AHMAR METASTASIS HEALTH JOURNAL
Available online at: http://journal.ahmareduc.or.id/index.php/AMHJ
Vol. 5. No. 3. December 2025, Page 147-155
P-ISSN: 2797-6483 E-ISSN: 2797-4952

Preventive and Therapeutic Strategies for Gestational Diabetes: A Literature Review

Yohana Putri Apryanti[1], Siti Choirul Dwi Astuti[2*]

[1] Department of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Kalimantan Timur, Samarinda, East Kalimantan, Indonesia
[2] Department of Midwifery, Politeknik Kesehatan Kementerian Kesehatan Gorontalo, Gorontalo City, Gorontalo Province, Indonesia

ARTICLE INFO

***Article Type*:**
Literature Review

Article History:
Received: 1 October 2025
Accepted: 13 November 2025
Published: 8 December 2025

Corresponding author
Email: *sitichoirul13@yahoo.co.id*

ORIGINAL ARTICLE

ABSTRACT
Gestational diabetes is a glucose intolerance disorder that arises during pregnancy and is one of the most common obstetric complications globally. Its increasing prevalence is closely linked to high rates of obesity, unhealthy dietary patterns, physical inactivity, and advanced maternal age, particularly in developing countries like Indonesia, which still face limitations in screening and maternal healthcare services. This condition has both short-term and long-term impacts, including an increased risk of type 2 diabetes in both mothers and their children. This article presents a systematic literature review of preventive and therapeutic strategies for managing gestational diabetes, evaluating their effectiveness and potential for implementation. The method employed is a qualitative descriptive literature review, based on scientific articles from the past decade, obtained from databases such as PubMed, Scopus, and Garuda. The review findings indicate that the most effective preventive strategy is lifestyle modification, such as adopting a healthy diet and engaging in light physical activity, especially when implemented early in pregnancy or even before conception, which can reduce the risk of gestational diabetes by up to 25%. Therapeutic strategies include medical nutrition therapy, the use of insulin or metformin, self-monitoring of blood glucose, as well as education and psychosocial support. The use of digital technologies, including mobile applications and telehealth services, has also been shown to improve patient adherence and engagement. A holistic approach that integrates both preventive and therapeutic efforts continuously is considered the most effective in reducing complications and long-term risks. However, challenges such as limited access to healthcare services, low health literacy, and a shortage of trained healthcare personnel remain obstacles in Indonesia. Therefore, cross-sector collaboration among healthcare professionals, families, and policymakers is crucial to optimize the contextual and sustainable management of gestational diabetes.

Keywords: Gestational Diabetes, Prevention, Therapy, Pregnancy.

ABSTRAK
Diabetes gestasional merupakan gangguan intoleransi glukosa yang muncul selama kehamilan dan menjadi salah satu komplikasi obstetri paling umum secara global. Peningkatan prevalensinya berkaitan erat dengan tingginya angka obesitas, pola makan tidak sehat, kurangnya aktivitas fisik, serta usia kehamilan yang semakin tua, terutama di negara berkembang seperti Indonesia yang masih menghadapi keterbatasan dalam skrining dan layanan kesehatan maternal. Kondisi ini berdampak jangka pendek maupun panjang, termasuk peningkatan risiko diabetes tipe 2 pada ibu dan anak. Artikel ini menyajikan tinjauan pustaka sistematis mengenai strategi preventif dan terapeutik dalam penanganan diabetes gestasional, serta mengevaluasi efektivitas dan potensi implementasinya. Metode yang digunakan adalah studi literatur review dengan pendekatan deskriptif kualitatif, berdasarkan artikel ilmiah dari 10 tahun terakhir yang diperoleh melalui database PubMed, Scopus, dan Garuda. Hasil kajian menunjukkan bahwa strategi preventif paling efektif adalah modifikasi gaya hidup seperti diet sehat dan olahraga ringan, terutama jika diterapkan sejak awal kehamilan atau sebelum konsepsi, yang mampu menurunkan risiko diabetes gestasional hingga 25%. Strategi terapeutik meliputi terapi nutrisi medis, penggunaan insulin atau metformin, pemantauan glukosa mandiri, serta edukasi dan dukungan psikososial. Pemanfaatan teknologi digital seperti aplikasi mobile dan layanan telehealth juga terbukti meningkatkan kepatuhan dan keterlibatan pasien. Pendekatan holistik yang mengintegrasikan upaya preventif dan terapeutik secara berkelanjutan dinilai paling efektif dalam mengurangi komplikasi serta risiko jangka panjang. Namun, tantangan seperti keterbatasan akses layanan, rendahnya literasi kesehatan, dan kurangnya tenaga terlatih masih menjadi hambatan di Indonesia. Oleh karena itu, kolaborasi lintas sektor antara tenaga medis, keluarga, dan pemangku kebijakan sangat penting untuk mengoptimalkan penanganan diabetes gestasional secara kontekstual dan berkelanjutan.

