Untreated GDM are associated with short- and long-term complications

- Macrosomia which is common in GDM women who is not diagnosed and treated affects around 15–45% of newborns²
- GDM is associated with a fourfold increased risk of stillbirth and death in the first week of life¹
- Women with GDM are at an increased risk of pre-eclampsia³
- Hyperglycaemia in GDM increases the risk of early labour and delivery³
- About 50% of women with GDM develop type 2 diabetes within 5 years of pregnancy⁴
- Children born to women with GDM are at eightfold increased risk of developing type 2 diabetes in their early childhood or adolescence⁴
- Children born to women with GDM are at increased risk of hypoglycaemia, respiratory distress syndrome and other complications⁵

Universal screening for GDM

- Hyperglycemia and Adverse Pregnancy Outcome (HAPO), an international prospective cohort study, which involved ~25,000 pregnant women who underwent a 75 g oral glucose tolerance test (OGTT) and assessed the perinatal outcome measures, demonstrated the risk of adverse pregnancy outcomes increased continuously with glucose levels⁶.
- With increasing maternal glucose levels, the frequency of each primary outcome including birth weight above the 90th percentile, primary cesarean section, clinical neonatal hypoglycemia and cord-blood serum C-peptide level above the 90th percentile increased, however, it is less for clinical neonatal hypoglycemia as compared with the other outcome measures.
- The fasting plasma glucose level frequencies in the lowest and highest categories, respectively, were 5.3% and 26.3% for birth weight above the 90th percentile, 13.3% and 27.9% for primary cesarean section, 2.1% and 4.6% for clinical neonatal hypoglycemia and 3.7% and 32.4% for cord-blood serum C-peptide level above the 90th percentile.

Glycaemic targets in pregnancy⁷,⁸

- Stringent glycaemic control can be considered in pre-gestational diabetic women.
**Gestational Diabetes Mellitus: A Growing Concern**

**Australian Carbohydrate Intolerance Study in Pregnant neonatal outcomes**

The primary measure used for assessing glucose levels during pregnancy is self-monitoring of blood glucose (SMBG). The recommended targets for SMBG are shown on-screen.

**Peak postprandial glucose**

Gestational Diabetes Mellitus: A Growing Concern

- **ADA: Pre-gestational diabetes**
  - Fasting: 60–69 mg/dL (3.3–5.4 mmol/L)
  - Pre-meal: 100–129 mg/dL (5.6–7.1 mmol/L)
- **ADA: GDM**
  - Fasting: ≤95 mg/dL (5.3 mmol/L)
  - Pre-meal: ≤140 mg/dL (7.8 mmol/L)
- **ACOG: GDM**
  - Fasting: ≤90 mg/dL (5.0 mmol/L)
  - Pre-meal: ≤105 mg/dL (5.8 mmol/L)

- **2-h postprandial**
  - ADA: Pre-gestational diabetes: 3.4–7.1 mmol/L
  - ADA: GDM: 6.7–12.0 mmol/L
  - ACOG: GDM: 6.8–12.0 mmol/L

- **Glucose Category**
  - 1: 90 mg/dL (5.0 mmol/L)
  - 2: 100–129 mg/dL (5.6–7.1 mmol/L)
  - 3: 130–149 mg/dL (7.2–8.2 mmol/L)
  - 4: 150–169 mg/dL (8.3–9.3 mmol/L)
  - 5: 170–189 mg/dL (9.4–10.5 mmol/L)
  - 6: 190–219 mg/dL (10.5–12.1 mmol/L)
  - 7: >219 mg/dL (>12.1 mmol/L)

- **Insulin requirement vary during pregnancy**
  - In a pregestational type-1 diabetes woman, during the 10–14 weeks’ gestation, the requirement of insulin may decrease due to increased insulin sensitivity.
  - During the later half of pregnancy, insulin requirement increases due to the increased concentration of circulating placental hormones (see Figure a).

- **Majority of GDM can be managed by lifestyle modifications alone**
  - Once diagnosed, all patients should receive extensive diet and exercise counseling.
  - It has been estimated that 70–85% of GDM can be managed with lifestyle modifications alone.
  - If treatment targets are not met, usually within 1–2 weeks, pharmacotherapy should be initiated.
  - As per the ADA and ACOG guideline recommendation, initiation of insulin therapy is to be based on measures of maternal glycaemia.
  - Glyburide and metformin are considered safe and effective; however, long-term safety data are inadequate.

**ADA**

- Initiation of insulin therapy to be based on assessment of maternal glycaemia with or without monitoring the foetal growth characteristics

**ACOG**

- Insulin therapy is based on the assessment of maternal glycaemia, fasting, and 1 hour and 2 hour plasma glucose levels
- Glyburide and metformin can be considered

- Although both the groups had comparable rates of caesarean delivery, women in intervention group had consistent improved health status at 3 months post-partum.

