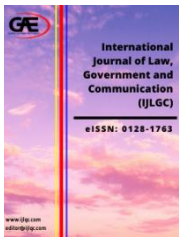
International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022



INTERNATIONAL JOURNAL OF LAW, GOVERNMENT AND COMMUNICATION (IJLGC)
www.ijlgc.com

MASTERCLASS ON DIABETES IN PREGNANCY – 'NAVIGATING THE CURVES'

Fatimah Zaherah Mohamed Shah[1*], Nur 'Aini Eddy Warman[2], Mohd Hazriq Awang[3], Aimi Fadilah Mohamed[4], Rohana Abdul Ghani[5]

[1] Endocrine Unit, Universiti Teknologi MARA, Selangor, Malaysia.
Email: fatimah521@uitm.edu.my
[2] Endocrine Unit, Universiti Teknologi MARA, Selangor, Malaysia.
Email: nuraini_eddy@uitm.edu.my
[3] Endocrine Unit, Universiti Teknologi MARA, Selangor, Malaysia.
Email: hazriq@uitm.edu.my
[4] Endocrine Unit, Universiti Teknologi MARA, Selangor, Malaysia
Email: aimifadilah@uitm.edu.my
[5] Endocrine Unit, Universiti Teknologi MARA, Selangor, Malaysia
Email: rohana1773@uitm.edu.my
Corresponding Author

Article Info:

Article history:
Received date: 28.06.2025
Revised date: 15.07.2025
Accepted date: 18.08.2025
Published date: 11.09.2025

To cite this document:

Shah, F. Z. M., Warman, N. A. E., Awang, M. H., Mohamed, A. F., & Abdul Ghani, R. (2025). Masterclass On Diabetes in Pregnancy – 'Navigating the Curves'. *International Journal of Law, Government and Communication, 10* (41), 336-350.

DOI: 10.35631/IJLGC.1041022

This work is licensed under CC BY 4.0

Abstract:

Introduction. The incidence of diabetes mellitus (DM) in Malaysia is increasing exponentially, particularly in the younger, childbearing population. Notably, the rapid increase in the number of cases with diabetes in pregnancy in recent years has added tremendous burden to healthcare costs. DM in pregnancy has risks to both the mother and neonate, leading to intergenerational health concerns. This program aimed to disseminate information regarding the burden and approach to DM in pregnancy, as well as to educate healthcare providers to manage the condition in a comprehensive manner. **Method.** This diabetes in pregnancy masterclass was targeted for healthcare-workers at all levels, from students and nurses to medical-officers and specialists. This novel program focused on a multidisciplinary approach, bringing together healthcare-practitioners from varying intersected specialties; namely endocrinology, obstetrics-&-gynaecology(O&G), paediatrics and primary-care. **Results.** This innovative program attracted 58 participants from various specialties and diverse training levels. Program structure: This masterclass highlighted the burden of DM in pregnancy, with focus on diagnosing this condition at different healthcare levels, delivered by endocrinologists. This was followed by an O&G session on management during pregnancy, and subsequently a comprehensive approach to neonatal handling by a paediatrician. The second part of this masterclass focused on specialized management of DM in pregnancy, encompassing treatment and monitoring. A special feature of this masterclass was then conducted, with a panel discussion on challenging clinical cases, with active involvement from

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

the participants. **Conclusion**. This innovative and engaging program was designed to emphasize on the need for a comprehensive and multidisciplinary approach in the management of diabetes in pregnancy. It is crucial for healthcare workers from all levels of hierarchy to work together and understand their contribution in successful management of this condition. This novel masterclass has realized this goal, and has great potential for integration into primary, secondary and tertiary healthcare systems.

Keywords:

Diabetes Mellitus, Endocrinology, Pregnancy, Management, Masterclass

Introduction

Diabetes mellitus (DM) is a metabolic disorder characterised by high blood sugar, or hyperglycaemia, which is due to insulin deficiency, insulin resistance or both, and has many subtypes including type 1, type 2, maturity-onset diabetes of the young (MODY), latent diabetes of adulthood, gestational diabetes, neonatal diabetes, secondary diabetes, and medication and steroid-induced diabetes among others (Sapra, A. and Bhandari, P. 2023). Type 1 diabetes, due to absolute insulin deficiency, and type 2 diabetes, signified by insulin resistance and relative insulin deficiency are the commonest types, with gestational diabetes on the rise (American Diabetes Association, 2024).

In Malaysia, type 2 diabetes mellitus (T2DM) is the commonest type, accounting for more than 90% of cases (Chandran, A., Abdullah, N., and Abdul, F., 2020), with exponential increase in its prevalence; from 11.2% in 2011 to 18.3% in 2019 (Institute for Public Health, 2020), to 15.6% in 2023 (Institute for Public Health, 2024). The recent National Health and Morbidity Survey (NHMS) in 2023 also underlines the fact of increasing diabetes cases in the younger, childbearing population, and more concerningly, 84% of adults with diabetes aged 18 to 29 years old were not aware of the diagnosis (Institute for Public Health, 2024). This rapid increase in prevalence is mirrored in the significant number of diabetes in pregnancy in Malaysia, illustrated clearly in the latest Malaysian National Health and Morbidity Survey on Maternal and Child Health 2022, which highlighted that the incidence of diabetes in pregnancy was 27.1%, constituting to about 15% increase within a 5-year period (Institute for Public Health, 2022).

The considerable increase in numbers of pregnant women with diabetes in Malaysia is of a growing concern, as the deleterious effects to both mother and offspring can span across generations, propagating higher complication rates. Addressing this considerable health impact will need a cohesive effort from all healthcare practitioners involved, and a concentrated undertaking is needed to impart relevant knowledge in the approach and management of this condition. Hence, an education program linking various specialties and training backgrounds is crucial to curb this rising prevalence, reduce morbidity and improve patient care.