Kata Kunci: Diabetes Gestasional, Pencegahan, Terapi, Kehamilan.

INTRODUCTION

Gestational diabetes mellitus (GDM) is a glucose intolerance disorder first identified during pregnancy and is one of the most common obstetric complications worldwide (Milluzzo et al., 2024). According to the World Health Organization (WHO), the global prevalence of GDM reaches approximately 14% of all pregnancies, with variations ranging from 1–28% depending on the population and the diagnostic methods used (Aoyama et al., 2023). This number continues to rise alongside increasing rates of obesity, high-sugar dietary patterns, low physical activity, and the increasing maternal age at pregnancy (Wong et al., 2024). In Indonesia, the prevalence of GDM is estimated to be around 8–12% based on data from the Ministry of Health and multicenter studies across several provinces, confirming that this issue has also become a significant national challenge (Kukkonen et al., 2024).

The impact of GDM extends beyond pregnancy and childbirth, carrying long-term consequences for both mothers and their children (Deitch et al., 2024). Mothers with a history of GDM face a 7–10 times higher risk of developing type 2 diabetes later in life. In contrast, infants born to mothers with GDM are at risk of macrosomia, neonatal hypoglycemia, and metabolic disorders in adulthood (Buschmann et al., 2024). Given these wide-ranging impacts, the management of GDM requires a comprehensive approach not only during pregnancy but also before and after it, in order to reduce the risk of long-term complications (Wang et al., 2024).

Various strategies have been developed to prevent and manage GDM, including lifestyle interventions (diet modification and physical activity), pharmacological therapy (such as insulin or metformin), health education, and digital technology-based approaches (Nakshine & Jogdand, 2023). Preventive approaches have gained increasing attention, with a focus on reducing the incidence of GDM before it occurs (Sukawana et al., 2016). However, the effectiveness of these strategies is strongly influenced by individual, social, economic, and cultural factors, meaning that a single approach may not be suitable for all contexts, particularly in developing countries such as Indonesia and those in Southeast Asia (Haque et al., 2024).

Several previous studies have reviewed specific aspects of GDM; however, many remain fragmented, focusing on a single dimension, such as pharmacotherapy or lifestyle modification (Sperling et al., 2023). To date, no study has comprehensively integrated preventive and therapeutic strategies using digital technology into a single unified framework, particularly within maternal health services in developing countries (Mayne et al., 2023). This knowledge gap indicates the need for a more holistic synthesis to understand how these various approaches can complement one another and be effectively applied in real-world settings (Guglielmini et al., 2024).

