INPLASY

# Transitioning from Gestational Diabetes to Type 2 Diabetes across African Contexts: A Systematic Review of Incidence, Risks and Protective Factors, and Health System Opportunities.

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## ADMINISTRATIVE INFORMATION

**Support -** None.

**Review Stage at time of this submission -** The review has not yet started.

**Conflicts of interest -** None declared.

**INPLASY registration number:** INPLASY202650023

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 5 May 2026 and was last updated on 5 May 2026.

## INTRODUCTION

**Review question / Objective** • Estimate the incidence of type 2 diabetes following gestational diabetes mellitus across Africa; and

• Examine how demographic, social, and health system factors are associated with variation in risk and protection across post gestational diabetes trajectories.

**Rationale** There is a growing recognition of the global impact of Diabetes mellitus on mortality and morbidity (Diabetes Atlas, 2025). Low- and middle-income countries carry a disproportionate diabetes burden, with impacts that extend beyond financial costs to social and systemic challenges (Mapa-Tassou et al.,2019; Mercer et al., 2019). This burden is compounded by colonial and post-colonial legacies which left fragile health infrastructures, limited investment in prevention, and persistent inequities in access to care (Atun et al., 2017; World Health Organization, 2023; International Diabetes Federation, 2024).

It is also noteworthy that Africa has a high proportion of adults living with undiagnosed diabetes (approximately 73% of adults), indicating substantial potential for improved early detection and surveillance (IDF Diabetes Atlas, 2024). Strengthening diabetes prevention remains one of the most effective strategies to reducing population-level health and economic impacts in low- and middle-income countries, particularly across Africa, where health systems are responding to a rapidly evolving burden of non-communicable diseases (International Diabetes Federation, 2023; Chikwati et al.,2025).

Gestational diabetes mellitus represents a critical window of opportunity for preventing type 2 diabetes (Bellamy, Casas, Hingorani, & Williams, 2009). Gestational Diabetes Mellitus is glucose intolerance first identified during pregnancy (typically 24–28 weeks, earlier in high risk women), resolving at delivery, with postpartum testing at 4–12 weeks to confirm resolution or reclassify persistent hyperglycemia beyond 12 weeks as type

2 diabetes mellitus. It is the most prevalent metabolic syndrome during pregnancy with an estimate prevalence in Africa of 14% (Baliutavičienė et al.2012). Women with previous gestational diabetes are predisposed in some instances to developing diabetes later. Many African countries have witnessed high fertility rates and previous studies suggest that the number of pregnancies is an independent risk factor for gestational diabetes (Mwanri et al 2015 ; Muche et al.,2019 ; Dai et al.,2025).

However, evidence on trajectories from gestational diabetes to type 2 diabetes across African contexts remains limited, constraining current estimates of incidence and the range of contributing factors that have been examined (Chivese, Norris, & Levitt, 2019). In addition, continuity of postnatal care (particularly for maternal health follow up and diabetes prevention) varies substantially, reflecting ongoing challenges in service access, integration, and long term engagement that may reduce the effectiveness of preventive strategies (Mwanri, Alhazmi, & Alshammari, 2022; Ohene-Agyei, Iqbal, Harding, Crowther, & Lin, 2024).

Several systematic reviews of studies on the progression from gestational diabetes mellitus to type 2 diabetes mellitus have been conducted globally (Ballena-Caicedo et al.,2026) but the limited inclusion of African studies in these systematic reviews raises important concerns about the generalisability of pooled estimates to countries in Africa, where political, sociocultural, genetic, and health system factors may influence both the incidence and progression from gestational diabetes mellitus to type 2 diabetes mellitus.

This study aims to estimate the incidence of progression from gestational diabetes mellitus to type 2 diabetes mellitus in Africa, and to examine how factors that confer risk or protection interact with this progression, with the ultimate goal of identifying opportunities to reduce transition from gestational diabetes mellitus to type 2 diabetes mellitus.

**Condition being studied** Subsequent type 2 diabetes mellitus among women with prior gestational diabetes mellitus.

## METHODS

**Search strategy** The search strategy is structured around five core conceptual domains:
(1) Gestational diabetes mellitus;
(2) Subsequent type 2 diabetes or post-gestational diabetes outcomes;
(3) Transition or disease progression,
(4) Incidence
(5) African contexts.

Databases: PubMed, Web of Sciences, Global Health, SCOPUS, and Africa-Wide Information. In case of need, grey literature and national or regional reports will be sought.