Literature Review

Hyperglycaemia in pregnancy, which can be due to gestational diabetes mellitus (GDM) or other subtypes of diabetes such as type 1 or 2 in pregnancy, has significant impact on both the mother and fetus, encompassing the antenatal period to intergenerational health concerns. Pregnancy itself is a state of substantial insulin resistance, progressively worsening through the

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

course of pregnancy, contributed by increased maternal adiposity and certain placental hormones with insulin-desensitizing effects (Rodriguez, B.S., et al. 2024).

Many factors during pregnancy that contribute to alterations in glycaemic metabolism essential for the maintenance of fetal nutritional status can in fact tip the balance to hyperglycaemia and diabetes mellitus in susceptible individuals. Placental hormones such as growth hormone, corticotrophin-releasing hormone, human placental lactogen, prolactin, estrogen, and progesterone, can induce or worsen insulin resistance during a normal pregnancy. Human placental lactogen in particular has significant antagonistic effect on insulin, by influencing changes in the insulin receptors and remodelling of the receptor substrate, leading to tissue resistance to insulin and reduced glucose uptake at peripheral tissues. Additionally, maternal obesity predisposes to insulin resistance due to higher free fatty acid levels, which inhibits maternal glucose uptake and stimulates independent production of glucose in the liver (Rodriguez et al., 2024).

The Asian diabetes phenotype describes distinct characteristics of type 2 diabetes that seem to influence the differing rates of this condition among Asian ethnicities compared to other populations. Factors such as a higher prevalence of diabetes at a lower body mass index (BMI), younger age of onset, lower existing beta-cell mass, prominent insulin secretory defects with rapid decline in beta-cell function, greater abdominal adiposity, increased insulin resistance, higher rate of gestational diabetes, and even lower socio-economic status among Asians (Varghese, J.S., and Narayan, K.M. 2022) all to contribute to the higher incidence and morbidity of diabetes mellitus in general and diabetes in pregnancy in particular, within these societies.

Gestational diabetes mellitus (GDM) is significantly more common among Asians, particularly those of South Asian and South East Asian ethnicities (Li, L.J., et al. 2022). The pooled prevalence of GDM in Eastern and South-eastern Asia has been reported to range from 10.1% to 11.5% , compared to an overall GDM prevalence of 5.4% in Europe (Zulkiply, S.H. et al. 2024). Malaysia has one of the highest prevalence rates of GDM in Southeast Asia (Kunasegaran, T., et al. 2021), reported as 12.5% in 2016 rising rapidly to 27.1% in 2022 (Zulkiply, S.H. et al. 2024). In an epidemiological survey looking at the prevalence of GDM in Southeast Asia, it was found that only Malaysia and Singapore had data on national estimates, and both these countries, together with Thailand had the highest prevalence, with an increasing trend of GDM noted in many countries in this region (Amara, MS., et al. 2021).

In Malaysia, differing rates of GDM has been described in different centres and states across the country, which has contributed to varying incidence of complications. In 2015, the National Health Morbidity Survey and the National Obstetric Report involving 14 tertiary hospitals reported that the incidence of diabetes in pregnancy was 8.66% in 2011 and 8.83% in 2012, with a doubling of the incidence of macrosomia diabetic patients in both years compared to the incidence in non-diabetics. The recent NHMS 2022 quoting an overall prevalence of 27.1%, may be influenced by higher prevalence in certain northern states, ranging from 27% (Latif, R.A., et al. 2022) to 33.7% (Shet, D. et al. 2023). Even a study done by Logakodie, S. et al (2017) in public health clinics in Selangor showed a prevalence of GDM to be 27.9%, and further described that higher risks were seen in women aged above 35 years old and in those with maternal obesity. In addition, GDM women were noted to have increased risk of non-spontaneous vaginal delivery, and high prevalence of postnatal diabetes, particularly among

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

working mothers. A meta-analysis by Teng CL., et al (2021) looking at the complications in mothers with GDM again showed a significant increase in macrosomia and caesarean delivery, but not pre-eclampsia. Considering these significant deleterious effects, proper screening and management of diabetes especially in the younger age groups is crucial.

The approach to proper manoeuvring of hyperglycaemia in pregnancy is multifaceted, ranging from pre-conception care to screening and diagnosis to management both during pregnancy and after delivery. International guidelines have ironed-out various factors to be assessed for optimal management of diabetes in pregnancy, while the Malaysian clinical practice guideline (CPG) has been tailored to local requirements, specifying the criteria for screening and diagnosis, as well as clearly defining those at high risk of developing GDM, which includes, among others, overweight or obesity, previous history of GDM, first degree family member with DM, history of large baby and bad obstetric history (Ministry of Health Malaysia, 2017). This CPG also contains a comprehensive algorithm on tackling DM in pregnancy, as well as elucidating recommendations for preconception care including lifestyle modification and medication titration; care during pregnancy including nutrition therapy, adhering to gestational weight gain limits according to pre-pregnancy weight, medication adjustment with streamlined choice of treatment and monitoring during the antenatal period, fetal growth assessment and timing of delivery; and subsequently post-partum care (Nurain MN., et al. 2019). Bearing in mind the rapidly increasing number of cases of GDM in Malaysia, this CPG is vital in improving patient care.

Diabetes in pregnancy, whether pre-existing or gestational, has widespread effects on both the mother and baby, from short-term or immediate to long-term complications. For the mother, the impact ranges from increased risk of preeclampsia, caesarean delivery, labour difficulties risk of infection, deterioration of glycaemic control and hyperglycaemic emergencies such as ketoacidosis, and worsening of pre-existing medical conditions such as kidney and nerve damage, and particularly diabetic eye disease (Balaji, V., et al. 2022). In those with GDM, the risk of progression to T2DM is significantly higher, even up to seven times compared to those without GDM (American Diabetes Association, 2024), with additional risk of cardiovascular and renal disease, and even malignancy later in life. The effects on the offspring are even more concerning, with large baby, respiratory distress, hypoglycaemia and birth trauma such as shoulder and nerve injuries in the immediate post-partum period, to metabolic syndrome and its associated adverse effects, neurodevelopment and neuropsychiatric issues, as well as other endocrine derangements later in life (Rodriguez et al., 2024). This significant intergenerational adverse health outcomes underline the importance of comprehensive management of the pregnant mother throughout her journey.