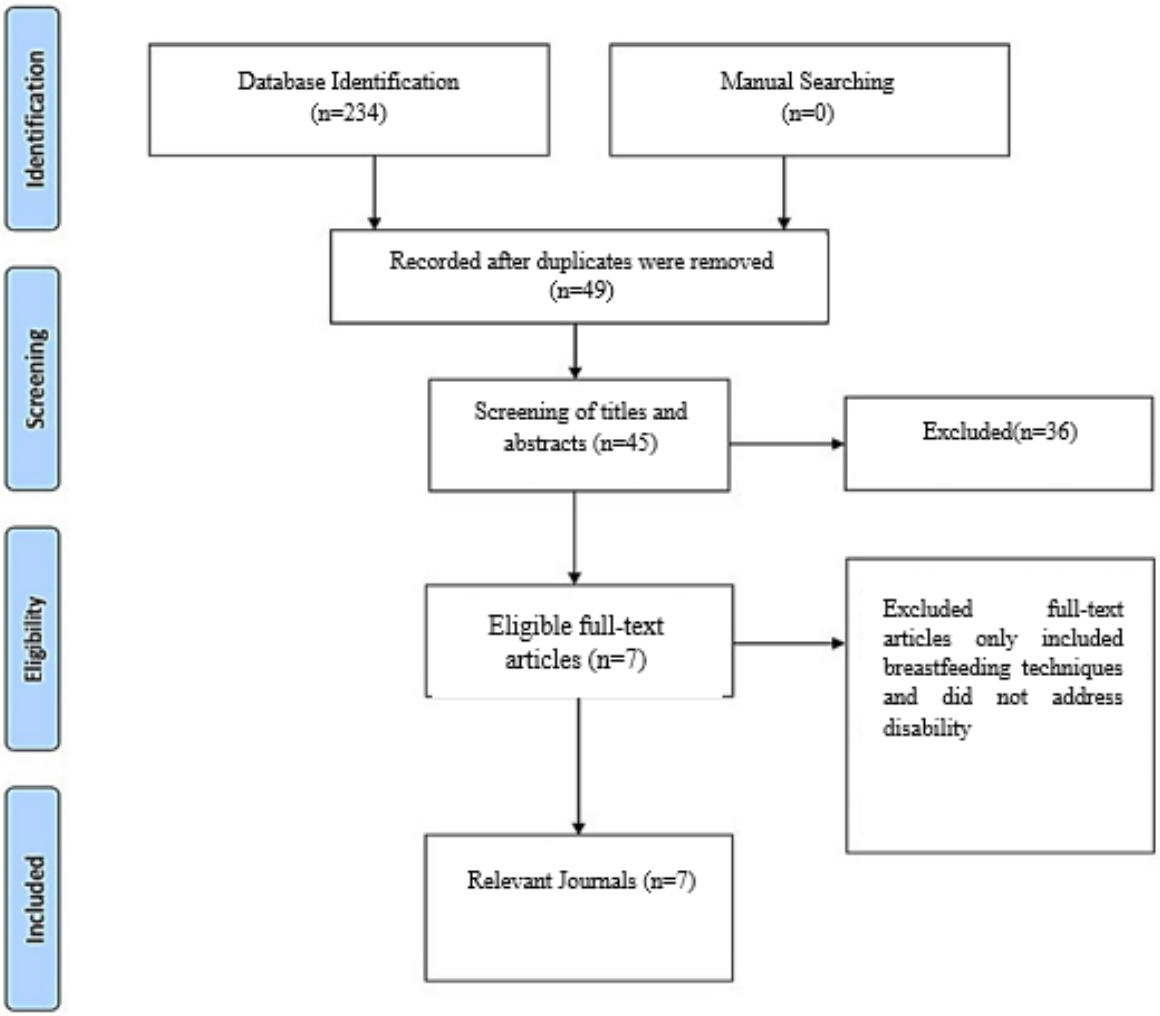
Based on these considerations, this article presents a narrative literature review of publications from 2019 to 2024, aiming to identify trends, innovations, and the effectiveness of various preventive and therapeutic strategies in the management of GDM (Yu et al., 2024). The primary focus of this review is to evaluate the latest scientific evidence regarding interventions that successfully reduce the risk and control GDM, as well as to examine the potential application of digital technologies and community-based approaches in improving maternal health services in Indonesia and other developing countries (Liu et al., 2024). The proposed holistic approach is expected to provide a more comprehensive and applicable understanding of GDM management, serve as a foundation for evidence-based maternal health policymaking, and encourage the development of intervention programs that are adaptive to local contexts and the needs of pregnant women across regions (Siddiqui & McAdams, 2024).

RESEARCH METHODS

The research design employed in this article is a systematic literature review aimed at identifying, evaluating, and analyzing various preventive and therapeutic strategies implemented in the management of gestational diabetes. This study employs a qualitative descriptive approach to summarize the main findings from various relevant and reputable scientific sources. Data collection was conducted through a systematic search of scientific articles published in international and national electronic databases, including PubMed, ScienceDirect, Scopus, Google Scholar, the Cochrane Library, and Garuda (Garba Rujukan Digital).

