RECOMMENDATIONS

INTRODUCTION

GDM is associated with adverse foetal outcome like macrosomia, intrauterine foetal death, shoulder dystocia, birth injuries, hyperbilirubinemia, polycythemia, neonatal hypoglycemia, respiratory distress syndrome, childhood obesity, glucose intolerance and DM in later adolescent. It is also complicated with maternal complications like increased incidence of pre-eclampsia, caesarean delivery, increased chance of developing type 2 DM later in life (approximately 50% in 5 to 10 years).

SAFES has made following 13 recommendations on different issues pertaining to GDM for this region.

RECOMMENDATION - 1

DEFINING GESTATIONAL DIABETES MELLITUS (GDM):

Any degree of glucose intolerance with onset or first recognition during pregnancy can be termed GDM whether or not the condition persists after pregnancy.

However, there is a possibility that unrecognised glucose intolerance may have antedated or begun concomitantly with the pregnancy. Hence, pregnant women with risk factors of type 2 DM should be screened at first antenatal visit using standard diagnostic criteria.If she is meets criteria for DM, then she should receive a diagnosis of Overt Diabetes Mellitus.

RECOMMENDATION - 2

EPIDEMIOLOGY OF GDM:

In order to estimate prevalence of Gestational Diabetes Mellitus, SAFES member countries should conduct their own national surveys.

Prevalence of GDM varies significantly among different populations, ethnicities as well as with diagnostic criteria. Age matched prevalence of GDM is more than DM and in South East Asia (SEA) region, frequency of hyperglycemia in pregnancy is about 25% as per IDF data.

RECOMMENDATION - 3

RISK OF DEVELOPING GDM:

Recommendation 3.1: *Following are considered as the risk factors of developing GDM.*

1. BMI $\geq$23 kg/m^2 (based upon ethnicity),

2. Age >25 years,

3. First degree relative with DM,

4. History of delivered baby >9lb or LGA or bad obstetric history,

5. Previous history of GDM, A1C $\geq$5.7%, IGT or IFG,

6. Not exercising regularly

7. Others: Family origin with high prevalence of diabetes (i.e. South Asians), HTN or therapy for HTN, HDL < 35 mg/dl and or TG >250 mg/dl, PCOS, Acanthosisnigricans, history of CVD.

Recommendation 3.2: *Risk factors may vary among member countries of SAFES; hence it is prudent to conduct indigenous research and survey to find out risk factors for individual countries.*

RECOMMENDATION 4

SCREENING AND DIAGNOSIS OF GDM:

Recommendation 4.1: *All pregnant women should be routinely screened for GDM as our population falls under high risk group.*

Recommendation 4.2: As a screening test, use of GCT is not necessary.

Recommendation 4.3: One step 75g 2h OGTT should be used for screening and diagnosis of GDM.

Recommendation 4.4: At first antenatal visit a diagnostic OGTT plus Risk Factor (RF) assessment should be done for all. If the woman does not tolerate OGTT then FBG should be done.

During 24th to 28th weeks 2nd OGTT is to be done for those women who were normal in initial OGTT. This OGTT is mandatory.

A woman who had earlier normal OGTTs and is now showing evidence of macrosomia or polyhydramnios on growth scan done during 3rd trimester will be an ideal candidate to screen with a glucose series i.e getting fasting and all 2 hour post-meal glucose values.

However; the condition may change for a woman who is presenting late (late antenatal booking) and is already in her 3rd trimester then should be offered an OGTT to screen for GDM/overt DM of pregnancy.

Recommendation 4.5: Following diagnostic criteria values are recommended.

Test	FPG	1 h PG	2 h PG	Diagnosis
75gm 2h OGTT	≥92 mg/dl	≥180 mg/dl	≥153 mg/dl	1 or more positive
	(≥5.1 mmol/L)	(≥10.0 mmol/L)	(≥8.5 mmol/L)	value(s)

Recommendation 4.6: A1C testing is not recommended for screening and diagnosis of GDM.

Recommendation 4.6.1: A1C test can be performed during the 1st trimester of pregnancy or if overt DM or pre-gestational DM is suspected.

Recommendation 4.6.2: Pregnant women with FPG ≥ 126 mg/dl (≥7.0 mmol/L) or 2h PG during 75g OGTT ≥200mg/dl (≥11.1 mmol/l) or those who along with classic symptoms of hyperglycemia are having RBS ≥200 mg/dl (≥11.1mmol/l) or in high risk cases if A1C ≥6.5%; should receive a diagnosis of overt diabetes and not GDM.