Managing hyperglycaemia in pregnancy is a comprehensive process, requiring concerted effort between the mother and her family with various disciplines of healthcare practitioners, including the obstetrician, endocrinologist, primary care doctors, nurses and midwives, diabetic educators, dietitians, and even rehabilitation physicians. Lifestyle management during pregnancy, especially in mother with diabetes deserves special focus, as both dietary interventions and physical activity can impact pregnancy outcomes (Ministry of Health Malaysia, 2017) In a meta-analysis of randomized controlled trials among pregnant women (mostly with BMI >25 kg/m2), it was described that combined dietary intervention and physical activity reduced the risk of GDM by 18% compared with standard care, and the benefits were particularly prominent when the intervention was started before 15 weeks of

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

gestation (Song, C., et al. 2016). Additionally, a Cochrane systematic review suggested a possible reduction in GDM risk in women receiving dietary intervention (Tieu, J., et al. 2017).

The recent interest in gut microbiota biodiversity in pregnancy has driven further understanding on lifestyle influences on pregnancy outcomes. A study looking into gut microbiota variation among pregnant Malaysia women showed relatively lower diversity in GDM mothers, and a trend of reducing diversity in pre-obese and even more in the obese population, and this microbiota dysbiosis was reported to be related to adiposity, low-grade inflammation, insulin resistance, and hyperglycemia (Abdullah, B., et al. 2022). Subsequently, a study by Kunasegaran, T., et al (2024) assessing the relationship between gut microbiota and lifestyle factors focusing on pregnant Malay women in this country reflected similar findings of reduced microbiota diversity in GDM, particularly in the third trimester. This study also revealed the dietary patterns of those with GDM having higher consumption of meat and unhealthy fat, more carbohydrate-rich food, poorer sleep quality and reduced physical activity. As gut microbiota dysregulation triggers low-grade inflammation, the impact on insulin resistance and hyperglycemia in pregnancy is further augmented by the dietary patterns described. Moreover, as sufficient exercise correlates with improved insulin sensitivity and glucose metabolism (Onaade, O., et al. (2021), inadequate physical activity in GDM mothers may worsen metabolic dysregulation. These studies highlighted the importance of lifestyle modifications for better pregnancy and health-related outcomes.

Considering the impact and far-reaching consequences of diabetes in pregnancy, the importance of educating women in child-bearing age, pregnant mothers, as well health-care workers on optimal management of this conditions cannot be overstated. In a systemic review by Haron, Z., et al (2023) looking at the effectiveness of educational programs for GDM, it was shown that information on the condition, and interventions on heathy diet and physical activity were the most applied knowledge, and although most forms for guidance was beneficial, the face-to-face educational group sessions had the most positive impact. Al Hashmi, I., et al (2022) described the efficacy and acceptance of smart-phone applications in improving GDM management, while Ghasemi, F., et al (2021) favourably compared counselling on social application in improving control and quality of life. An interventional study by He, R. et al (2022) concluded that health education combined with personalized psychological nursing may improve pregnancy outcomes, while Rokni, S., et al (2022) illustrated the utility of diabetes education programs in improving disease control and quality of life in GDM.

Closer to home, assessment of knowledge and acceptance in the Malaysian population mirror similar findings. In a study by Anuar, N. M., et al. (2020) looking at knowledge on dietary recommendations for GDM, it was shown that the majority of participants had fair to poor knowledge on glycemic index and impact on control, and a community-based assessment of diabetes awareness by Qamar, M., et al (2017) showed that the majority of responders had only a moderate-level of knowledge, but many misconceptions regarding the disease management. A study reviewing the knowledge and understanding on post-natal diabetes assessment in GDM women showed that the vast majority had poor knowledge regarding postpartum T2DM screening, which was predicted by low education and self-efficacy (Minhat, H.S., et al. 2022). An evaluation by Surendran, S., et al (2022) on the receptiveness of people with diabetes in pregnancy to digital education, positive outcome was demonstrated with the use of automated applications in improving awareness of healthy lifestyle choices in GDM.

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

Appraising healthcare practitioners (HCP) on tackling diabetes in pregnancy revealed some interesting data. In a survey assessing perceptions on GDM management from both the patients and healthcare professionals revealed conflicting perspectives, with the professionals attributing poor control to patients negligence, being in denial and resistance to imparted knowledge, while the patients cited confusing information, non-supportive environment and disappointment in progress as the contributors (Nur Suraiya, A.H.S., et al. 2015). Additionally, a study assessing the perceived barriers to exercise in Malaysian women with GDM reported that the main hurdles were tiredness and childcare duties, and concerningly, health care professionals did not sufficiently educate these women on suitable exercise (Arasoo, V. J. T., et al. 2018). Even in the aspect of medication use in GDM, the awareness of HCP in Malaysia regarding utility of certain medications seem to be sub-optimal (Daud, N.A.A., et al. 2021). Taken together, it is imperative that HCP and other relevant parties are kept up-to-date on the multiple facets of tackling this condition.

The substantial bearing of diabetes in pregnancy encompassing the multiplying number of cases, as well as adverse effects propagating across generations calls for comprehensive management in all levels of healthcare facilities. Educating all those involved in dealing with diabetes in pregnancy is crucial in optimal health outcomes. Hence this diabetes in pregnancy masterclass was designed with the objectives of disseminating information regarding the burden and approach to DM in pregnancy, as well as to educate healthcare providers to manage the condition in a comprehensive manner.