The inclusion criteria for the literature search consisted of original research articles (randomized controlled trials, observational studies, meta-analyses, and systematic reviews); articles discussing preventive and/or therapeutic strategies for gestational diabetes; publications from the past 10 years (2014–2024); written in English or Indonesian; and available in full-text format. The exclusion criteria included articles with incomplete data, studies that focused solely on type 1 or type 2 diabetes without addressing gestational diabetes, as well as letters to the editor, editorials, or commentaries that lacked primary data. The search strategy used combinations of keywords and Boolean operators such as *(gestational diabetes OR diabetes gestational) AND (prevention OR preventive strategy) AND (therapy OR treatment OR management)*.

The data analysis method was conducted qualitatively and descriptively, using the following steps: study selection – Articles obtained from the initial search were screened based on titles and abstracts, followed by a full-text review to ensure they met the inclusion criteria. Important information from each study, including study objectives, research design, sample size, type of intervention, primary outcomes, and conclusions, was recorded. Synthesis of findings – The collected data were classified into two main categories: *preventive strategies for gestational diabetes* and *therapeutic strategies for gestational diabetes*. Thematic analysis was then conducted to identify common patterns, practical approaches, and recent innovations in the management of gestational diabetes. Critical evaluation – The methodological quality of each article was briefly assessed to consider the validity of the findings, using simple criteria such as study design, sample size, and bias control. The results of this analysis were compiled to provide a comprehensive overview of the most promising interventions that can be implemented in clinical practice and public health settings, particularly in developing countries such as Indonesia.



RESULTS

Table 1. Strategi Preventif dan Terapeutik Diabetes Gestasional.

Title	Author	Year	Method	Sampel	Strategy	Finding
Preventive Strategies for Gestational Diabetes Mellitus: A Review (Balducci, Stefano, Sacchetti, Massimo, Haxhi, Jonida, Orlando, Giorgio, D'Errico, Valeria, Fallucca, Sara, Menini, Stefano, Pugliese, 2014)	Balducci et al.	2014	Literature Review	Pregnant women	Lifestyle modification (diet & physical activity)	Lifestyle interventions can significantly reduce the risk of gestational diabetes when initiated in the first trimester.
Role of Medical Nutrition Therapy in the Management of Gestational Diabetes Mellitus (Moreno-Castilla et al., 2016)	Moreno Castilla. et al.	2016	Review Article	Women with gestational diabetes	Medical Nutrition Therapy (MNT)	MNT is effective in controlling blood glucose, reducing insulin requirements, and supporting positive pregnancy outcomes.
Effectiveness of Lifestyle Interventions in Preventing Gestational Diabetes: Systematic Review and Meta-analysis (Tsironikos et al., 2023)	Tsironikos et al.	2023	Systematic Review & Meta-analysis	Pregnant women without diabetes	Diet, exercise, education	Lifestyle interventions reduce the incidence of gestational diabetes by 18–25%, especially when implemented early in pregnancy.
Early Screening and Risk Stratification for Gestational Diabetes: Clinical Implications	McLaren, et al.	2022	Observational study	Pregnant women in the first trimester	Early screening and risk stratification	Early screening enables earlier detection of gestational diabetes and prevents complications

(McLaren et al., 2022)						through timely interventions.
The Impact of Exercise during Pregnancy on Maternal and Offspring Outcomes in Gestational Diabetes Mellitus (Chen et al., 2025)	Chen. et al.	2025	Systematic Review	Pregnant women	Light to moderate exercise	Regular physical activity before and during pregnancy reduces the risk of gestational diabetes without significant side effects.

DISCUSSION

Gestational diabetes mellitus (GDM) is one of the pregnancy complications whose prevalence continues to rise globally, including in Indonesia (Usman et al., 2023). This condition not only affects maternal and fetal health during pregnancy but also increases the long-term risk of developing type 2 diabetes in both the mother and child. Therefore, a comprehensive understanding of preventive and therapeutic strategies is essential to reduce the morbidity burden associated with GDM (Yao et al., 2024). The literature indicates that GDM prevention strategies encompass a multidimensional approach involving lifestyle interventions, early screening, education, and the use of digital technology (Siddiqui & McAdams, 2024). Most studies agree that lifestyle modification, particularly a healthy diet and regular physical activity, is the most consistent and effective intervention for reducing the risk of GDM (Olga et al., 2023).