RECOMMENDATION 5

PRECONCEPTION CARE:

Recommendation 5.1: Preconception care includes risk factor identification, screening for abnormalities of glucose homeostasis and or other metabolic abnormalities prior to conception.

Recommendation 5.1.1: A holistic approach that includes prevention programmes beginning at school level, college level, young working women level, community level and policy maker's level is necessary. Gynaecologists, midwives, policy makers, politician, community workers, media person may be involved. Education regarding GDM must gain main focus along with other healthy life style in general.

Recommendation 5.1.2: Preconception strategic approach should include awareness programmes at school level,

college level, young working women level, community level and policy maker's level.

Recommendation 5.1.3: School based approach: It should include education of teachers about healthy life style first and later diabetes prevention and education of the girls on healthy lifestyle, nutrition, weight management and particularly on physical activity. At this stage of education keeping in mind the cultural values; knowledge about healthy living can be added to the school curriculum. This can be done as per available resources in each country which may vary within the region. From public health perspective this needs to be discussed with respective governments at the outset for prevention of diabetes in future and reducing the load of GDM by creating awareness.

Recommendation 5.1.4: College based approach: The majority of college girls may enter into marriage and pregnancy after college. In addition to the approach outlined as in school girls, the benefit of this approach is that it directly addresses the outcomes of a pregnancy in a young woman. Knowledge on GDM can be added to already present physical education classes. Again In this regard emphasis must be put on educating teachers first.

Women who are high risk need to be counselled. One way of achieving this may be health-screening clinics at the universities in which healthy living education may be taken as priority and information about GDM in high risk should be available. This can be done as per resources available in each country which may vary within the region. If there isn't any setup yet in the country then relevant bodies can use this as a pilot with respective governments and later disseminate in the rest of the institutions and country.

Recommendation 5.1.5: Community leaders based approach: A preconception programme can be developed that involves community leaders (e.g.; Kazis) coordinating with the obstetrician and community health worker aiming the bride/ couple to [after engagement] undergo counselling and evaluation for women in general and high risk women in particular where ever possible in the regional countries. This programme is truly one of its kind with synergies between health providers, religious leaders and community policy makers.

Recommendation 5.1.6: Public health system based approach: Trained public health workers and midwives may be distributed (e.g.; 100 families/worker) or so to start family education. Public health system based approach includes empowering public health midwife (PHM), or a Lady Health worker (LHW) on preventive education and supervision based on eligible couple registry and to train PHM/LHW by specialists to establish preconception clinics. Utilising social media such as face book and twitter for promotion of preconception care has been proposed.

Recommendation 5.1.7: Professional societies based approach: Clinics focused on "Diabetes in Pregnancy Care" will deal exclusively with the preconception, GDM and postpartum care, which can be contributed by professional societies. Methods for disseminating information in the form of flyers, booklets, posters, Innovative and smart messages to reach young girls and women may be developed.

Recommendation 5.1.8: Social media based approach: Use of Slogan, poster, large scale community level activities and use of print media, radio and other portals for reaching women regarding gestational diabetes for promotion of preconception care can be a useful tool. Utilising social media such as facebook and twitter for promotion of preconception care has been proposed.

Recommendation 5.1.9: Policy makers based approach: Strategies should be taken to include the policy makers and office bearers of the professional societies to brain storm and develop programmes for educating girls, young women and all women of reproductive age about preconception care.

Recommendation 5.2: Women with diabetes

For women with pre-existing Diabetes Mellitus, following are recommended:

Recommendation 5.2.1: Optimise glycemic control to achieve an A1C <7% and closer to 6% or 6.5% whichever can be safely achieved without putting the woman at risk of hypoglycemia.

Recommendation 5.2.2: Discontinue medications (including OADs, insulin) that are not safe at the time of conception or are embryopathic.

Recommendation 5.2.3: Women with pre-existing T1DM or T2DM should get baseline screening for retinopathy, nephropathy. Appropriate treatment and stabilisation of any complication prior to conception is prudent.

Recommendation 5.2.4: Screen and treat for cardiac illnesses as needed in symptomatic women or in those with pre-existing heart disease.

Recommendation 5.2.5: Switch from non-insulin agents to insulin.However, metformin can be continued.

Recommendation 5.2.6: Supplement Folic acid starting 3 months prior to conception.

Recommendation 5.2.7: Ensure self-monitoring of blood glucose.