Methods

A diabetes in pregnancy masterclass was created for comprehensive information sharing on the multiple aspects crucial in the approach and management hyperglycaemia in pregnancy, and targeted for healthcare-workers at all levels, from students and nurses to medical officers and specialists. This novel program focused on a multidisciplinary approach, bringing together healthcare-practitioners from varying intersected specialties, including endocrinology, obstetrics-&-gynaecology(O&G), paediatrics and primary care. This education process was designed to fill the knowledge gap, facilitate attainment of information and integrate the knowledge into practice in the local clinical setting.

Information for this masterclass was garnered mainly from local, and also international guidelines and consensus, with incorporation into the relevant population, from primary to tertiary care settings. Feedback from the participants was collected and collated, and qualitative data on demography, program significance and clinical relevance were subsequently analysed by utilizing the IBM SPSS (version 28.0) program.

Structured Program

Themed ‘Navigating the Curves’, this masterclass on management of diabetes in pregnancy was designed to educate health-care practitioners on the importance of integrated management and to disseminate information on the various treatment modalities available in this country across all levels of medical care. The speakers and moderators in this program were all highly trained professionals, and were actively involved in formulating local and even international guidelines. This program was organized into a few cluster subgroups, with each section containing an informative lecture followed by interactive discussion and knowledge sharing.

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

Cluster 1: Approach and Overview - by Endocrinologists

This masterclass was initiated with an overview on the burden of DM in pregnancy, internationally, in Asia and in Malaysia, and the impact on mother and child, followed by in-depth review on diagnosing this condition at different healthcare levels, both delivered by endocrinologists. The information sharing included local practices for screening and diagnosis, and specific medications for use in pregnancy with recommended titration. Monitoring and targets for control, utilizing both the standard finger-prick glucometer method and newer technologies such as continuous glucose monitoring systems were elaborated to the participants. Complications of hyperglycaemia in pregnancy, with comparisons between GDM and other diabetes types in pregnancy were then enumerated, as well as the ideal long-term monitoring strategies in these conditions. An engaging clinical case discussion session ensued.

Cluster 2: Monitoring during Pregnancy for Mother and Fetus – by Obstetrician

The subsequent session was conducted by an obstetrics and gynaecology (O&G) specialist on proper assessment and monitoring of both the mother and baby during the antenatal period, with emphasis on newer investigative techniques, ranging from genetic testing to ultrasonographic features of structural abnormalities in the fetus concentrating on specific effects of hyperglycaemia such as large baby, cardiac and neural tube abnormalities, as well placental blood flow for evaluation of certain complications such as hypertension and preeclampsia. Some of the advances in fetal monitoring were also shared, with management of maternal co-morbidities according to general consensus and guidelines. Issues encountered in the immediate post-partum period were then discussed, with treatment suggestions. This session garnered huge interest from the attendees, resulting in a robust question and answer session with practical case illustration, and valuable tips for multilevel engagement.

Cluster 3: Optimal Post-Natal Management of the Offspring – by Paediatrician

The next session was delivered by a paediatrician on the optimal handling of the infant immediately after delivery. Considering that the main issue after birth is fetal hypoglycaemia, or low blood sugar, this issue was highlighted in detail, with step-by-step approach to monitoring the baby from the time of birth to the initial minutes and hours, to the first few days. Other issues such as fetal abnormalities assessment were also addressed, as were the recommendations for monitoring during childhood and even adulthood for possible long-term effects such as metabolic syndrome and neuropsychiatric disturbances. This was succeeded by an interactive discussion with portrayal of a series of medical cases.

Cluster 4: Healthy Lifestyle with Nutrition Therapy – by Dietitian

Management of diabetes in pregnancy is multifaceted, with lifestyle modification as important component. Medical nutrition therapy was clearly expounded by a dietitian during this session, with assessment of differing food groups for carbohydrate or caloric counting, and the use of modern technologies and phone applications for personalized dietary advice. Light exercise recommendations were also elucidated, again aided by digital technologies for types of approved activities. Adhering to the optimal gestational weight gain by harnessing these lifestyle adjustment tips was showcased in the practical gathering.

Cluster 5: Pharmacological Treatment – by Endocrinologist

Medical treatment is the defining facet in successful management of diabetes in pregnancy, ranging from standard to advanced technological treatment options. Anchored by a senior endocrinologist of international renown, this session highlighted the importance of specialized

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

management of DM in pregnancy, encompassing both oral and injectable therapies, the indications, benefits and disadvantages, the use in various populations and across different trimesters. Interpretation of its use in several clinical circumstances was driven by spirited discussion among the participants.

Enhanced-Learning Platform – Mini Workshop with Specialized Panel

A special feature of this masterclass was the mini-workshop assembly featuring a panel of specialists, namely endocrinologists, obstetrician and paediatrician. Discussion on a broad spectrum of challenging clinical scenarios selected specifically for this masterclass, interspersed with cases presented by audience members was navigated in an interactive manner, with active involvement from the participants.

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

Program Framework: Theoretical to Practical
– Designing the Optimal Program to Address Diabetes in Pregnancy

