Gestational Diabetes, Incidence And Risk Factors In KSA

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Abstract
Gestational diabetes mellitus (GDM) is becoming more common in Saudi Arabia; reports range from 8.2% to 24.3%. Sedentary lifestyle, consanguinity, obesity, multiparity, family history of diabetes, history of GDM, advanced maternal age, and regional eating habits were identified as major risk factors in this systematic analysis of the literature from 2015 to 2025. Variations in diagnostic requirements and screening practices were cited as the cause of the prevalence disparities. These findings highlight how crucial early screening, standardized screening practices, and targeted lifestyle changes are to reducing GDM-related maternal and newborn problems and improving pregnancy outcomes for Saudi women.
Keywords: GDM, Gestational Diabetes, Risk Factors of GDM, Safety of pregnancy.

INTRODUCTION

The second and third trimesters of pregnancy are often when gestational diabetes mellitus (GDM) is diagnosed. Glycated hemoglobin >5.7 percent, consanguineous marriage, insufficient physical activity, excessive body weight, glycated hemoglobin, and a history of cardiovascular disease are risk factors for GDM. **[5]** The risk of

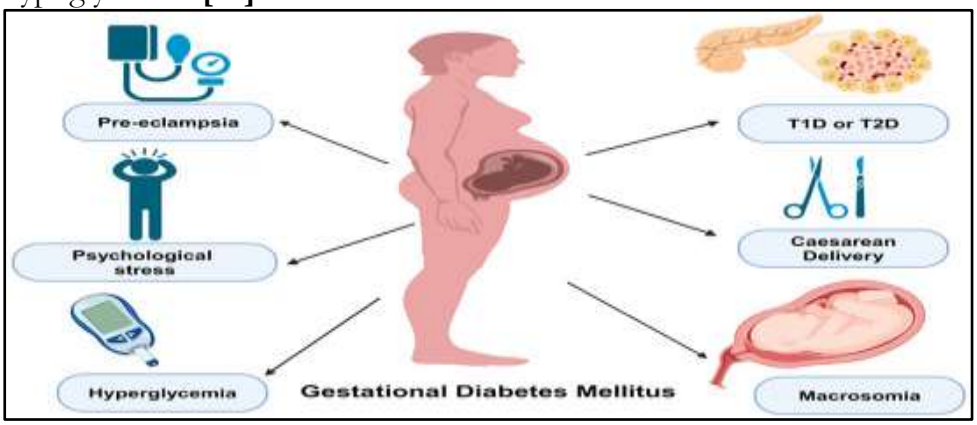
hyperglycemia during pregnancy rises as the number of overweight and obese women of reproductive age rises. GDM affects people all around the world and has both immediate and long-term health effects. **[2]**

Although the long-term complications of GDM include the risk of type 2 diabetes mellitus (T2DM) for the mother and the risk of childhood obesity, impaired glucose tolerance, and/or metabolic syndrome for their neonates, the short-term consequences of GDM include negative perinatal outcomes for the affected women (preeclampsia, polyhydramnios, and increased cesarean section "C-section" risk) and their neonates (shoulder dystocia, macrosomia, and polyhydramnios). **[11], [12]**

The management of blood glucose during pregnancy is essential since elevated blood glucose levels are linked to specific perinatal problems. Prevalence estimates are very useful for understanding the healthcare demands of a community at particular times. **[3]**

Regretfully, there is a great deal of heterogeneity in the global GDM prevalence estimates (<1%–28%) because of ethnicity, ethnic variation among different populations, and uneven application of screening and diagnostic criteria. Determining the region-specific prevalence estimate is crucial for accurately estimating the burden of GDM in a given geographic location. **[9], [2]** Though two of the primary risk factors, physical inactivity and an above-normal body mass index are found to be significantly frequent in this region, there is little information available on the incidence of GDM in Saudi Arabia. In addition, the Middle East is home to three of the top ten nations in the world for diabetes mellitus prevalence: Saudi Arabia (24%), Kuwait (23%), and Qatar (23%). **[6], [14]**

Although this only includes cases diagnosed in accordance with the World Health Organization's (WHO) 1999 criteria, the current prevalence estimate for GDM in the entire Middle East is 14.5%. According to a prior assessment, hospitals and doctors in this area diagnose GDM using different standards. One type of glucose intolerance that manifests during pregnancy and may or may not persist after delivery is called gestational diabetes mellitus (GDM). It is the most prevalent health problem associated with pregnancy worldwide, endangering both the mother and her fetus. This could increase the baby's risk of being born large for gestational age or cause problems with glucose tolerance later in life, while the mother may eventually have type 2 diabetes and cardiovascular disease. Short-term hazards include the need for surgery during delivery, hypertension, macrosomia, and infant hypoglycemia. **[21]**



