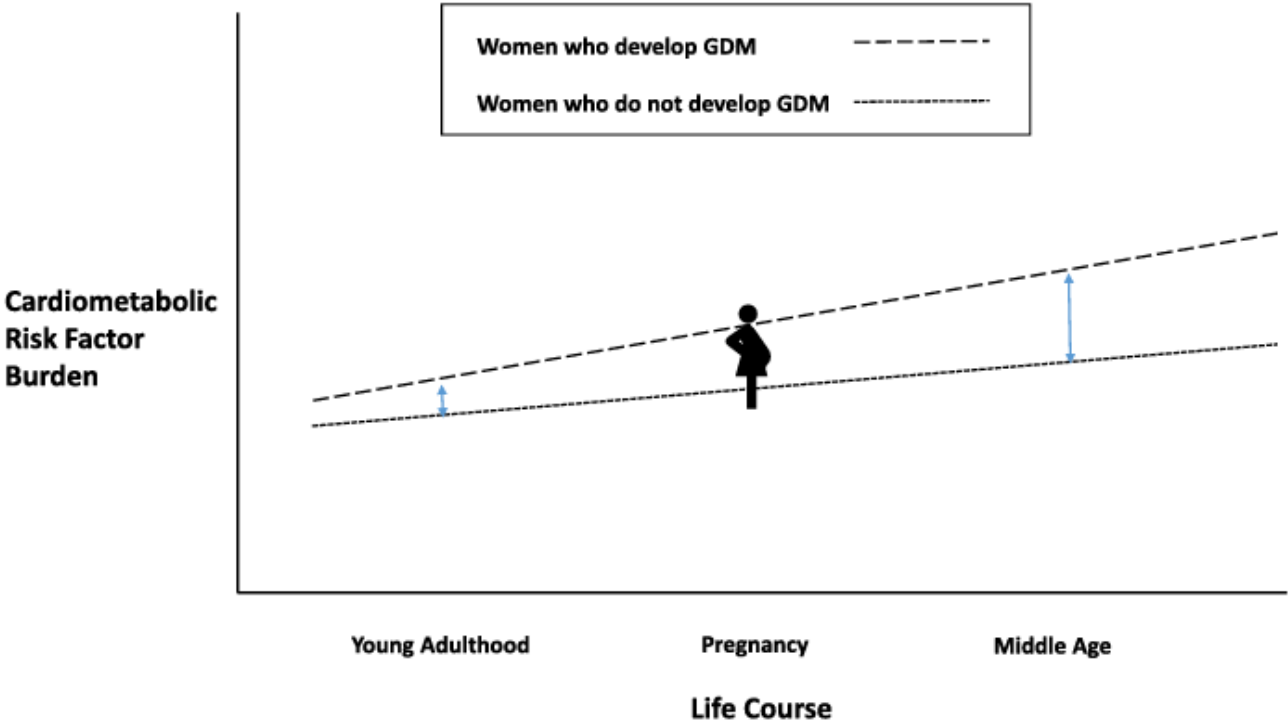


Table 1

Key challenges and potential benefits associated with outstanding research questions that should be addressed in the coming years.

Outstanding question	Key challenges	Potential benefits
Can the treatment of diabetes in pregnancy impact growth and development of the offspring? Is the prevention of GDM feasible?	Likely requires long-term follow-up of offspring through childhood Likely requires preconception intervention trials, which can be logistically challenging	Could improve the long-term health of the offspring Could prevent intrauterine programming and the transgenerational propagation of metabolic risk
Can we reduce the risks of type 2 diabetes and cardiovascular disease in women with previous GDM?	Need to find ways to improve clinical engagement of new mothers in the postpartum	Could enable primary prevention of type 2 diabetes and CVD in women

Risk Perception for Diabetes Among Women With Histories of Gestational Diabetes Mellitus

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Diabetes Care 30:2281–2286, 2007

Survey on 217 women with histories of GDM who were enrolled in a managed-care plan and who did not have diabetes.

Aim: to assess the associations between risk perceptions and current lifestyle behavioral practices, plans to modify behaviors, and recent lifestyle behavior changes.

Results:

- Ninety percent of women recognized that GDM was a risk factor for future diabetes, but only 16% believed that they themselves had a high chance of developing diabetes.
- Perceived risk increased to 39% when women were asked to estimate their risk assuming they maintained their current lifestyle.
- Women who perceived themselves to be at moderate/high risk more often planned to modify their future lifestyle behaviors.