Recommendation 5.2.8: Targets for fasting and post prandial glucose should be individualised. FBG: <5.1 mmol/L (<92 mg/dl) [if that can be safely achieved without putting the woman at risk of hypoglycemia, otherwise an FBG target of <5.3 mmol/L (<95 mg/dl) & 2 hour PPG <6.7 mmol/L (<120 mg/dl) are widely accepted.

RECOMMENDATION 6

MANAGEMENT OF GDM:

Recommended 6.1: SMBG:

Recommendation 6.1.1: SMBG should be done both pre- and 1 or 2 hour post-prandial (4 times per day) to achieve glycemic targets and improve pregnancy outcomes. Daily SMBG is superior to less frequent monitoring. After achieving target blood glucose SMBG can be done every 3rd day.

Recommendation 6.1.2: Monitoring BG before going to bed at night should be done to prevent nocturnal hypoglycemia.

Recommendation 6.1.3: Frequency of self-monitoring of blood glucose (SMBG) will vary according to the treatment regimen.

For women on insulin; any one of the following three types of SMBG can done,

1. Intensive SMBG: Six times/daily (pre breakfast + post breakfast, pre-lunch, post lunch, pre and post dinner).

2. Standard SMBG: Three to four times/daily (pre breakfast + 2-3 post meals can also be suggested).

3. Modified SMBG: SMBG can be done 4 to 5 times every day or alternate day until target blood glucose are achieved, once target is achieved, SMBG can be done 3 times (pre breakfast and Pre- and Post-meal of major meal or other meals as required every 4th or 5th day or as required).

For women on MNT or on metformin a total of 14 readings per week including pre-breakfast and 1h PPG or 2h PPG are suggested.

Recommendation 6.2: Blood glucose and targets:

FBG and 1 h PPG or 2 h PPG monitoring is recommended with following target values.

	mg/dl	**mmol/L**
FBG	<92	<5.1
1 h PPG	< 140	< 7.8
2 h PPG	< 120	< 6.7

◆ ***Recommendation 6.3:*** SAFES do not recommend A1C for diagnosis of GDM but it may be used for monitoring of therapy if local resource permits. Due to the physiological increases in red blood cell turnover during pregnancy; A1C levels fall during normal pregnancy. Additionally, as A1C represents an integrated measure of glucose, it may not fully capture postprandial hyperglycemia, which drives macrosomia. Thus, while A1C may be useful, it should be used as a secondary measure, after self-monitoring of blood glucose. The interpretation of A1c should be done in conjunction with

SMBGs/lab values of glucose.

Recommendation 6.4: Non-Pharmacological Treatment of GDM:

Recommendation 6.4.1: MNT Should be started soon after diagnosis of GDM by registered dietitian and reviewed in each trimester.

Recommendation 6.4.2: MNT should be aimed at achieving normoglycemia, providing adequate maternal weight gain and adequate foetal growth and at the same timeshould be able to prevent starvation ketosis.

Recommendation 6.4.3: Weight loss with hypocaloric diet is generally not recommended to avoid starvation ketosis and nutritional deficiency. There should be at least a minimum of 1800 calories per day for the basic metabolic rate of the mother, calorie for physical activity, growth of foetus and extra weight of the mother.

Recommendation 6.4.4: If pre-pregnancy weight is normal (BMI 18.5 to 22.9 kg/m^2), the recommended calorie intake is 30kcal/kg/day during first trimester and 38 kcal/kg/day thereafter.

Recommendation 6.4.5: If pre-pregnancy weight is underweight (BMI < 18.5 kg/m^2), recommended calorie intake is 35 kcal/kg/day during first trimester and 40 kcal/kg/day thereafter.

Recommendation 6.4.6: If pre-pregnancy weight is over weight (BMI 23 to 27.4 kg/m^2), recommended calorie intake is 25 kcal/kg/day during first trimester and. 30 kcal/kg/day thereafter.

Recommendation 6.4.7: If pre-pregnancy weight is obese (BMI > 27.5 kg/m^2), a 30-33% calorie restriction is recommended. This has been shown to reduce hyperglycemia and plasma triglycerides with no increase in ketonuria.

Recommendation 6.4.8: Ideal weight gain during pregnancy should be as per following table. Recommended weight gain during pregnancy is based on pre-pregnancy BMI:

BMI [kg/m^2]	**Recommended wt gain [lbs (kg)]**
Singleton pregnancy	
<18.5	28-40 (12.5-18.0)
18.5-22.9	25-35 (11.5-16.0)
23.0-27.4	15-25 (7.0-11.5)
≥27.5	11-20 (5-9.0)
Twin pregnancy	
<18.5	No recommendation
18.5-22.9	37-54 (16.8-24.5)
23.0-27.4	31-50 (14.1-22.7)
≥27.5	25-42 (11.4-19.1)

Recommendation 6.4.9: Monitoring and assessment of MNT should be done. This can be achieved by assessing maternal weight gain, SMBGs, hypoglycemic episodes, appetite, blood pressure, urine ketones, and food and activity records.