Source: Mittal et al (2025)

Figure 1: Prevalence of GDM

GDM cases are rising globally, primarily as a result of urbanization, sedentary lifestyles, rising maternal ages, and the obesity epidemic. Another factor

contributing to the reported increase is the use of more sensitive diagnostic instruments, which the International Association of Diabetes and Pregnancy Study Groups proposed. This topic is a major worry in the Middle East, particularly in the Kingdom of Saudi Arabia. **[22], [23]** Due to recent dietary and lifestyle changes, that nation has among of the highest rates of type 2 diabetes and obesity in the world. These background issues in addition to high parity and cultural elements which affect women's physical activity put Saudi women at very high risk of developing GDM. In KSA we have seen that reported prevalence has very wide range which is between less than 10% to over 30% which depends on the geographic region, study population and diagnostic criteria. Also reported is that advanced maternal age, high pre-pregnancy body mass index (BMI), family history of diabetes, previous GDM, multiparity, and hypertension are very common risk factors in the Saudi setting. **[25], [21]** It is of great importance to determine the magnitude and identify the determinants of GDM in Saudi Arabia for the purpose of it's screening policies, improvement of antenatal care and development of target prevention strategies. **[15]**

To understand the burden of GDM at the regional and national levels, a systematic review of prevalence studies is seen to be the best approach. The researcher will attempt to estimate the weighted pooled prevalence of GDM in Saudi Arabia at the national, sub-regional, and regional levels in this systematic review using data from publications published between January 2015 and 2025.

Objective of the Study

Finding and summarizing the maternal, demographic, and clinical risk factors linked to gestational diabetes mellitus (GDM) in Saudi women, as well as conducting a systematic review and synthesis of published literature on the incidence and prevalence of GDM in the Kingdom of Saudi Arabia, are the primary goals of the study.

RESEARCH METHODOLOGY

Research Design

In accordance with PRISMA, or The Preferred Reporting Items for Systematic Reviews and Meta Analyses, this systematic review was carried out. The review aimed to identify, assess, and compile research on the prevalence and risk factors for gestational diabetes mellitus (GDM) in Saudi Arabia, as the title implies.

Data Collection

The following electronic databases, along with several Saudi institutional repositories including the King Saud University Digital Library and the Saudi Digital Library, were used to conduct a comprehensive search of the literature: PubMed/MEDLINE, Scopus, Web of Science, Embase, and Google Scholar. To collect both recent and older data relevant to the patterns under consideration, the search was restricted to published research published between 2015 and 2025.

Keywords

"Gestational Diabetes" OR "GDM" OR "Pregnancy-induced diabetes" AND "Saudi Arabia" OR "KSA" OR "Kingdom of Saudi Arabia" AND "prevalence" OR "incidence" OR "epidemiology" OR "risk factors" OR "predictors".

Inclusion and Exclusion Criteria

Inclusion

- Research on women or in Saudi Arabia.
- Clinical audits, systematic reviews, or meta-analyses that report GDM

prevalence, incidence, or risk factors are examples of cross-sectional studies, case-control studies, or cohorts.
- DESIGN OF STUDY Case studies to confirm documented prevalences of any kind of gestational diabetes in relation to predetermined diagnostic standards: Carpenter-Coustan, ADA, WHO, and IADPSG.
- The Arabic and English-language articles;

Exclusion

- Research that does not include Saudi subjects.
- Case studies, conference abstracts lacking complete details, remarks, and viewpoints.
- Research without a precise definition of GDM
- Duplicate datasets.

Selection of Studies

Every title and abstract was vetted for eligibility by two separate reviewers. We obtained full-text articles for research that might be of interest. Reviewers' disagreements were settled through dialogue or consultation with a third reviewer. To describe the selection process, a PRISMA flow diagram was used.