Pregnancy as an opportunity to prevent type 2 diabetes
mellitus: FIGO Best Practice Advice

GDM Follow up - Best practice advice

Recommendations for postpartum follow-up of all women with GDM:

- Two-hour oral glucose tolerance test (OGTT) at 6–12 weeks postpartum using the diabetes criteria applicable to non pregnant women (gold standard)
- Include a fasting lipid profile and measurement of blood pressure, BMI, and abdominal circumference

Follow-up of women with a history of gestational diabetes in Italy: Are we missing an opportunity for primary prevention of type 2 diabetes and cardiovascular disease?

Italian Survey of the Diabetes and Pregnancy Study Group SID-AMD

Please indicate for your institution the percent of women with GDM performing the recommended post-partum OGTT:

<25%	31.0%
25%–49%	29.0%
50%–74%	18.0%
≥75%	10.0%
Unable to provide an estimate	12.0%

60% of the diabetes centres surveyed reported that less than 50% of the women with recent GDM performed the recommended OGTT between 6- and 12-week post-partum

International data indicate less then 60% of women were screend after GDM





Screening of postpartum diabetes in women with gestational diabetes: high-risk subgroups and areas for improvements—the STRONG observational study

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From a sample of 2,736 women, OGTT was performed in 941 (34.4%) women, of whom 217 (23.0%) developed PPD.

Abstract

Aims To assess the proportion of women with gestational diabetes (GDM) by performing postpartum Oral Glucose Tolerance Test (OGTT) and to identify GDM phenotypes at high-risk of postpartum dysglycemia (PPD).

Methods Observational, retrospective, multicenter study involving consecutive GDM women. Recursive partitioning (REC-PAM) analysis was used to identify distinct and homogeneous subgroups of women at different PPD risk.

Results From a sample of 2,736 women, OGTT was performed in 941 (34.4%) women, of whom 217 (23.0%) developed PPD. Insulin-treated women having family history of diabetes represented the subgroup with the highest PPD risk (OR 5.57, 95% CI 3.60–8.63) compared to the reference class (women on diet with pre-pregnancy BMI ≤ 28.1 kg/m²). Insulin-treated women without family diabetes history and women on diet with pre-pregnancy BMI > 28.1 kg/m² showed a two-fold PPD risk. Previous GDM and socioeconomic status represent additional predictors. Fasting more than post-prandial glycemia plays a predictive role, with values of 81–87 mg/dl (4.5–4.8 mmol/l) (lower than the current diagnostic GDM threshold) being associated with PPD risk.

Conclusions Increasing compliance to postpartum OGTT to prevent/delay PPD is a priority. Easily available characteristics identify subgroups of women more likely to benefit from preventive strategies. Fasting BG values during pregnancy lower than those usually considered deserve attention.

FACTORS CONTRIBUTING TO POOR POST-PARTUM FOLLO-UP

Healthcare worker factors	People, family, community factors
• Uncertainty about screening recommendations • Lack of communication and acceptance of responsibility between obstetrician and primary care provider for ordering screening test • Lack of continued vigilance beyond immediate postpartum visit • Office location and/or type (hospital-based or hospital-affiliated community clinic) • Degree of provider specialization • Lack of funded national screening programs • Inadequate training and tools to provide practical guidance	• Low awareness of risk • Difficulty to keep screening visit appointment(s) • Inadequate family support • Lack of prioritization or inadequate attention to women's health • Education and financial independence

Barriers	Enablers
• OGTT test • Environmental context and resources • Social influences • Emotional aspects • Lack of information • Memory/attention • Social roles • Optimism • Reinforcement	• Knowledge and beliefs about consequences • Empowerment for self-care with practical guidance (not just what to but also how to) • Setting goals • Behavioral regulation

Pregnancy as an opportunity to prevent type 2 diabetes
mellitus: FIGO Best Practice Advice

GDM Follow up - Best practice advice

Recommendations for postpartum follow-up of all women with GDM:

Pragmatic advice

If best practice cannot be achieved, consider:

- Fasting glucose at 6–12 weeks postpartum,

OR

- Glycated hemoglobin (HbA1c)

OR

- Consider combining fasting glucose and HbA1c

Adam S. Int J Gynecol Obstet. 2023;160(Suppl. 1):56–67.