Recommendation 6.5: Meal Pattern:

Recommendation 6.5.1: Three meals and 3 snacks should be taken including 1 snack at bed time. This approach can be adopted where nutritionist service is not available.

Recommendation 6.5.2: Recommended overall total caloric distribution:

o Carbohydrate: 33-40% with low glycemic index.

o Protein: ~ 20%.

o Fat: < 40%, saturated fat <7% and transfat<1%.

Recommendation 6.5.3: Plate model can be practiced. Advise women to avoid consumption of raw meat, uncooked eggs, unpasteurized milk and soft cheese to prevent risk of food borne bacterial disease. Strictly prohibit smoking and alcohol that are known to cause foetal developmental harm. Avoid mercury containing fish. Restrict caffeine, as it may increase miscarriage risk. Teach carbohydrate counting tools for carbohydrate consistency in each meal. Also teach insulin to carbohydrate ratio so that insulin intake can be changed according to carbohydrate intake.

Recommendation 6.5.4: Simple sugars should be avoided. Food containing complex carbohydrate intake is recommended.

Recommendation 6.5.5: High dietary fibre and whole grain containing foods should be encouraged.

Recommendation 6.5.6: Non-calorie sweeteners (aspartame) may be used safely in moderate amounts

Recommendation 6.5.7: Lean protein, oily fish and vegetable consumption should be increased.

Recommendation 6.5.8: Recommended daily requirement of

o Iron- 30-60 mg

o calcium- 1000 mg (1300 mg for women below 19 years of age)

o folate- 0.4 mg.

Recommendation 6.5.9: Over-nutrition during pregnancy should be discouraged.

Recommendation 6.6: Exercise/ Physical activity: Women with GDM should be encouraged to be as active as possible throughout the day.

Recommendation 6.6.1: Moderate exercise of 30 minutes/day in 1st trimester is recommended. Walking can be continued till term at a pace that is comfortable.

Recommendation 6.6.2: In addition to the previous plan, advising intermittent exercise programme such as 10 minutes three times a day preferably post prandial is suggested. While doing exercise excessive abdominal muscular contracture should be avoided and should be modified by obvious safety issue (e.g., activities involving balance, direct contact sports).

Recommendation 6.6.3: Upper limb exercise while seated for 10 minutes after each meal is recommended if there is no medical or obstetric contraindication. Upper limb exercise is preferred during 2nd and 3rd trimester. Aerobic exercise is preferred.

Recommendation 6.6.4: Walking, cycling, swimming and yoga are a few recommended exercises which can be practiced until term if there are no obstetric complications which require bed rest. It is important to recognise that any exercise that poses the risk of fall to the pregnant woman should be discouraged.

Recommendation 6.6.5: If there is any medical or obstetric contra-indication then exercise should not be advised. Similarly a new intense exercise during pregnancy should not be started during pregnancy.

RECOMMENDATION 7

PHARMACOLOGICAL TREATMENT OF GDM:

Recommendation 7.1: Pharmacological therapy should be considered if one fails to achieve glycemic targets with non-pharmacological therapy (MNT & Physical activity) within target days.

Recommendation 7.2: Pharmacological treatment should be started if target BGs are not achieved at any point of pregnancy after 1 to 2 weeks on MNT and exercise.

Algorithm based guidance on initiation of pharmacological treatment considering FBG, 1h or 2 h PPG has been suggested.

Recommendation 7.3: During FIRST TRIMESTER: (Table 1)

Recommendation 7.3.1: If FBG is ≥92 mg/dl (≥5.1 mmol/L) to 109 mg/dl (6.0 mmol/L) and or 2h PPG is ≥120 mg/dl (≥6.7 mmol/L) to 139 mg/dl (7.7 mmol/L) non-Pharmacological therapy is started and continued. If BG targets are not achieved within 1 week, along with non-Pharmacological therapy, pharmacological treatment should be started.