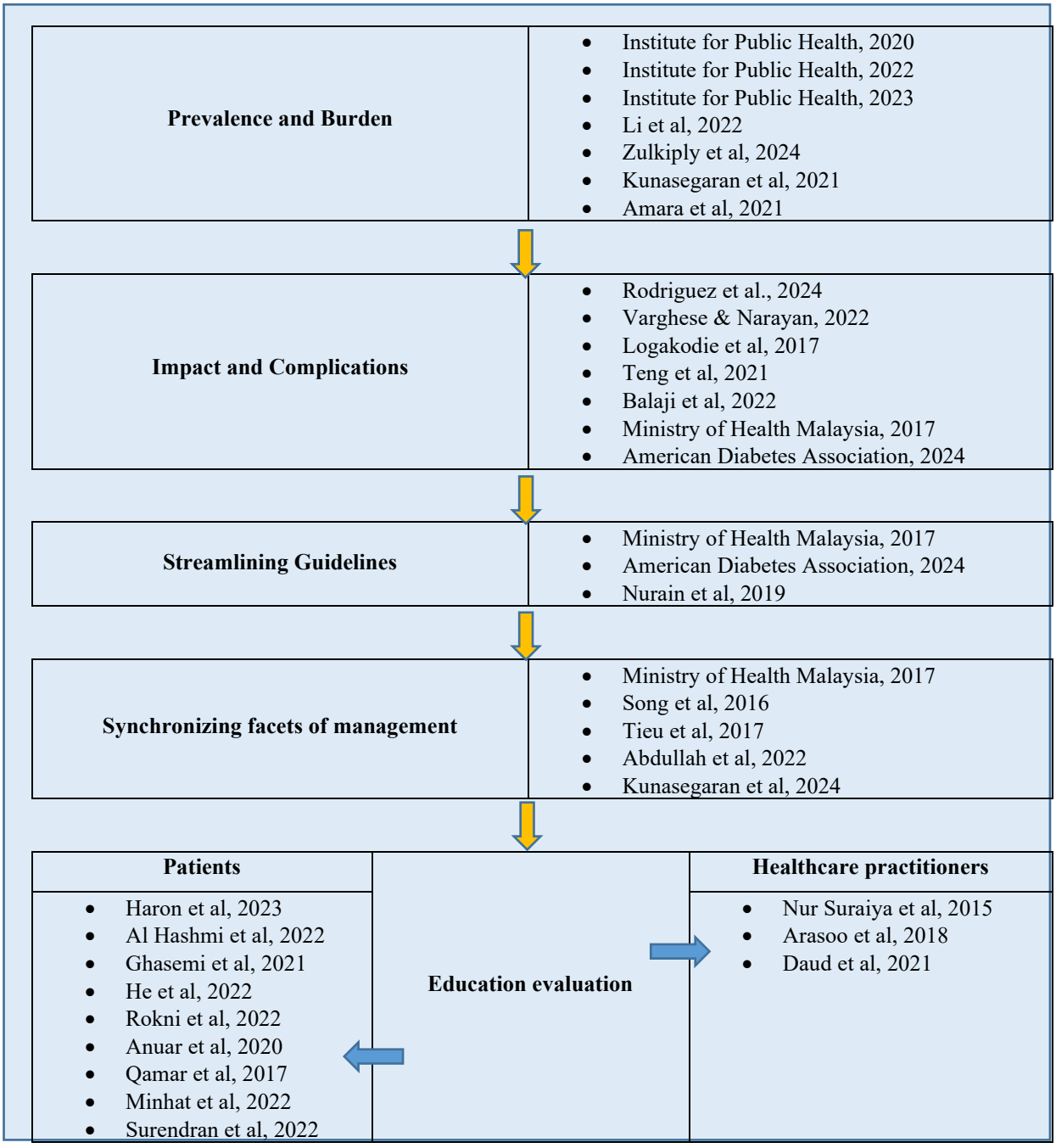


Figure 1. Theoretical Framework

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

Comprehensive education program:
Diabetes in Pregnancy Masterclass – "Navigating the Curves"

Objectives	➢ To disseminate information regarding the burden and approach to DM in pregnancy ➢ Educate healthcare providers to manage DM in pregnancy in a comprehensive manner.

PROGRAM STRUCTURE

Cluster 1: Anchored by Endocrinologists	
Scope: Approach and overview	❖ Burden of DM in pregnancy – local and international ❖ Impact on mother and offspring ❖ Screening in different levels of health facilities ❖ Monitoring and targets ❖ Complications – short and long-term, intergenerational ❖ Technological advancements – continuous glucose monitoring systems, mobile, virtual and smartphone applications and programs

↓

Cluster 2: Anchored by Obstetrician	
Scope: Monitoring during pregnancy for mother and fetus	❖ Proper assessment during the antenatal period ❖ Novel techniques - genetic testing, specific features on scanning, placental blood ❖ Advances in fetal monitoring ❖ Guidelines up-to-date recommendations ❖ Practical tips for clinical management

↓

Cluster 3: Anchored by Paediatrician	
Scope: Optimal offspring supervision and management post-natal	❖ Ideal handling of the infant immediately after delivery. ❖ Step-by-step approach to monitoring the baby from the time of birth to the first few days. ❖ Monitoring for short and long-term effects ❖ Interactive discussion with portrayal of a series of medical cases

↓

Cluster 4: Anchored by Dietitian	
Scope: Healthy lifestyle with nutrition therapy and exercise	❖ Focusing on Medical Nutrition Therapy (MNT) – for healthy pregnancy outcomes ❖ Food group choises ❖ Carbohydrate and calorie counting ❖ Use of modern technologies and phone applications for personalized dietary advice. ❖ Physical activity recommendations - aided by digital technologies

↓

Cluster 5: Conducted by Endocrinologists	
Scope: Pharmacological management	❖ Medical treatment options ❖ Advanced technological choices and impact ❖ Addressing management in various populations and across different trimesters. ❖ Interpretation in clinical situations

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

Enhanced-Learning Platform – Mini Workshop with Specialized Panel	
Special feature: Panel - endocrinologists, obstetrician and paediatrician	❖ Interactive panel discussion with a variety of clinical case illustrations ❖ Discussion on a broad spectrum of challenging practical scenarios ❖ Fresh cases from audience members ❖ Active involvement by participants

Analysis of feedback

Figure 2. Program Framework

Result and Discussion

This masterclass was successful, with participants from various clinical backgrounds filling more than the 50 offered seats. The attendees ranged from nurses and mid-wives to medical officers and specialists, from primary, secondary and tertiary medical facilities. The feedback was mainly positive, with the majority of the audience finding this program useful in clinical practice, particularly the interactive sessions, with requests for regular education programs.