TABLE 3 Major risk factors for developing type 2 diabetes after GDM

General factors	Pregnancy-related factors
• Age • BMI • Waist circumference • Hypertension • Family history of diabetes • Fasting glucose level	• GDM • Use of insulin for GDM • Gestational weight gain • Short duration of breastfeeding



La diagnosi di diabete gestazionale è definita dalla presenza di uno o più valori uguali o superiori a quelli indicati in **Tabella VI.B1**.

Le donne con pregresso GDM devono sottoporsi a un OGTT-75 g per lo screening di alterazioni della tolleranza glucidica, dopo almeno 6 settimane dal parto ed entro 6 mesi. L'allattamento al seno non è una controindicazione all'esecuzione del carico orale di glucosio post-partum. Il controllo successivo deve prevedere un OGTT-75 g ogni 3 anni. Se vi è una alterata tolleranza glucidica (IFG o IGT) il test deve essere ripetuto ogni anno. **VI B**



15. Management of Diabetes in Pregnancy: *Standards of Care in Diabetes—2024*

American Diabetes Association
Professional Practice Committee*

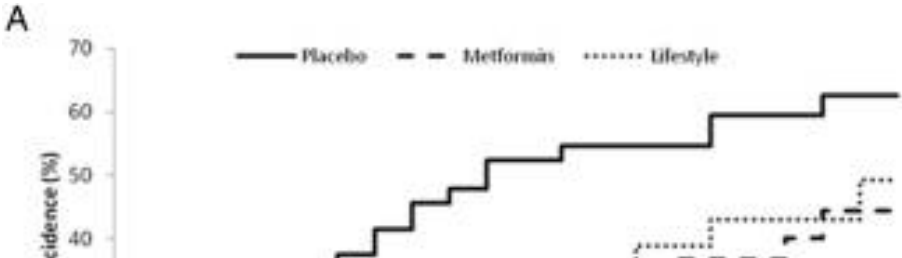
Diabetes Care 2024;47(Suppl. 1):S282–S294 | <https://doi.org/10.2337/dc24-S015>

15.25 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**

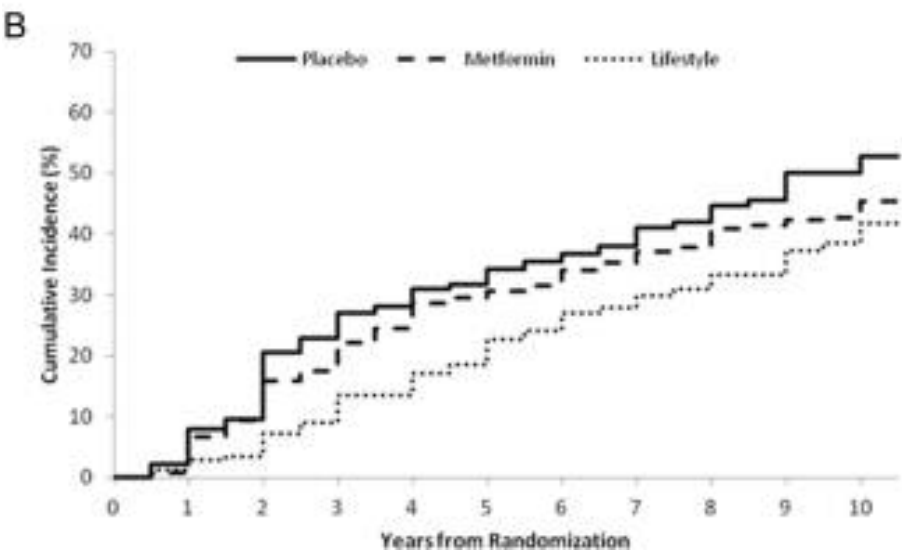
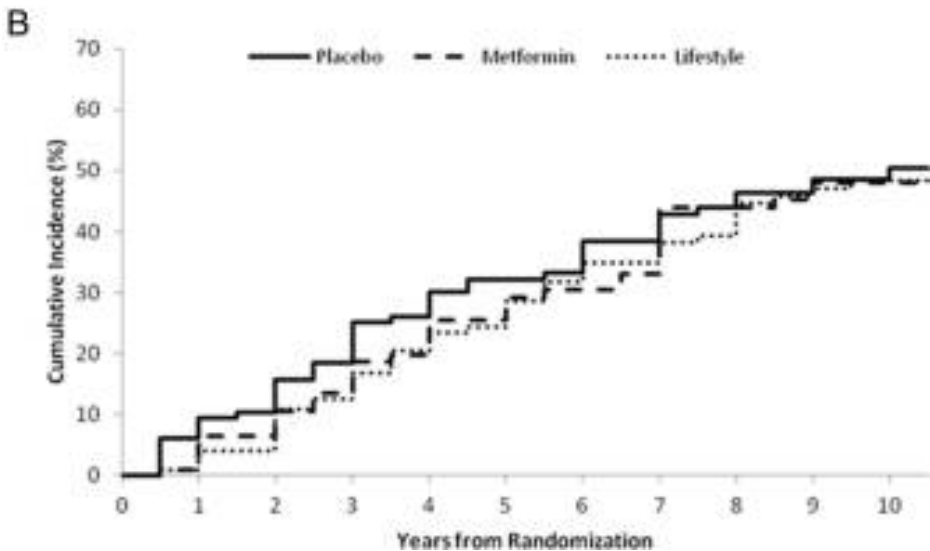
15.26 Individuals with overweight/obesity and a history of GDM found to have prediabetes should receive intensive lifestyle interventions and/or metformin to prevent diabetes. **A**