Recommendation 7.3.2: If FBG is ≥110 mg/dl (≥6.1 mmol/L) to 126 mg/dl (6.9 mmol/L) and or 2h PPG is ≥140 mg/dl (≥7.8 mmol/L) to 199 mg/dl (11.0 mmol/L) non-Pharmacological therapy is started & continued for 3 days. If good improvement is observed after 3 days then non-Pharmacological therapy can be continued for 1 week. If BG target are achieved after 1 week, then non-Pharmacological therapy is continued. If BG targets are not achieved during this duration then pharmacological treatment should be started along with non-Pharmacological therapy.

Recommendation 7.3.3: If FBG is ≥126 mg/dl (≥7.0 mmol/L) and or 2h PPG is ≥200 mg/dl (≥11.1mmol/L), pharmacological therapy should be started from the onset along with non-pharmacological treatment.

Recommendation 7.3.4: Ketonuria or ketosis due to diabetes is an indication for insulin at any gestation.

Table-1: TREATMENT IN 1ST an 3rd TRIMESTER

GDM PLASMA GLUCOSE TARGETS AND TREATMENT PROTOCOL BY SAFES

PG values		Treatment		Change of treatment at onset	Treatment if Target not achieved in	reviewed & continued
FBG	≥92 mg/dl (≥5.1 mmol/L)	To	109 mg/dl (6.0 mmol/L)	NPT	1 week	NPT+PT
and/or 2h PPG	≥120 mg/dl (≥6.7 mmol/L)	To	< 140 mg/dl (7.8 mmol/L)	NPT	1 week	NPT+PT
FBG	≥110 mg/dl (≥6.1 mmol/L)	To	<126 mg/dl (7.0 mmol/L)	NPT	3 days	NPT+PT
and/or 2h PPG	≥140 mg/dl (≥7.8 mmol/L)	To	< 200 mg/dl (11.1 mmol/L)	NPT	3 days	NPT+PT
FBG	≥126 mg/dl (≥7.0 mmol/L)			NPT+PT	x	NPT+PT
and/or 2h PPG	≥200 mg/dl (≥11.1mmol/L)			NPT+PT	x	NPT+PT

NPT: Non-pharmacological treatment, PT: Pharmacological treatment.

Recommendation 7.4: During SECOND TRIMESTER: (Table 2).

Recommendation 7.4.1: If FBG is ≥92 mg/dl (≥5.1 mmol/L) to 109 mg/dl (6.0 mmol/L) and or 2h PPG is ≥120 mg/dl (≥6.7 mmol/L) to 139 mg/dl (7.7 mmol/L); non-Pharmacological therapy is started & continued. If BG targets are not achieved

within 2 weeks for uncomplicated cases and 1 week for complicated cases (Pre-eclampsia, polyhydramnios) pharmacological treatment should be started along with non-Pharmacological therapy.

Recommendation 7.4.2: If FBG is ≥110 mg/dl (≥6.1 mmol/L) to 126 mg/dl (6.9 mmol/L) and or 2h PPG is ≥140 mg/dl (≥7.8 mmol/L) to 199 mg/dl (11.0 mmol/L) non-Pharmacological therapy can be started & continued for 1 week. If BG targets are achieved after 1 week, then non-Pharmacological therapy is continued. If BG targets are not achieved, pharmacological treatment should be started along with non-Pharmacological therapy.

Recommendation 7.4.3: If FBG is ≥126 mg/dl (≥7.0 mmol/L) and or 2h PPG is ≥200 mg/dl (≥11.1mmol/L), pharmacological therapy should be started fromthe onset along with non-pharmacological treatment.

Table-2: TREATMENT IN 2ND TRIMESTER

GDM PLASMA GLUCOSE TARGETS AND TREATMENT PROTOCOL BY SAFES

SECOND TRIMESTER:

PG values		Treatment		Change of treatment at onset	Treatment if Target not achieved in	reviewed & continued
FBG	≥92 mg/dl (≥5.1 mmol/L)	To	109 mg/dl (6.0 mmol/L)	NPT	2 week/1 week Uncomplicated/complicated	NPT+PT
and/or						
2h PPG	≥120 mg/dl (≥6.7 mmol/L)	To	<140 mg/dl (7.8 mmol/L)	NPT	2 week/1 week Uncomplicated/complicated	NPT+PT
FBG	≥110 mg/dl (≥6.1 mmol/L)	To	<126 mg/dl (7.0) mmol/L)	NPT	1 week	NPT+PT
and/or						
2h PPG	≥140 mg/dl (≥7.8 mmol/L)	To	< 200 mg/dl (11.1 mmol/L)	NPT	1 week	NPT+PT
FBG	≥126 mg/dl (≥7.0 mmol/L)			NPT+PT	x	NPT+PT
and/or						
2h PPG	≥200 mg/dl (≥11.1mmol/L)			NPT+PT	x	NPT+PT

NPT: Non-pharmacological treatment, PT: Pharmacological treatment.