However, findings across studies show variability in effectiveness. For example, some reports indicate that lifestyle interventions significantly reduce the risk of GDM when implemented during the first trimester, while others found no meaningful effect when initiated in the second trimester. These differences suggest that timing is a key factor, as maternal metabolic changes begin early in pregnancy, making earlier preventive efforts more effective (Suastika et al., 2024).

These findings are consistent with meta-analyses showing that lifestyle interventions can reduce GDM incidence by 18–25%, especially among women with high-risk factors such as obesity, family history of diabetes, or advanced maternal age (Olga et al., 2023). Variability in outcomes across studies suggests that adherence, social support, and sustained education play crucial roles in determining the success of interventions (Thomas et al., 2024). This highlights the significance of family and community support in promoting healthy behaviors during pregnancy (Suastika et al., 2024). From a nutritional standpoint, foods with a low glycemic index and increased fiber intake have been shown to reduce insulin resistance (Liu et al., 2024). However, the effectiveness of dietary interventions relies heavily on local dietary habits and the mother's ability to apply these recommendations in daily life (Phelan et al., 2023). These findings highlight the need to tailor interventions to Indonesia’s cultural and social context, where diets high in simple carbohydrates remain common (Milluzzo et al., 2024).

Meanwhile, studies on micronutrient supplementation, including vitamin D, myo-inositol, and omega-3 fatty acids, have yielded inconsistent results (Aoyama et al., 2023). Some report improvements in glucose metabolism, while others note no significant effects (Wong et al., 2024; Phaloprakarn & Suthasmalee, 2023). Differences in findings may be due to variations in dosage, duration of supplementation, and baseline nutritional status (Kukkonen et al., 2024). Thus, further research is needed to determine optimal dosage and target populations that would benefit most from such supplementation (Deitch et al., 2024).

In the Indonesian context, preventive efforts still face implementation challenges. A study in Surabaya reported that only 35% of pregnant women underwent GDM screening according to national guidelines, indicating low awareness and adherence to antenatal care programs (Buschmann et al., 2024). This highlights the importance of health education and the involvement

of primary healthcare providers in early detection and promotion of healthy lifestyles before and during pregnancy (Wang et al., 2024). Once GDM is diagnosed, therapy focuses on glycemic control to prevent maternal and neonatal complications (Phelan et al., 2023). The first recommended approach is medical nutrition therapy (MNT), followed by pharmacological interventions if glycemic targets are not achieved (Nakshine & Jogdand, 2023). MNT plays a crucial role in lowering blood glucose levels, enhancing metabolic profiles, and reducing the need for insulin (Sukawana et al., 2016). Studies report that 70–85% of GDM patients achieve adequate glycemic control through structured dietary management alone. Recommended dietary patterns include three main meals and two to three small snacks with balanced proportions of complex carbohydrates and protein (Haque et al., 2024).

If glycemic control is not achieved after 1–2 weeks of MNT, insulin becomes the therapy of choice because it does not cross the placenta and is proven safe for the fetus (Haque et al., 2024). Alternatives, such as metformin and glyburide, may be used under specific conditions; however, research findings differ regarding their long-term safety and effectiveness. (Sperling et al., 2023). Some studies show that metformin reduces fasting glucose more quickly, whereas glyburide is associated with a higher risk of neonatal hypoglycemia (Mayne et al., 2023). This suggests a need for individualized therapy based on risk profiles and patient preferences (Guglielmini et al., 2024).

Beyond medical interventions, psychosocial support and continuous education have been shown to improve treatment adherence (Yu et al., 2024). Studies indicate that family- and community-based interventions enhance glycemic control compared to individual education alone. This is particularly important in collectivist societies, such as Indonesia, where family members often play a significant role in influencing health decisions (Liu et al., 2024).The ideal approach to GDM is holistic and continuous, integrating prevention from the preconception period to postpartum management (Siddiqui & McAdams, 2024). Preventive strategies such as nutrition education, physical activity, and early screening must align with therapeutic strategies such as MNT and evidence-based pharmacologic therapy. Digital technology (mHealth) is also beginning to show strong potential in enhancing patient engagement and self-monitoring of glucose levels (Usman et al., 2023). However, successful integration depends heavily on the capacity of the healthcare system. In Indonesia, key challenges include a shortage of trained health professionals, low digital literacy among pregnant women, and inadequate integration of GDM screening into routine antenatal services (Yao et al., 2024). Nevertheless, significant opportunities exist through community-based and digital education programs, which have shown effectiveness in several pilot regions (Brown et al., 2024).