Cumulative incidence of diabetes in women with a history of GDM (A, n = 218) and parous women without a history of GDM (B, n = 352) 25–44 years of age.

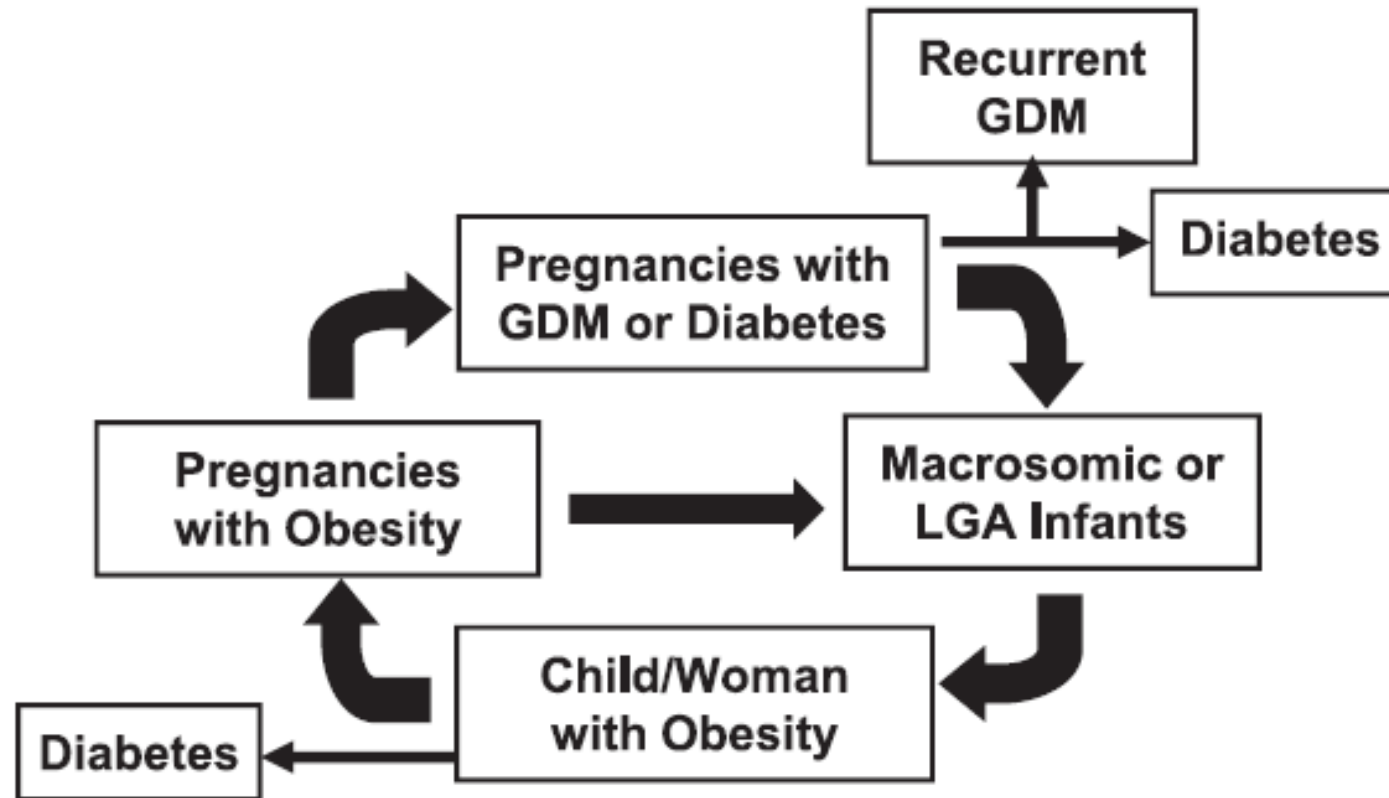
Cumulative incidence of diabetes in women with a history of GDM (A, n = 121) and parous women without a history of GDM (B, n = 791) 45–59 years of age.