Recommendation 7.5: During THIRD TRIMESTER: (Table 1).

Recommendation 7.5.1: If FBG is ≥92 mg/dl (≥5.1 mmol/L) to 109 mg/dl (6.0 mmol/L) and or 2h PPG is ≥120 mg/dl (≥6.7 mmol/L) to 139 mg/dl (7.7 mmol/L) non-Pharmacological therapy is started and continued. If BG targets are not achieved within 1 week, along with non-Pharmacological therapy; pharmacological treatment should be started.

Recommendation 7.5.2: If FBG is ≥110 mg/dl (≥6.1 mmol/L) to 126 mg/dl (6.9 mmol/L) and or 2h PPG is ≥140 mg/dl (≥7.8 mmol/L) to 199 mg/dl (11.0 mmol/L) non-Pharmacological therapy can be started and continued. If BG targets are achieved after 3 days, then non-Pharmacological therapy continued. If BG targets are not achieved then pharmacological treatment should be started along with non-Pharmacological therapy.

Recommendation 7.5.3: If FBG is ≥126 mg/dl (≥7.0 mmol/L) and or 2h PPG is ≥200 mg/dl (≥11.1mmol/L), pharmacological

therapy should be started from the onset along with non-pharmacological treatment.

Recommendation 7.6: Insulin is recommended for treatment of GDM (and pre-gestational / pre-existing diabetes) as pharmacological therapy.

Recommendation 7.6.1: Recommended Insulin types: Recombinant human short acting (regular) insulin, recombinant human intermediate acting (NPH) insulin is recommended for use during pregnancy. Among ultra-short acting insulin analogues; Aspart and Lispro are safe. Among long acting analogue use of detemir is recommended. Data on glargine is evolving, and if a woman was well-controlled on glargine before pregnancy, she can continue it during pregnancy. Premixed human, biphasic aspart and biphasic lispro are frequently used in South Asia and these can be used in selected patients keeping in mind that these insulins have limited flexibility for dosage adjustment. Use of Glulisine, and Degludec is not recommended until more safety data is available.

Recommendation 7.6.2: Required initial dose is 0.2 to 0.5 U/kg/day. Obese women may need higher dose. Treatment should be graded to reach the targets.

Recommendation 7.7: Recommended approach to start insulin:

Step 1: In case of high fasting blood glucose (FBG), An intermediate acting human insulin or basal analogue insulin with a dose of 0.1 to 0.2U/kg at bed time may be a starting dose. The insulin dose must be titrated every 48 to 72 hours to reach the desired FBG target.

Step 2: High post meal blood glucose should be controlled by bolus insulin -either by regular human insulin or by short acting insulin analogue with meal(s) and titrated every 48 to 72 hours to achieve the desired post-meal targets.

o Only bolus insulin may be needed in some cases of GDM when FBG is well controlled with non-Pharmacological therapy.

o The Premixed insulin regimens put the woman at risk of fluctuating glycemic control during pregnancy and should ideally be avoided. However, premixed insulin can be considered on individual basis where patients are unwilling to or unable to take basal bolus regimen.

o ***Recommendation 7.8:*** Recommended OAD: Use of sulphonylurea during GDM is not recommendedby SAFES. Since the safety data on use of metformin during pregnancy is now spanning more than four decades; this is the only OAD recommended for use during GDM by SAFES. The doses will vary from 250 mg to 2550 mg per day depending upon individual needs. Insulin must be supplemented if metformin monotherapy is unable to achieve control within a week.

RECOMMENDATION 8

ANTENATAL CARE TIMETABLE:

Recommendation 8.1: First appointment: Patient should be counselled about importance of good glycaemic control. Doctor should take a thorough clinical history including review ofcurrent medications being used. In pre-existing hyperglycemia, oral anti-diabetic agents should be stopped apart from metformin, and insulin should be started if required. Retinal assessment should be done. Renal assessment through urinary albumin to creatinine ratio should be obtained.

Screening for major chromosomal anomalies and cardiac defects by Nuchal Translucency ultrasound between 11+6 to 13+6 weeks in women with Pregestational diabetes or overt Diabetes should be offered.

Advise high-risk women with T1DM and T2DM to take 75 mg of aspirin daily. Aspirin needs to be administered from 12 weeks until the birth of the baby for prevention of preeclampsia.

16 weeks: Routine clinical and laboratory assessment should be done.