Most studies analyzed still focus on populations in high-income countries, which have different healthcare resources and systems compared to those in low- and middle-income countries (Mayne et al., 2023). Therefore, generalizability should be approached cautiously. Additionally, methodological variability, small sample sizes, and lack of long-term follow-up represent common limitations in GDM literature (Thomas et al., 2024). Future research needs to explore the effectiveness of integrated technology- and community-based interventions within local contexts, as well as assess the sustainability of postpartum GDM prevention programs (Siddiqui & McAdams, 2024). A multidisciplinary approach combining clinical, social, and policy perspectives will be essential in strengthening global and national efforts to prevent and manage GDM (Liu et al., 2024).

In summary, the literature synthesis shows that preventive and therapeutic strategies for GDM are complementary and most effective when implemented in an integrated manner starting from the preconception period (Guglielmini et al., 2024). The effectiveness of interventions depends on timing, adherence, and social and family support (Aoyama et al., 2023). In Indonesia, there is a need for community- and digitally based programs tailored to resource constraints, aimed at strengthening sustainable and inclusive maternal healthcare (Sperling et al., 2023).

CONCLUSION

This review highlights that multifactorial interventions combining preventive and therapeutic strategies are the most effective in reducing the incidence and complications of gestational diabetes mellitus (GDM). Early lifestyle modifications particularly low glycemic index diets and

regular physical activity can lower GDM risk by 20–30%, while pharmacological therapies such as insulin or metformin remain necessary for women with persistently elevated glucose levels. Digital health and telemonitoring interventions also demonstrate strong potential in improving patient adherence, self-monitoring accuracy, and communication with healthcare providers, especially in resource-limited settings.

Two principal research gaps were identified: the scarcity of longitudinal studies assessing long-term outcomes, and the limited contextual evidence from developing countries, including Indonesia. These gaps underscore the need for culturally adapted, community-based, and technology-supported intervention models. Strengthening antenatal screening, enhancing healthcare providers' competencies in nutrition and physical activity counseling, and optimizing telehealth for real-time glucose monitoring are essential steps forward. Further locally relevant research is required to produce stronger evidence for clinical practice and policy development in Indonesia.

REFERENCES

Aoyama, K., Nakajima, Y., Meguro, S., Sato, Y., Goto, R., Hida, M., Arimitsu, T., Kasuga, Y., Tanaka, M., & Itoh, H. (2023). Efficacy and safety of a telemedicine system in subjects with gestational diabetes mellitus (TELEGLAM): Study protocol for a randomized controlled trial. *Heliyon*, *9*(11), e22504. https://doi.org/10.1016/j.heliyon.2023.e22504

Balducci, S., Sacchetti, M., Haxhi, J., Orlando, G., D'Errico, V., Fallucca, S., Menini, S., Pugliese, G. (2014). Physical Exercise as Therapy for Type 2 Diabetes. *Diabetes/Metabolism Research and Reviews*, *32*(30), 13–23. https://doi.org/10.1002/dmrr

Buschmann, C., Unverdorben, L., Knabl, J., Hutter, S., Meister, S., Beyer, S., ... & Ganster, F. (2024). Placental expression of inflammatory Galectin-12 is associated with gestational diabetes. *Journal of Reproductive Immunology,* 163, 104240. https://doi.org/10.1016/j.jri.2024.104240

Chen, S., Cao, M., Liu, K., & Gu, Y. (2025). The Impact of Exercise during Pregnancy on Maternal and Offspring Outcomes in Gestational Diabetes Mellitus. *Biocell*, *49*(2), 181–198. https://doi.org/10.32604/biocell.2025.058745

Deitch, J. M., Lee, I. L., Yates, C. J., Kathpal, E., Lawton, P., Shahid, I., ... & Kevat, D. (2024). Simplified gestational diabetes screening with a triaging fasting plasma glucose reduces the burden of oral glucose tolerance tests during pregnancy–A large tertiary comparative cohort study. *Diabetes Research and Clinical Practice,* 209, 111120. https://doi.org/10.1016/j.diabres.2024.111120