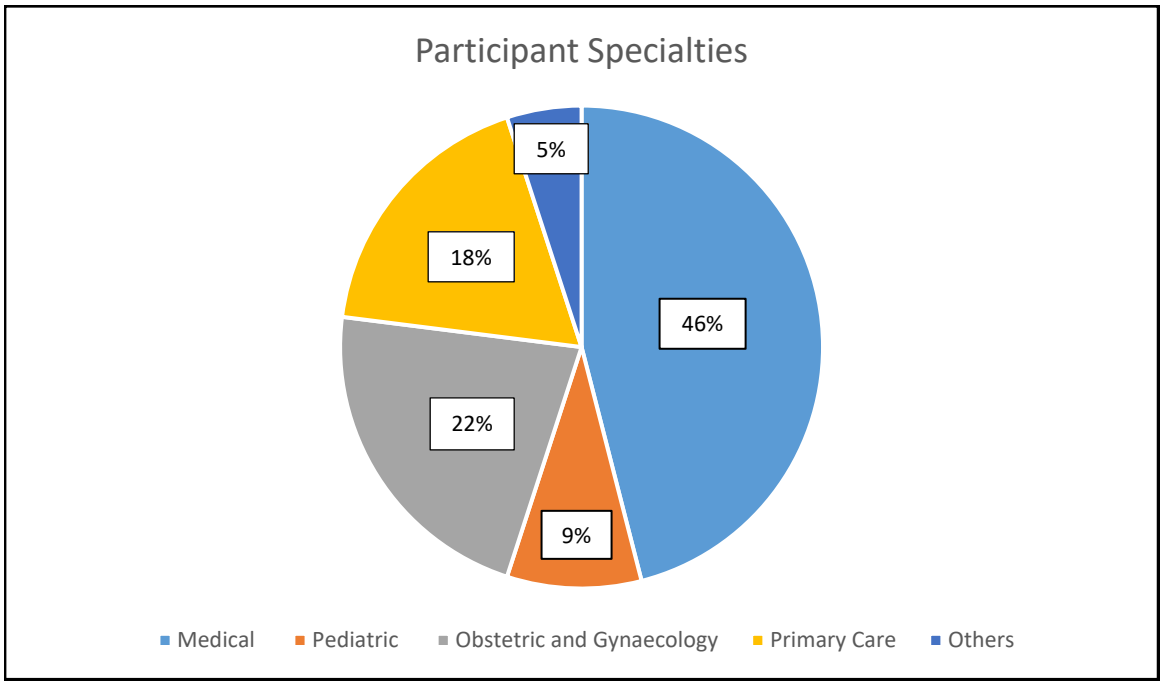


Figure 3. Participants Distribution According to Specialties

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

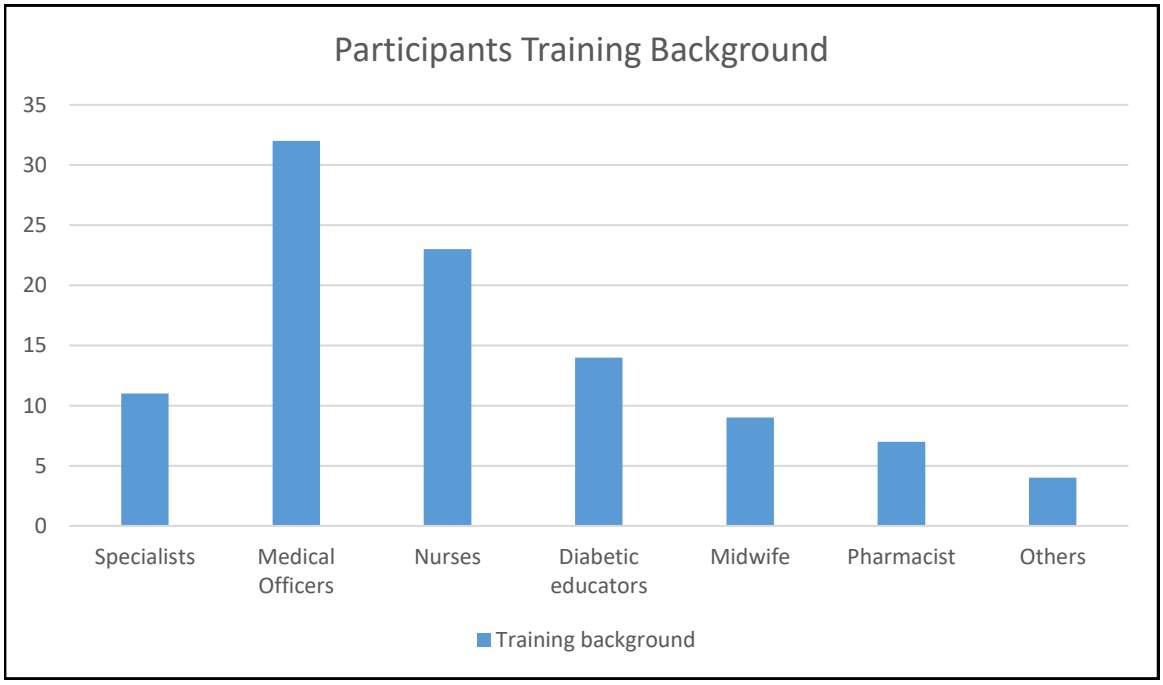


Figure 4. Participants Categorization According to Various Training Levels

This masterclass provided a crucial service in bridging the educational gap in knowledge among health-care practitioners in the optimal management of diabetes in pregnancy. DM is a multi-factorial condition, and during pregnancy the impact of this condition can lead to serious morbidity if not managed adequately. Many consensus and guidelines have been outlined for optimal management of this metabolic disorder in pregnancy, with concurrent increase in technological advancements in the approach, monitoring and treatment of this condition. However, without effective training initiatives, these modern techniques may not be translated into widespread clinical practice, and hence result in limited benefit in the community.