20-22 weeks: Detailed anomaly scan and four-chamber view of the foetal heart and outflow tracts to be done.

24 weeks: Routine care to be offered.

28 weeks: Ultrasound monitoring of foetal growth and amniotic fluid volume should be offered.

32 weeks: Ultrasound monitoring of foetal growth and amniotic fluid volume should be offered.

34 weeks: Routine care should be offered.

36 weeks: Ultrasound monitoring of foetal growth and amniotic fluid volume should be offered.

37+0-38+6 weeks: Induction of labour, or caesarean section (if indicated) to women with pregestational diabetes. Tests of foetal wellbeing for women waiting for spontaneous labour should be offered.

39 - 40 weeks: advise delivery by 40 weeks to women with GDM with no obstetric complications and optimum glucose control. Tests for foetal wellbeing for women waiting for spontaneous labour should be offered.

Recommendation 8.2: Counselling and planning should be done in following issues:

o -timing, mode and management of birth,

o -analgesia and anaesthesia (including anaesthetic assessment for women with comorbidities),

o -changes to therapy during and after birth,

o -initial care of the baby,

o -initiation of breastfeeding and the effect of breastfeeding on glycemic control,

o Contraception and follow-up

Recommendation 8.3: Other maternal assessment:

Urine for ketone bodies during severe hyperglycemia, weight loss or to detect possible starvation ketosis should be done.

Recommendation 8.4: Psychological assessment is recommended to detect anxiety, depression, eating disorders and stress.SAFES recommends use of WHO-5 and Whooley's 2 item questionnaire.

RECOMMENDATION 9

INTRA-PARTUM MANAGEMENT:

Recommendation 9.1: Timing and route of delivery:

Recommendation 9.1.1: SAFES recommend that delivery is indicated after 38 completed weeks if not indicated by maternal and foetal compromisesand no later than 40 weeks.

Recommendation 9.1.2: Mode of delivery is as per general indications. GDM (and pre-gestational/ pre-existing DM) is not an indication for caesarean delivery.

Recommendation 9.1.3: Elective caesarean section is recommended if GDM is complicated with foetal weight 4500gm or more and or bad obstetric history.

Recommendation 9.2: Intrapartum glycemic control.

Recommendation 9.2.1: Women on MNT with good glycemic control do not require active glucose management during labour. Blood glucose monitoring should be done on admission.

Recommendation 9.2.2: If the woman is on MNT, BG monitoring is recommended 4 to 6 hourly. If the woman is receiving pharmacotherapy for glycemic control then she needs more frequent glucose monitoring, typically hourly monitoring.

Recommendation 9.2.3: Glycemia is managed by an IV insulin infusion separate from the dextrose infusion.An I/V Insulin infusion is needed in all women with T1DM and most of the insulin treated T2DMs.

Recommendation 9.2.4: Goal of Intra-partum capillary BG level is between: 72-126 mg/dl (4 - 7mmol/L).

Recommendation 9.2.5: Assessment for anaesthesia should be done on 3rd trimester if GDM/ pre-existing diabetes is complicated with co-morbid conditions. If general anaesthesia is used BG should be monitored every 30 to 60 minutes.

RECOMMENDATION 10

POST-PARTUM MANAGEMENT:

Recommendation 10.1: All mothers with history of Gestational Diabetes Mellitus should be counselled about screening for GDM during every subsequent pregnancy. Empowering Health care professionals (Gynaecologists, mid-wives, lady health visitors, paediatricians, nurses, diabetes educators) by providing sensitised standard literature and continuing education by conducting training are crucial. At all levels a shared decision making with obstetric team should be considered when necessary.

Recommendation 10.1.1: After delivery at least 1 fasting and 1 post meal BG before discharge should be measured in GDM patients who were managed by MNT and FBG and post meals BG should be monitored for at least 24 hours who were managed with insulin. If blood glucose remains elevated, continued monitoring is warranted. Possibility of type 2 diabetes should be considered. If immediate post-delivery (i.e. 1-3 days) BG is suggestive of DM, then should be confirmed by FBG ($\geq$7 mmol/l) or or 126 mg/dl post-prandial BG ($\geq$11.1mmol/l) or 200 mg/dl.