Over 10 years, women with a history of GDM assigned to placebo had a 48% higher risk of developing diabetes compared with women without a history of GDM. In women with a history of GDM, ILS and metformin reduced progression to diabetes compared with placebo by 35% and 40%, respectively. Among women without a history of GDM, ILS reduced the progression to diabetes by 30%, and metformin did not reduce the progression to diabetes.



THE VICIOUS CIRCLE OF DIABETES



GDM prevention

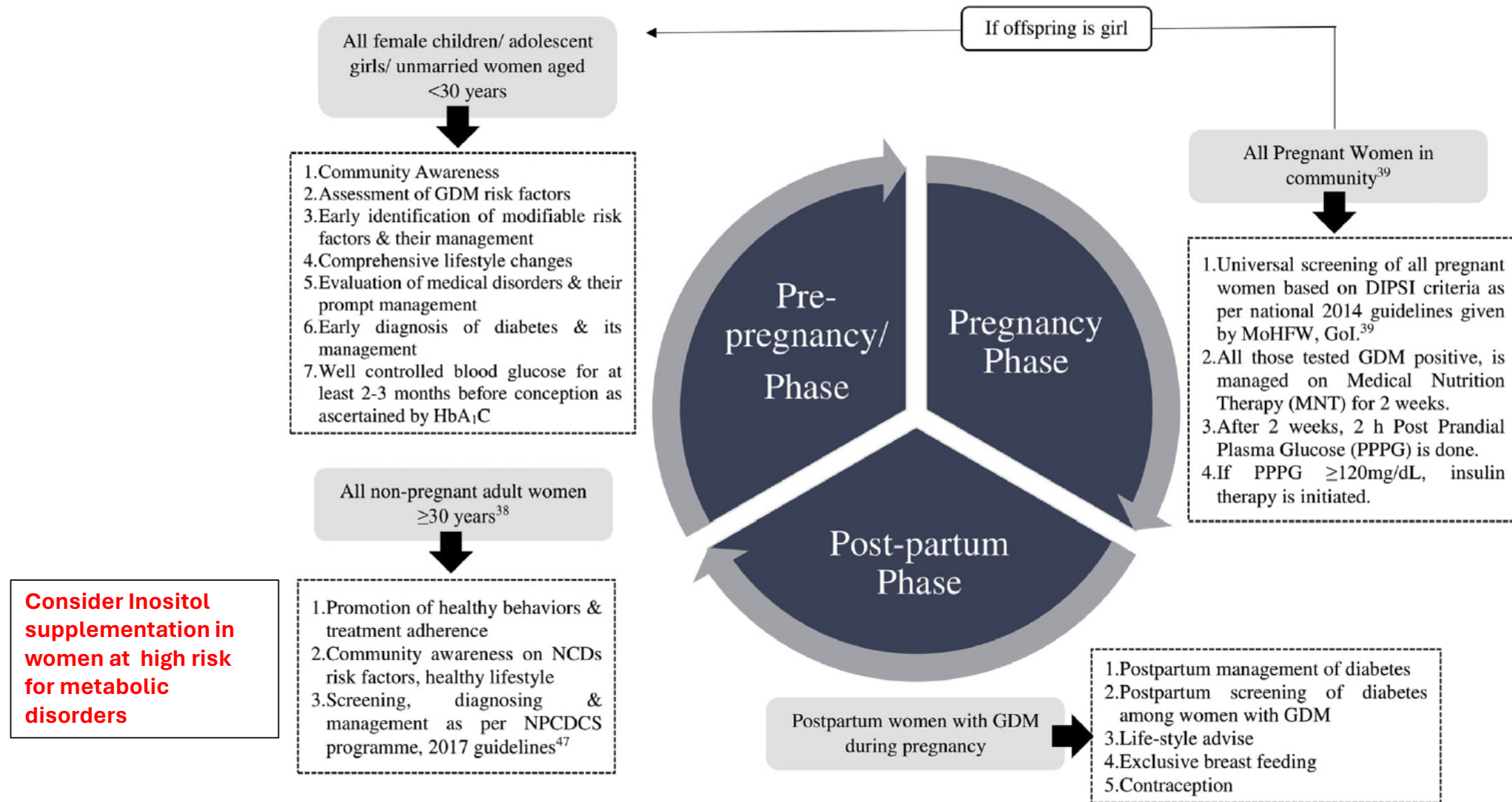


Fig. 1. 'Life-cycle Approach' for prevention of GDM.

CONCLUSION

The traditional paradigm for the GDM pregnancy focuses on perinatal outcomes.

Yet GDM may also serve as an indicator of future maternal glucose intolerance and a “teachable moment” during which women may be alerted to their increased risk.