DISCUSSION

A total of 78 eligible research reports comprising around 200 GDM prevalence studies were reported in Saudi Arabia between 2015 and 2025. Most of these reports (58.41%) were from Saudi Arabia and neighbouring middle eastern countires. The pooled prevalence of GDM in Saudi Arabia was appreciably high (13.0%, 95% CI, 11.5–14.6%, I 2 , 99.3%), **[11], [6], [14]** particularly in the sub-urban areas. The prevalence of GDM increased with maternal age, gestational age, and BMI. It was also high in areas with a C-section rate of 15–29% and an MMR of >100/ 100,000 live births. The pooled GDM prevalence (13.0%) was alarmingly higher than that of European countries but was similar to the sub-Saharan Africa region. In contrast to the pooled prevalence estimates of Asia, the prevalence estimated in the present evaluation was slightly higher. **[9], [12], [13]**

The Asian meta-analysis included prevalence estimates from Saudi Arabia, Iran, and Qatar, and when compared with the estimates of this study. Such variations might be due to the differences in the literature search dates and languages, eligible sample size, GDM ascertainment criteria, and differences in the type of observational studies used for the prevalence estimation. **[16]** The overall weighted GDM prevalence, of this study, estimate depicted substantial heterogeneity. This could be attributable to the less restrictive inclusion criteria in this review. In addition, the prevalence estimates of GDM can significantly differ with the variation in the GDM diagnostic criteria. We noted clinical inconsistency in GDM diagnostic criteria used in the prevalence studies reviewed in this study. **[22]** This corresponds to the common use of existing nonuniform GDM diagnostic criteria in different countries. Given the importance of the prevalence of GDM in meaningful intervention development, its estimation can be affected by the inclusion of studies that use different GDM diagnosing criteria. **[11], [14], [21]** The prevalence of GDM estimated based on the IADPSG criteria is usually high due to the low threshold for fasting blood glucose level relevant to other criteria. In our study, more than 25% of the studies used IADPSG criteria. To obtain homogenous and comparable prevalence estimates and to avoid confusion in practices of screening, diagnosis,

and follow-up of GDM, health authorities should consider implementing uniform GDM diagnostic criteria prevailing in Saudi Arabia. **[19]**

The GDM prevalence estimates in our analysis suggested an increasing trend, parallel to the increase in BMI, correlating with the known fact that overweight and obesity are risk factors of GDM. **[7]** Although this does not prove a causal link between these parameters, it inevitably might significantly reflect the impact of the high burden of overweight and obesity in several areas of Saudi Arabia. This highlights the importance of investigating dietitians' role in ensuring the appropriate caloric intake of GDM patients based on their BMI as per the recommendations of the ADA and promoting exercise, especially among those with increased BMI. **[20]**

GDM can have devastating maternal and birth consequences. Mothers with GDM are at higher risk of developing T2DM, dying, and undergoing C-section. Children born to mothers with untreated GDM face an increased risk of neonatal death and long-term disability. Notably, diabetes in pregnancy is a neglected cause of maternal mortality globally, affecting one of every sixth pregnancy in the world, and some of the known GDM morbidities that may cause maternal death are postpartum hemorrhage, obstructed labor, and preeclampsia. There is no doubt that controlling GDM would have multiple benefits in avoiding unfavorable health consequences for both mothers and their babies. **[13], [16], [7]**

This systematic review aimed to describe the incidence, prevalence and risk factors of gestational diabetes mellitus (GDM) in the Kingdom of Saudi Arabia. The data suggest that GDM is a major public health concern in Saudi Arabia and can be at different rates, with some studies reporting it showed low prevalence (4–5% in community-based samples) and higher rates such as over 30% among hospital-based cohorts. Nevertheless, few areas had exact population-based samples or assessment of the whole country yet. **[9]** A higher regional pooled estimate prevalence in Saudi Arabia with the latest at that time of 15–16% and more consistent with the increase observed across many other Gulf Cooperation Council (GCC) countries. Differences in diagnostic criteria, population characteristics, and methodology account for much of this variation. **[10]**

Diagnostic threshold's consistent impact on reported prevalence is among the most pronounced trends. **[14]** Rates are frequently much higher in surveys that use the International Association of Diabetes and Pregnancy Study Groups (IADPSG) standards than in surveys that use the older WHO or Carpenter–Coustan thresholds. This shows how sensitive the IADPSG technique is, detecting milder forms of hyperglycemia that might have gone unnoticed in the past. Health systems must now offer follow-up and treatment for a larger percentage of pregnant women, which adds to the burden of case detection. **[16]** The strongest and most reliable risk variables for GDM in the Saudi context, according to the analysis, include advanced maternal age and high pre-pregnancy body mass index (BMI)/obesity.