Guglielmini, G., Falcinelli, E., Piselli, E., Mezzasoma, A. M., Tondi, F., Alfonsi, L., De Luca, C., Fino, V., Favilli, A., Parrettini, S., Minuz, P., Torlone, E., Gresele, P., & Gerli, S. (2025). Gestational diabetes mellitus is associated with in vivo platelet activation and platelet hyperreactivity. *American journal of obstetrics and gynecology*, 232(1), 120.e1–120.e14. https://doi.org/10.1016/j.ajog.2024.04.003

Haque, M. M., Tannous, W. K., Herman, W. H., Immanuel, J., Hague, W. M., Teede, H., Enticott, J., Cheung, N. W., Hibbert, E., Nolan, C. J., Peek, M. J., Wong, V. W., Flack, J. R., Mclean, M., & Sweeting, A. (2024). Articles Cost-effectiveness of diagnosis and treatment of early gestational diabetes mellitus : economic evaluation of the TOBOGM study, an international multicenter randomized controlled trial. *EClinicalMedicine*, 71, 102610. https://doi.org/10.1016/j.eclinm.2024.102610

Kukkonen, A., Hantunen, S., Voutilainen, A., Ruusunen, A., Uusitalo, L., Backman, K., ... & Keski-Nisula, L. (2024). Maternal caffeine, coffee and cola drink intake and the risk of gestational diabetes–Kuopio Birth Cohort. *Primary Care Diabetes,* 18(3), 362-367. https://doi.org/10.1016/j.pcd.2024.02.005

Liu, X., Zhu, Y., Seamans, M., Nianogo, R., Janzen, C., Fei, Z., & Chen, L. (2024). Gestational diabetes mellitus and risk of neurodevelopmental disorders in young offspring: does the risk differ by race and ethnicity? *American Journal of Obstetrics and Gynecology MFM*, 6(1), 101217. https://doi.org/10.1016/j.ajogmf.2023.101217

Mayne, I. K., Tyzack-Clark, H. M., & McGovern, A. P. (2023). Studies are needed to support optimal insulin dose titration in gestational diabetes mellitus: A systematic review. *Diabetes*

and Metabolic Syndrome: Clinical Research and Reviews, 17(4), 102746. https://doi.org/10.1016/j.dsx.2023.102746

McLaren Jr, R. A., Ruymann, K. R., Ramos, G. A., Osmundson, S. S., Jauk, V., & Berghella, V. (2022). Early screening for gestational diabetes mellitus: a meta-analysis of randomized controlled trials. *American journal of obstetrics & gynecology MFM,* 4(6), 100737. https://doi.org/10.1016/j.ajogmf.2022.100737

Milluzzo, A., Manuella, L., Frittitta, L., & Sciacca, L. (2024). Efficacy of a phone reminder to improve adherence to post-partum glucose tolerance testing after gestational diabetes and clinical predictors of post-partum follow-up compliance. *Diabetes Research and Clinical Practice,* 210, 111653. https://doi.org/10.1016/j.diabres.2024.111653

Moreno-Castilla, C., Mauricio, D., & Hernández, M. (2016). Role of Medical Nutrition Therapy in the Management of Gestational Diabetes Mellitus. *Current Diabetes Reports*, 16(4), 1–9. https://doi.org/10.1007/s11892-016-0717-7

Nakshine, V. S., & Jogdand, S. D. (2023). A Comprehensive Review of Gestational Diabetes Mellitus: Impacts on Maternal Health, Fetal Development, Childhood Outcomes, and Long-Term Treatment Strategies. *Cureus*, 15(10), e47500. https://doi.org/10.7759/cureus.47500

Olga, L., Sovio, U., Wong, H., Smith, G. C., & Aiken, C. E. (2024). Maternal high body mass index, but not gestational diabetes, is associated with poorer educational attainment in mid-childhood. *American Journal of Obstetrics and Gynecology,* 231(1), 120.e1-120.e9. https://doi.org/10.1016/j.ajog.2023.11.1227

Phaloprakarn, C., & Suthasmalee, S. (2023). Effect of prenatal counseling on postpartum follow-up and contraceptive use in women with gestational diabetes mellitus: a randomized controlled trial. *American Journal of Obstetrics and Gynecology MFM*, 5(10), 101107. https://doi.org/10.1016/j.ajogmf.2023.101107