Table 1. Program Feedback

Feedback parameters	Response, N=58 (100%)
Relevance of program	82% of participants found the program relevant to clinical practice
Practical application	87% of participants felt they gained practical knowledge for clinical application
Knowledge attainment	➢ New knowledge – 56% gathered new information ➢ Knowledge reinforcement – 38% felt that their previous knowledge was updated
Most preferred component	▪ Mini workshop with panel discussion – 58% ▪ Clinical case interpretation – 32%
Suggestions	▪ Regular program addressing various concerns on diabetes in pregnancy ▪ Longer or multi-day programs

The significant positive response from the participants signalled that this program has fulfilled its objectives of dissemination information and educating healthcare workers on the comprehensive management of diabetes in pregnancy. Considering the huge burden of diabetes

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022

in pregnancy in this region, both in terms of health morbidity and healthcare costs, and the encouraging positive feedback from this program, similar and more encompassing educational programs are likely the key to improving knowledge and the drive to optimal practice in the management of this challenging condition with reduction of complications and enhancement of quality of life.

Conclusion

This innovative and engaging program was designed to emphasize on the need for a comprehensive and multidisciplinary approach in the management of diabetes in pregnancy. It is crucial for healthcare workers from all levels of hierarchy to work together and understand their contribution to ensure the successful management of this condition. This novel masterclass has realized this goal, and has great potential for integration into primary, secondary and tertiary healthcare systems.

Acknowledgement

We would to acknowledge and thank all the members of the Universiti Teknologi MARA Endocrine team and the organizing committee, including the medical officers, fellows, masters students, nurses, diabetic educators and research assistants that contributed to make this program a success.

References

Abdullah, B., Daud, S., Aazmi, M.S. et al. (2022). Gut microbiota in pregnant Malaysian women: a comparison between trimesters, body mass index and gestational diabetes status. BMC Pregnancy Childbirth 22, 152 (2022). https://doi.org/10.1186/s12884-022-04472-x

Al Hashmi, I., Alsabti, H., Al Omari, O., Al Nasseri, Y., & Khalaf, A. (2022). Development, feasibility and acceptability of a self-efficacy-enhancing smartphone application among pregnant women with gestational diabetes mellitus: Single-arm pilot clinical trial. BMC Pregnancy Childbirth, 22(1), 358. 10.1186/s12884-022-04684-1

Amara, M.S., et al (2021). ILSI Southeast Asia symposium: prevalence, risk factors, and actions to address gestational diabetes in selected Southeast Asian countries. European Journal of Clinical Nutrition volume 75, pages1303–1308 (2021

American Diabetes Association (ADA) (2024). Management of Diabetes in Pregnancy: Standards of Care in Diabetes. Diabetes Care 2024;47(Supplement_1):S282–S294. https://doi.org/10.2337/dc24-S007

Anuar, N. M., Yusof, B. N. M., Hasbullah, F. Y., Adznam, S. N. A., Ibrahim, Z., Zakaria, N. F., & Hashim, N. (2020). Levels of knowledge about the glycemic index concept among women with gestational diabetes mellitus. Malaysian Journal of Medicine and Health Sciences, 16(3), 185-191

Arasoo, V. J. T., Dominic, N. A., Ramadas, A., Lim, K. H., Tionga, C. W., Liew, E., Tang, J. L., & Jeganathan, R. (2018). Perceived Barriers to Exercise in Women with Gestational Diabetes Mellitus. IIUM Medical Journal Malaysia, 17(3). https://doi.org/10.31436/imjm.v17i3.244

Balaji, V., et al (2022). A clinical update on the molecular pathogenesis of gestational diabetes mellitus and its consequences. Indian Journal of Obstetrics and Gynecology Research 9(2):147-152. DOI:10.18231/j.ijogr.2022.031

Chandran, A., Abdullah, N., Abdul, F. (2020). National Diabetes Registry Report 2013 – 2019. Ministry of Health Malaysia

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022
Daud, N.A.A., Mohiuddin, S.G., Ong, Y.P., Yusof, F., Yusoff, F., Harun, S.N., Ghadzi, S.M.S. (2021). Metformin Use in Gestational Diabetes: Awareness, Attitude, and Practice among Healthcare Professionals in Malaysia. J Pharm Bioallied Sci. 2021 Apr-Jun;13(2):230-237. doi: 10.4103/jpbs.JPBS_542_20.

Ghasemi, F., Vakilian, K., & Khalajinia, Z. (2021). Comparing the effect of individual counseling with counseling on social application on self-care and quality of life of women with gestational diabetes. Primary Care Diabetes, 15(5), 842-847. 10.1016/j.pcd.2021.05.009

Haron, Z., Sutan, R., Zakaria, R., Abdullah Mahdy, Z. (2023). Self-care educational guide for mothers with gestational diabetes mellitus: A systematic review on identifying self-care domains, approaches, and their effectiveness. Belitung Nurs J. 2023 Feb 12;9(1):6-16. doi: 10.33546/bnj.2396.

He, R., Lei, Q., Hu, H., Li, H., Tian, D., & Lai, Z. (2022). The effect of health education combined with personalized psychological nursing intervention on pregnancy outcome of pregnant women with gestational diabetes mellitus. BioMed Research International, 2022, 3157986. 10.1155/2022/3157986

Institute for Public Health (2022). National Health and Morbidity Survey on Maternal and Child Health 2022. Ministry of Health Malaysia

Institute for Public Health (2024). National Health and Morbidity Survey (NHMS) 2023: Non-communicable Diseases and Healthcare Demand - Key Findings

Institute for Public Health (IPH), National Institutes of Health, Ministry of Health Malaysia. (2020). National Health and Morbidity Survey (NHMS) 2019: Vol. I: NCDs—Non-Communicable Diseases: Risk Factors and other Health Problems.

Jeeyavudeen, M.S., Crosby, M., Pappachan, J.M. (2024). Continuous glucose monitoring metrics in pregnancy with type 1 diabetes mellitus. World J Methodol. 2024 Mar 20;14(1):90316. doi: 10.5662/wjm.v14.i1.90316.