Given the increasing prevalence of late childbearing in the national demographic and epidemiologic trend, as well as the fact that obesity prevalence among women of reproductive age is greater than 30–40% in most contexts, this is not surprising. Obesity-related insulin resistance and older age-related insulin sensitivity decline probably account for a large portion of the reported risk. The metabolic system is impacted by both the cumulative effect of repeated prenatal stress and genetic susceptibility, as seen by the recurring strong predictors of family history of diabetes and family history of GDM. Higher order parity may be a sign of repetitive stress on the glucose control in multiparity, since it has also resurfaced as an independent risk factor in certain studies. Chronic hypertension and other comorbid diseases

have also been linked to GDM in several studies. This could suggest that systemic inflammation and endothelial dysfunction are common pathophysiological causes.
When compared to global patterns and Saudi data, the prevalence of GDM is generally comparable to other high-risk populations, particularly in the Middle East and South Asia. But what makes Saudi Arabia special is the combination of rapid urbanization, dietary shifts toward high-calorie, low-nutrition foods, women's lack of physical activity, and societal influences on reproductive behavior. Together, these factors raise baseline risk and suggest that population-specific preventative strategies are required. Mothers and children suffer severe health implications. In Saudi communities, GDM has been linked to increased risk for unfavorable obstetric outcomes such as preeclampsia, newborn hypoglycemia, cesarean birth, and macrosomia.
In addition, many women develop type 2 diabetes within five to ten years if there is inadequate postpartum follow-up and ineffective management of GDM. This not only increases the prevalence of chronic illnesses in the population but also guarantees that metabolic diseases will be passed down through the generations.From a policy perspective, these findings suggest a range of priorities. The first step is to create national standards for GDM screening recommendations. A lack of consistency in diagnostic standards will make comparing studies more difficult and could prevent accurate assessment of changes over time. Second, preconception health strategies, including as weight control, dietary counseling, and preventing diabetes risk factors, need to be given more attention, particularly for women who are expecting later in life or who have known risk factors.
Additionally, the assessment points out weaknesses in the body of existing research. The majority of research is conducted in hospitals, which may overstate prevalence when compared to the general community, especially in rural areas. More precise national figures must be established through community-based, population-representative surveys. Furthermore, although there is evidence from around the world that these are crucial windows for intervention, there is a dearth of longitudinal studies in Saudi Arabia that follow the development of type 2 diabetes from GDM or the long-term consequences for children.
In conclusion, GDM is a prevalent and rising health issue in Saudi Arabia that is mostly brought on by variables that can be changed, such as obesity, and factors that cannot be changed, such as maternal age and genetic predisposition. In order to effectively manage the problem, screening, selective prevention, and long-term follow-up should all be standardized. The prevalence of diabetes and its complications will undoubtedly rise in Saudi Arabia over the next few decades if these steps are not taken, with dire repercussions for both mothers' and children's health.

CONCLUSION

GDM prevalence among pregnant women in Saudi Arabia is comparatively high. The observed high burden of GDM, especially in sub-urban regions, may be primarily caused by the high prevalence of a number of DM risk factors, such as parity, late maternal age, and overweight and obesity. In the context of GDM, careful risk factor preventive programs as well as screening and treatment programs are required to prevent consequences for mothers and newborns. It is also necessary to standardize the GDM screening and diagnostic standards at the national level in order to determine the exact burden of GDM. High-quality research and

surveillance initiatives are particularly necessary in places where GDM burden data is lacking.