Recommendation 10.1.2: As some case of GDM may represent pre-existing undiagnosed type 2 diabetes and 50% women with GDM may develop type 2 DM within 5 to 10 years, women with GDM should be screened for diabetes 6 weeks post-partum (linked to child immunisation) with 75g 2h OGTT using non-pregnant OGTT criteria. However, the opportunity to perform OGTT should not be missed later on; if 6 weeks OGTT is not done due to one reason or another. Because of pre-partum management of hyperglycemia during pregnancy, using A1C is not recommended. If BG is normal, re-assessment should be done annually with 75g2h OGTT or A1C. If prediabetes, re-assessment should be done 6 monthly and should be put on either on MNT alone or MNT and metformin.. Incorporating a post-partum calendar to ensure screening of index GDM subjects and synchronising with child's immunisation calendar has been proposed.

Recommendation 10.1.3: Low dose oestrogen-progesterone can be offered for contraception. Medroxyprogesterone preparations can increase risk of vascular complications with long-term use. However, long acting levonorgestrel based systems are relatively safe. Barrier method and non-hormonal intrauterine device can be used safely in all women.

Continued Retinal assessment for one year post-partum in women with T1DM or T2DM with evidence of retinopathy should be done.

Recommendation 10.1.4: Screening for all components of metabolic syndrome should be offered.

Recommendation 10.2: POST-PARTUM GLYCEMIC MANAGEMENT:

Recommendation 10.2.1: Women on MNT and metformin can reduce the intensity of SMBG.

Recommendation 10.2.2: Women with GDM who were on metformin can stop the medication.

Recommendation 10.2.3: Women with GDM who were on low dose insulin (<0.5units/kg/day) can stop insulin and monitor glucose levels.

Recommendation 10.2.4: Women with either overt diabetes of pregnancy or pregestational T2DM who were on insulin >1units/kg/day may reduce the dose to 50% and while those on 0.5-1units need individualised clinical decision.

Recommendation 10.2.5: Insulin sensitivity increases with delivery of the placenta and then returns to prepregnancy levels over the following 1-2 weeks. In women with T1DM; insulin requirements will be around 0.3 unit/kg/day, further adjustment of insulin doses should be done according to SMBGs. Particular attention is needed to hypoglycemia prevention in the setting of lactation, erratic sleep and eating schedules.

Recommendation 10.2.6: Insulin at 50% of pregnancy dose should be continued for mothers who underwent LSCS.

Recommendation 10.2.7: If the pregnancy has motivated the adoption of a healthier diet, building on these gains to support weight loss is recommended in the postpartum period.

Recommendation 10.3: BREASTFEEDING

Recommendation 10.3.1: All types of insulin and metformin can be safely used in lactating women. There is some evidence on the use of glibenclamide and glipizide during lactation.

Recommendation 10.3.2: Women with diabetes who are breastfeeding should continue to avoid any drugs for the treatment of diabetes complications that were discontinued for safety reasons in the pre-conception period. An exception to this is diabetic nephropathy in which case ACE-inhibitors/ARBs can be safely restarted.

RECOMMENDATION 11

CHILD CARE:

Recommendation 11.1: Exclusive breast feeding is recommended as this reduces mother's and offspring's obesity and prevent development of future type 2 DM of mother in GDM and offspring and reduces the risk of neonatal hypoglycemia. Breastfeeding should be initiated as soon as possible/ within the first 30 minutes after birth and should be done at 2-3 hours interval. First newborn blood glucose should be checked after first feeding then before each subsequent feedings for 24 hours with a aim to keep pre-feed BG at least >2.5 mmol/L (>45 mg/dl). Glucometer calibrated for neonatal use should be utilised for this purpose. Blood tests for polycythemia, hyperbilirubinemia, hypocalcemia, hypomagnesemia can be carried out if clinical sign is present.

Recommendation 11.2: At the time of delivery, birth weight, gestational age, congenital abnormalities if any, blood glucose at birth should be noted. Consider maintaining baby registry to remind mothers to follow up with baby's paediatrician for annual checkup. Annual Medical check-up of baby/child should be done to monitor growth charts to detect childhood obesity. Parental counselling should be done at every visit to adopt healthy lifestyle and healthy eating habits to avoid obesity.

RECOMMENDATION 12

WOMEN WITH GESTATIONAL DIABETES MELLITUS AND FOETAL LOSS:

These women require special attention by the health care professionals. Special attention should be paid to their psychological well-being with referral to a mental health professional as and when needed. Since there is no baby immunisation visit, these women should be screening with standard 75g 2h OGTTat 6-12 weeks after foetal loss.

RECOMMENDATION 13

ADAPTATION OF RECOMMENDATION:

In case of any need for adaptation/change in recommendation(s) due to resource constraint or any other reason(s) for a member country the respective Endocrine Society can adopt and inform SAFES.