Kunasegaran, T., Balasubramaniam, V.R.M.T., Thirunavuk Arasoo, V.J. et al. (2024). Diet, lifestyle and gut microbiota composition among Malaysian women with gestational diabetes mellitus: a prospective cohort study. Sci Rep **14**, 6891 (2024). https://doi.org/10.1038/s41598-024-57627-5

Kunasegaran, T., et al (2021) Gestational Diabetes Mellitus in Southeast Asia: A Scoping Review Int J Environ Res Public Health. 2021 Jan 31;18(3):1272. doi: 10.3390/ijerph18031272

Latif, R.A., et al (2022) The prevalence of gestational diabetes, associated factors and feto-maternal outcome among antenatal women attending health clinics in Terengganu Malays Fam Physician. 2022 Jul 12;17(3):43–52. doi: 10.51866/oal302

Li L.J., et al (2022). Gestational Diabetes Mellitus Among Asians – A Systematic Review From a Population Health Perspective. Front. Endocrinol., Vol 13.2022 https://doi.org/10.3389/fendo.2022.840331

Logakodie, S., Azahadi, O., Fuziah, P., Norizzati, B., Tan, S.F, Zienna, Z., Norliza, M., Noraini, J., Hazlin, M., Noraliza, M.Z., Sazidah, M.K., Mimi, O. (2017). Gestational diabetes mellitus: The prevalence, associated factors and foeto-maternal outcome of women attending antenatal care. Malays Fam Physician. 2017 Aug 31;12(2):9-17.

Minhat, H.S., Puganeswary, T., Norliza, A. (2022). Knowledge on postpartum type-2 diabetes mellitus screening among pregnant women with gestational diabetes mellitus in Malaysia. Malays Fam Physician. 2022;17(2):64-70. https://doi.org/10.51866/oa1262

Ministry of Health Malaysia (2017). Clinical Practice Guidelines for the Management of Diabetes in Pregnancy 2017. MOH/P/PAK/353.17(GU)-e

International Journal of Law, Government and Communication
EISSN : 0128-1763
Volume 10 Issue 41 (September 2025) PP. 336-350
DOI 10.35631/IJLGC.1041022
Nur Suraiya, A.H.S., Zahara, A.M., Nazlena, M.A., Suzana, S., Norazlin, M.I., Sameeha, M.J. (2015). Perspectives of Healthcare Professionals and Patients on Management of Gestational Diabetes Mellitus: A Qualitative Study in Negri Sembilan, Malaysia. Mal J Nutr. 21(3): 393-399

Nurain MN., et al (2019). Management of diabetes in pregnancy in primary care - Clinical Practice Guidelines Management of diabetes in pregnancy. Malays Fam Physician. 2019;14(3);55–59

Onaade, O. et al. (2021). Physical activity for blood glucose control in gestational diabetes mellitus: Rationale and recommendations for translational behavioral interventions. Eur. J. Epidemiol. **7**, 7

Qamar, M., Rashid, R., Ahmad, S., Shaikh, F. A., & Ismail, N. E. (2017). Awareness of diabetes mellitus among general public in Shah Alam, Malaysia: A cross-sectional study. Asian Journal of Pharmaceutical and Clinical Research, 10(9), 192-196. 10.22159/ajpcr.2017.v10i9.17747

Rodriguez, B.S., Elsa S. Vadakekut, E.S., MahdySapra, H. (2024). Gestational Diabetes. Treasure Island (FL): StatPearls Publishing

Rokni, S., Rezaei, Z., Noghabi, A. D., Sajjadi, M., & Mohammadpour, A. (2022). Evaluation of the effects of diabetes self-management education based on 5A model on the quality of life and blood glucose of women with gestational diabetes mellitus: An experimental study in eastern Iran. Journal of Preventive Medicine and Hygiene, 63(3), E442-E447. 10.15167/2421-4248/jpmh2022.63.3.2611

Sapra, A. and Bhandari, P. (2023). Diabetes. Treasure Island (FL): StatPearls Publishing

Shet, D. et al (2023) Prevalence and Risk Factors of Gestational Diabetes Mellitus in Malaysian Antenatal Mothers in North-East Peninsular Malaysia, A Retrospective, Cross-Sectional Study. Malaysian Journal of Nursing, 2023. VOL. 14 (4) doi:10.31674/mjn.2023.v14i04.012

Song, C., Li, J., Leng, J., et al. (2016). Lifestyle intervention can reduce the risk of gestational diabetes: a meta-analysis of randomized controlled trials. Obes Rev. 2016;17(10):960-969.

Surendran, S., Lim, C. S., Koh, G. C. H., Yew, T. W., Tai, E. S., & Foong, P. S. (2021). Women's usage behavior and perceived usefulness with using a mobile health application for gestational diabetes mellitus: Mixed-methods study. International Journal of Environmental Research and Public Health, 18(12), 6670. 10.3390/ijerph18126670

Teng, C.L. et al (2021) Gestational Diabetes in Malaysia: A Systematic Review of Prevalence, Risk Factors and Outcomes. Sains Malaysiana 50(8)(2021): 2367-2377 http://doi.org/10.17576/jsm-2021-5008-19

Tieu, J., Shepherd, E., Middleton, P., et al. (2017). Dietary advice interventions in pregnancy for preventing gestational diabetes mellitus. Cochrane Database Syst Rev. 2017;1:CD006674

Varghese, J.S., Narayan, K.M. (2022). Ethnic differences between Asians and non-Asians in clustering-based phenotype classification of adult-onset diabetes mellitus: A systematic narrative review. Prim Care Diabetes. 2022 Sep 23;16(6):853–856. doi: 10.1016/j.pcd.2022.09.007

Zulkiply, S.H., Yoga Ratnam, K.K., Liew, S.H. (2024). Prevalence and factors associated with gestational diabetes mellitus in Malaysia: a population-based study comparing 2016 and 2022. BMC Public Health. 24 (2703)