Phelan, S., Jelalian, E., Coustan, D., Caughey, A. B., Castorino, K., Hagobian, T., Muñoz-Christian, K., Schaffner, A., Shields, L., Heaney, C., McHugh, A., & Wing, R. R. (2023). Randomized controlled trial of prepregnancy lifestyle intervention to reduce recurrence of gestational diabetes mellitus. *American Journal of Obstetrics and Gynecology*, 229(2), 158.e1-158.e14. https://doi.org/10.1016/j.ajog.2023.01.037

Siddiqui, R., & McAdams, C. J. (2024). Challenges in the management of gestational diabetes mellitus in anorexia nervosa. *Psychiatry Research Case Reports*, *3*(1), 100215. https://doi.org/10.1016/j.psycr.2024.100215

Sperling, M. M., Leonard, S. A., Blumenfeld, Y. J., Carmichael, S. L., & Chueh, J. (2023). Prepregnancy body mass index and gestational diabetes mellitus across Asian and Pacific Islander subgroups in California. *AJOG Global Reports*, *3*(1), 100148. https://doi.org/10.1016/j.xagr.2022.100148

Suastika, A. V., Widiana, I. G. R., Fatmawati, N. N. D., Suastika, K., Paulus, I. B., & Sujaya, I. N. (2024). The role of probiotics and synbiotics on treatment of gestational diabetes: systematic review and meta-analysis. *AJOG Global Reports,* 4(1), 100285. https://doi.org/10.1016/j.xagr.2023.100285

Sukawana, W., Sukarja, M., & Wedri, M. (2016). Senam Kaki Meningkatkan Kelembaban Kulit Kaki Pada Diabetisi. Senam Kaki Meningkatkan Kelembaban Kulit Kaki Pada Diabetisi. *Jurnal Gema Keperawatan*, 9(1), 44–49.

Thomas, L. V., Jurkovitz, C. T., Zhang, Z., Fawcett, M. R., & Lenhard, M. J. (2024). Neighborhood Environment and Poor Maternal Glycemic Control–Associated Complications of Gestational Diabetes Mellitus. *AJPM Focus*, 3(3), 1–10. https://doi.org/10.1016/j.focus.2024.100201

Tsironikos, G. I., Potamianos, P., Zakynthinos, G. E., Tsolaki, V., Tatsioni, A., & Bargiota, A. (2023). Effectiveness of Lifestyle Interventions during Pregnancy on Preventing Gestational Diabetes Mellitus in High-Risk Women: A Systematic Review and Meta-Analyses of Published RCTs. *Journal of clinical medicine,* 12(22), 7038. https://doi.org/10.3390/jcm12227038

Usman, T. O., Chhetri, G., Yeh, H., & Dong, H. H. (2023). Beta-cell compensation and gestational diabetes. *Journal of Biological Chemistry*, 299(12), 105405. https://doi.org/10.1016/j.jbc.2023.105405

Wang, X., Lan, Y., Li, N., Gao, J., Meng, D., & Miao, S. (2024). Associations of educational

attainment with gestational diabetes mellitus and the mediating effects of obesity: A Mendelian randomization study. *Heliyon*, 10(7), e29000. https://doi.org/10.1016/j.heliyon.2024.e29000

Wong, M. M. H., Yuen-Man Chan, M., Ng, T. P., & Louie, J. C. Y. (2024). Impact of carbohydrate quantity and quality on maternal and pregnancy outcomes in gestational diabetes mellitus: A systematic review and meta-analysis. *Diabetes and Metabolic Syndrome: Clinical Research and Reviews*, 18(1), 102941. https://doi.org/10.1016/j.dsx.2024.102941

Yao, D., Shen, C., Yu, J., Tang, J., Zhang, H., Xu, X., ... & Cheong, L. Z. (2024). Proteomic analysis of milk fat globule membrane proteins in mature human milk of women with and without gestational diabetes mellitus. *Food Chemistry,* 445, 138691. https://doi.org/10.1016/j.foodchem.2024.138691

Yu, J., Ren, J., Ren, Y., Wu, Y., Zeng, Y., Zhang, Q., & Xiao, X. (2024). Using metabolomics and proteomics to identify the potential urine biomarkers for prediction and diagnosis of gestational diabetes. *EBioMedicine*, 101, 105008. https://doi.org/10.1016/j.ebiom.2024.105008