**Dr. A. N. Z.**

**With the available efficacy and safety evidence with the various insulin products, it is reasonable to utilize any of the insulin products (regular, NPH, or one of the analogs) in the management of GDM**.

**Treating pregnant women with mild GDM reduces the perinatal complications**

- **A total of 1000 women who were between 24 and 34 weeks’ gestation and had GDM were randomized into the intervention group that received routine standard care practiced at the centre**.
- **The trial demonstrated that the rate of serious perinatal complications was significantly lower among the infants of the intervention group than among the infants of the routine-care group**.
- **Although both the groups had comparable rates of caesarean delivery, women in intervention group had consistent improved health status at 3 months post-partum.**

**Strict glycaemic control improve maternal and neonatal outcomes**

- Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) trial, a multicenter trial, evaluated the effects of treatment on perinatal complications and maternal outcome.

- **Insulin therapy is based on the assessment of maternal glycaemia with or without monitoring the foetal growth characteristics**

**Intervention group**

- **ACOG**
  - Initiation of insulin therapy to be based on measures of maternal glycaemia with or without monitoring the foetal growth characteristics.

**Standard Care**

- **ACOG**
  - Insulin therapy is based on the assessment of maternal glycaemia, fasting, and 1 hour and 2 hour plasma glucose levels.
  - Glyburide and metformin can be considered.

**FDA**

- Providers can select a product and delivery form (pen or vial and syringe) based on the patient’s needs.

- **It is vital for patients to be screened for type 2 diabetes between 6 weeks and 6 months postpartum**.

- **If treatment is required, the safety of pharmacotherapy during breastfeeding must be considered.**

- **Lifestyle modifications are quintessential in the management of GDM along with the pharmacotherapy.**

- **Maintaining optimized glycaemic control can reduce perinatal complications.**
**Gestational Diabetes Mellitus: A Growing Concern**

**Samples**

- **Australian Carbohydrate Intolerance Study in Pregnant**
  - neonatal outcomes
- **The primary measure used for assessing glucose levels**
  - **A1C should be used as the secondary measure.**
  - **The recommended targets for SMBG are shown on-screen**
- **Peak postprandial glucose**

**Gestational Diabetes Mellitus:**

**ACOG:** GDM

**ADA:** Pre-gestational diabetes

- **Efficacy and safety evidence with the various insulin products**
  - It is reasonable to utilize any of the insulin products (regular, NPH, or one of the analogs) in the management of GDM.

**Treating pregnant women with mild GDM reduces the perinatal complications**

**Majority of GDM can be managed by lifestyle modifications alone**

- **Once diagnosed,** all patients should receive extensive diet and exercise counseling.
- **It has been estimated that 70-85% of GDM can be managed with lifestyle modifications alone**
- **If treatment targets are not met, within 1-2 weeks,** pharmacotherapy should be initiated.
- **As per the ADA and ACOG guideline recommendation,** initiation of insulin therapy is based on measures of maternal glycemia.
- **Glyburide and metformin can be considered safe and effective; however, long-term safety data are inadequate.**

**Insulin requirement vary during pregnancy**

- **In a pregestational type-1 diabetes woman,** during the 10-14 weeks’ gestation, the requirement of insulin may decrease due to increased insulin sensitivity.
  - During the later half of pregnancy, insulin requirement increases due to the increased concentration of circulating placental hormones.

**ACAOG:**

- **Insulin therapy is based on the assessment of maternal glycemia, fasting, 1 hour and 2 hour plasma glucose levels.**
- **Glyburide and metformin can be considered.**

**ACOG**

- **Insulin therapy is based on the assessment of maternal glycaemia with or without monitoring the foetal growth characteristics.**

**Insulin requirements in Type 1 diabetes mellitus**

- **Providers can select a product and delivery form (pen or vial and syringe) based on the patient's needs.**
- **It is vital for patients to be screened for type 2 diabetes between 6 weeks and 6 months postpartum.**
- **If treatment is required, the safety of pharmacotherapy during breastfeeding must be considered.**

**With the available efficacy and safety evidence with the various insulin products, it is reasonable to utilize any of the insulin products (regular, NPH, or one of the analogs) in the management of GDM.**

- **Although both the groups had comparable rates of caesarean delivery,** women in intervention group had consistent improved health status at 3 months post-partum.

**Strict glycaemic control improve maternal and neonatal outcomes**

- **Australian Carbohydrate Intolerance Study in Pregnant Women (ACHOIS) trial, a multicenter trial,** evaluated the effects of treatment on peri-natal complications and maternal outcome.