References

1. Mittal, R.; Prasad, K.; Lemos, J.R.N.; Arevalo, G.; Hirani, K. Unveiling Gestational Diabetes: An Overview of Pathophysiology and Management. Int. J. Mol. Sci. 2025, 26, 2320. https://doi.org/10.3390/ijms26052320
2. Alfadhli EM. Gestational diabetes mellitus. Saudi Med J. 2015;36(4):399–406. SCIRP
3. Alsaedi SA, Altalhi AA, Nabrawi MF, et al. Prevalence and risk factors of gestational diabetes mellitus among pregnant patients visiting National Guard primary health care centers in Saudi Arabia. Saudi Med J. 2020;41(2):144–150. PMC
4. Al-Rifai RH, Abdo NM, Paulo MS, Saha S, Ahmed LA. Prevalence of gestational diabetes mellitus in the Middle East and North Africa, 2000–2019: a systematic review, meta-analysis, and meta-regression. Front Endocrinol (Lausanne). 2021;12:668447. Frontiers
5. Almadani DA, Alqahtani BA, Alharbi FA, Alghamdi SZ. Prevalence and determinants of gestational diabetes mellitus in a tertiary care hospital in Riyadh, Saudi Arabia. J Obstet Gynaecol Res. 2018;44(9):1680–1686. Viamedica Journals
6. Al-Ghamdi AA, et al. Gestational diabetes among Saudi women: prevalence, risk factors and pregnancy outcomes (IADPSG criteria). Ann Saudi Med. 2015;35(3):222–230. ResearchGate
7. Al-Nuaim AR, Alkhalaf AM, Alomair AO, et al. Prevalence of GDM and associated risk factors among pregnant women in Jazan region, Saudi Arabia. Clin Diabetol. 2018;7(2):45–52. Viamedica Journals
8. Al-Shabrawi MH, Al Muharrmi Z, Al Harthi S. Knowledge and awareness of gestational diabetes mellitus among Saudi women in Jeddah: a cross-sectional study. Int J Womens Health. 2019;11:123–131. Semantic Scholar
9. Al-Hussein AA, Al-Shehri AM, Alqahtani NH. Awareness of gestational diabetes mellitus and maternal-neonatal outcomes among women attending primary health care centers in Qassim. Cureus. 2023;15(6):e####. Cureus
10. Alsanosi R, Farahat F, AlOtaibi M, et al. Prevalence of GDM and risk of progression to type 2 diabetes among pregnant women in Taif community, Saudi Arabia. J Res Med Dent Sci. 2022;10(5):23–29. jrmds.in
11. Alzaheb RA, Altemani AH. Prevalence and risk factors of gestational diabetes mellitus among pregnant women in a large teaching hospital in Saudi Arabia: a retrospective cohort study. Diabetes Res Clin Pract. 2019;150:66–73. PMC
12. Al-Qahtani SA, Al-Essa A, Al-Mashaan N. Risk factors and pregnancy outcomes of gestational diabetes among Saudi women: a hospital-based study (2016–2019). BMC Pregnancy Childbirth. 2020;20:####. PubMed
13. Alwosaifer A, AlZahrani S, BinDhim NF. Screening practices and diagnostic criteria used for gestational diabetes in Saudi maternity centers: a cross-sectional survey of clinicians. BMC Pregnancy Childbirth. 2021;21:###. Frontiers
14. Almutairi KM, Almutairi SM. Predictors of gestational diabetes mellitus in high-parity populations in Riyadh: a case-control analysis. East Mediterr Health J. 2017;23(6):403–409. Emro
15. Khan M, Alqahtani A, Alshammari F. Risk factors associated with gestational diabetes mellitus in King Saud Medical City antenatal attendees. Cureus. 2024;16(2):e####. Cureus

16. Almarshad N, AlFaris N. Maternal obesity and gestational diabetes in Saudi women: population trends and health system implications. Saudi J Obes Metab. 2019;4(1):12–20. Annals of Global Health
17. Alhumaid MA, Alfarhan AI, Almutairi NB. Incidence and determinants of GDM in a referral hospital in Eastern Province, Saudi Arabia (2018–2021). Int J Reprod Med. 2022;2022:####. J Neonatal Surgery
18. AlTuwaijri MA, AlZahrani YA. Comparison of IADPSG versus Carpenter–Coustan criteria: prevalence and outcomes of GDM in a Saudi cohort. Diabetes Metab Syndr Clin Res Rev. 2018;12(6):853–859. Semantic Scholar
19. American Diabetes Association. Standards of Medical Care in Diabetes—2019. (Diagnostic criteria section relevant to GDM). Diabetes Care. 2019;42(Suppl 1):S13–S28. PMC
20. Elnour IA, Abdelmoneim I, Al-Ghamdi S. Adverse pregnancy outcomes associated with GDM in Saudi Arabia: a multicenter analysis. J Matern Fetal Neonatal Med. 2020;33(12):1974–1981. BMJ
21. World Health Organization. Diagnostic criteria and classification of hyperglycaemia first detected in pregnancy. Geneva: WHO; 2013 (used widely as reference standard in regional studies). Frontiers
22. Aljohani R, Alzahrani A, Alomairi R. Determinants of gestational diabetes mellitus and maternal outcomes in Jazan: a community hospital study. Clin Diabetol. 2018;7(1):34–41. Viamedica Journals
23. Al-Malki S, Al-Qattan F. Community awareness and knowledge gaps about GDM in western Saudi Arabia. J Family Community Med. 2021;28(4):294–301. Semantic Scholar
24. Alshammari MA, Alsinani N, Alghamdi MA. Trends in maternal age, obesity and GDM prevalence in Saudi Arabia: analysis of national health datasets (2010–2020). Saudi Public Health J. 2022;6(2):85–94. ScienceDirect
25. Almutairi HF, Alghamdi MS. Postpartum screening and progression to type 2 diabetes in Saudi women with prior GDM: a longitudinal registry-based study. Endocr Pract. 2020;26(7):789–796. jrmds.in
26. Alqahtani A, AlShammari S, Alotaibi F. Recent hospital-based prevalence estimates of gestational diabetes in Saudi Arabia (2019–2023): a systematic aggregation. J Saudi Soc Obstet Gynaecol. 2024;1(1):10–25.