In turn, this increased risk perception could potentially encourage the adoption of preventive behaviors.

A shift is needed in the thinking about obesity and gestational diabetes; moving from the perception of a short-term conditions that confers increased risks of large babies to a potentially modifiable long-term condition that contributes to the growing burden of childhood obesity and cardiometabolic disorders in women and the future generation.

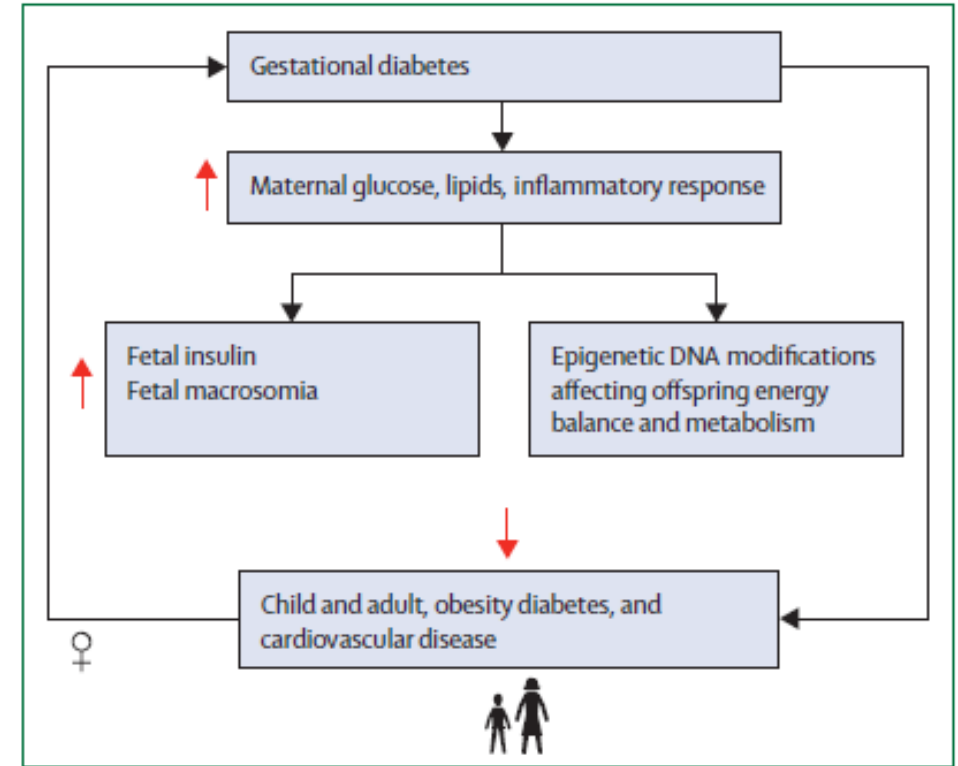


Figure: Developmental programming and gestational diabetes
Metabolic consequences of maternal gestational diabetes might increase the risk of obesity, diabetes, and cardiometabolic disorders in the child and adult, leading to a transgenerational cycle of gestational diabetes and higher cardiometabolic susceptibility.