**Participant or population** Women with type 2 diabetes mellitus after a prior gestational diabetes in Africa.

**Intervention** Not applicable.

**Comparator** No comparator.

**Study designs to be included** As it is planned to estimate the incidence of type 2 diabetes mellitus following gestational diabetes mellitus, longitudinal cohort studies will be considered. For determining risk and protective factors, the following study designs will be considered: randomised controlled trials, quasi-experimental trials, case-control. In the absence of sufficient studies to estimate incidence, cross-sectional studies will be considered for estimating prevalence.

**Eligibility criteria** Eligible studies will be those reporting on the progression from gestational diabetes to type 2 diabetes.

**Information sources** The search will be conducted in six databases: PubMed, Web of Sciences, Global Health, SCOPUS, and Africa-Wide Information. In addition, the reference lists of the selected articles will be reviewed for any other eligible articles.

**Main outcome(s)** 1. Incidence of type 2 diabetes following gestational
diabetes Estimates of the incidence of type 2 diabetes after gestational diabetes across Africa, including pooled estimates where feasible, to characterise the scale and variability of observed outcomes.
2. Risk and protective
factors Reported risk and protective factors associated with type 2 diabetes following gestational diabetes, as identified in the included studies.
3. Evidence of inequities in post-gestational diabetes risk and
protection Evidence of systematic differences in exposure to risk and protective factors for type 2 diabetes following gestational diabetes and how

this is shaped by individual, socio-structural and health-systemfactors.

**Additional outcome(s)** Not applicable.

**Data management** The data from eligible studies will be captured using a Microsoft Excel file.

**Quality assessment / Risk of bias analysis** The methodological quality of the selected studies will be assessed by three reviewers using the Joanna Briggs Institute Critical Appraisal Tools (Hilton, 2024) and any differences of opinion between the two reviewers will be resolved by consensus.

**Strategy of data synthesis** Where available, incidence rates per person years will be extracted and analyzed to account for varying follow up durations. For cohorts reporting multiple follow up points, we will either select one timepoint per prespecified window or apply statistical methods that account for repeated measures, thereby avoiding double counting.
A meta analysis will be performed if studies are sufficiently homogeneous, using a random effects model with appropriate transformations of proportions to estimate the incidence of progression from gestational diabetes to type 2 diabetes mellitus and its risk factors. Measures of association (odds ratios, relative risks, hazard ratios) with 95% confidence intervals will be reported.
Statistical heterogeneity will be assessed using the $I^2$ statistic (25%, 50%, and 75% representing low, moderate, and high heterogeneity, respectively) and Cochran's Q test. Forest plots will be used to display individual study results and pooled estimates. Subgroup analyses will explore heterogeneity by African region (Northern, Eastern, Western, Central, Southern), study type (case control, cohort, cross sectional, quasi experimental, randomized controlled trial), time of occurrence of type 2 diabetes mellitus (postpartum diabetes mellitus; chronic type 2 diabetes mellitus), and, where possible, equity related and health system factors outlined in Table 2.

**Subgroup analysis** Subgroup analyses will explore heterogeneity by African region (Northern, Eastern, Western, Central, Southern), study type (case control, cohort, cross sectional, quasi experimental, randomized controlled trial), time of occurrence of type 2 diabetes mellitus (postpartum diabetes mellitus; chronic type 2 diabetes mellitus), and, where possible, equity related and health system factors.

**Sensitivity analysis** Sensitivity analyses will be conducted, including exclusion of studies judged to be at high risk of bias and comparison of random effects versus fixed effects models.

**Language restriction** None.

**Country(ies) involved** Congo.

**Other relevant information** None.

**Keywords** Gestational diabetes mellitus; Subsequent type 2 diabetes; Disease progression; Incidence; Africa.

**Dissemination plans** We will disseminate findings through publication in a peer reviewed journal and presentations at relevant scientific conferences. To reach policymakers and health system stakeholders, we will prepare a summary report highlighting implications for screening and follow up of gestational diabetes. Results will also be shared via institutional websites, open access repositories, and professional networks. Where appropriate, lay summaries or infographics will be developed for patient advocacy groups and the wider public to enhance accessibility and awareness.

**Contributions of each author**

Author 1 - Jean-Pierre FINA LUBAKI - Conception, design, writing of the first draft of the protocol; data search, assessment of quality and synthesis.
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Author 2 - Kenneth Yakubu - Substantial contribution in the revision of the protocol; data search, assessment of quality and synthesisdata collection; data analysis.
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