- **A total of 1000 women who were between 24 and 34 weeks’ gestation and had GDM were randomized into the intervention group that received dietary advice, glucose monitoring and insulin as needed, and the other group received routine standard care practiced at the centre.**

- **The trial demonstrated that the rate of serious perinatal complications was significantly lower among the infants of the intervention group than among the infants of the routine-care group.**

- **As compared to type 1 diabetes, type 2 diabetes women require a significantly higher dose of insulin during each trimester (as shown in Figure b).**

**Although there is no difference in insulin requirement between type 1 and type 2 diabetes women during the first trimester, the insulin requirement significantly increases during the second trimester with type 2 diabetes (33%) as compared with type 1 diabetes (10%).**

- **In the third trimester, the insulin requirement continues to increase reaching a total increment of 40% in patients with type 2 diabetes.**
- **This is leads to the sudden increase in body mass and heightened insulin resistance in type 2 diabetes women during pregnancy.**
- **As a result, constant insulin adjustment is necessary to keep up with the increasing insulin requirement of pregnancy.**

**Clinical Neonatal hypoglycemia**

- **Based on the HAPO study results, many guidelines including IDF and IADPSG advocated universal screening for GDM at 24-28 weeks’ gestation.**

<table>
<thead>
<tr>
<th>Guidelines</th>
<th>Fasting</th>
<th>Pre-meal</th>
<th>1-h postprandial (mmol/L)</th>
<th>2-h postprandial (mmol/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADA: Pre-gestational diabetes</td>
<td>60-69 mg/dL (3.3 - 5.4 mmol/L)</td>
<td>100-129 mg/dL (5.6 - 7.1 mmol/L)**</td>
<td>(3.4-7.1 mmol/L)***</td>
<td></td>
</tr>
<tr>
<td>ADA: GDM</td>
<td>≤95 mg/dL (5.3 mmol/L)</td>
<td>≤140 mg/dL (7.8 mmol/L)</td>
<td>≤120 mg/dL (6.7 mmol/L)</td>
<td></td>
</tr>
<tr>
<td>ACOG: GDM</td>
<td>≤90 mg/dL (5.0 mmol/L)</td>
<td>≤105 mg/dL (5.8 mmol/L)</td>
<td>≤140 mg/dL (7.8 mmol/L)</td>
<td>≤120 mg/dL (6.7 mmol/L)</td>
</tr>
</tbody>
</table>
Gestational Diabetes Mellitus: A Growing Concern

GDM, the leading cause of diabetes in pregnancy, affected about 21 million live births.

- One in seven births is affected by gestational diabetes mellitus (GDM)
- Proportion of women with GDM is 85.1%
- Proportion of women with diabetes first detected in pregnancy is 7.4%
- Proportion of women with diabetes detected prior to pregnancy is 7.5%

Untreated GDM are associated with short- and long-term complications

- Macrosomia which is common in GDM women who is not diagnosed and treated affects around 15-45% of newborns.
- GDM is associated with a fourfold increased risk of stillbirth and death in the first week of life.
- Women with GDM are at an increased risk of pre-eclampsia.
- Hyperglycaemia in GDM increases the risk of early labour and delivery.
- About 50% of women with GDM develop type 2 diabetes within 5 years of pregnancy.
- Children born to women with GDM are at eightfold increased risk of developing type 2 diabetes in their early childhood or adolescence.
- Children born to women with GDM are at increased risk of hypoglycaemia, respiratory distress syndrome and other complications.

Universal screening for GDM

- Hyperglycaemia and Adverse Pregnancy Outcome (HAPO), an international prospective cohort study, which involved ~25,000 pregnant women who underwent a 75 g oral glucose tolerance test (OGTT) and assessed the perinatal outcome measures, demonstrated the risk of adverse pregnancy outcomes increased continuously with glucose levels.
- With increasing maternal glucose levels, the frequency of each primary outcome including birth weight above the 90th percentile, primary cesarean section, clinical neonatal hypoglycaemia and cord-blood serum C-peptide level above the 90th percentile increased, however, it is less for clinical neonatal hypoglycaemia as compared with the other outcome measures.
- The fasting plasma glucose level frequencies in the lowest and highest categories, respectively, were 5.3% and 26.3% for birth weight above the 90th percentile, 13.3% and 27.9% for primary cesarean section, 2.1% and 4.6% for clinical neonatal hypoglycaemia and 3.7% and 32.4% for cord-blood serum C-peptide level above the 90th percentile.

Glycaemic targets in pregnancy

- Stringent glycaemic control can be considered in pre-gestational diabetic women.