Standard Operating Procedure for (SOP)

GESTATIONAL DIABETES MELLITUS

2024

Maternal Health Section
Directorate of Family Welfare

SOP/DFW/MH-2/GDM/ Version -1

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Foreword

Gestational Diabetes Mellitus (GDM) has been identified as a potential risk factor for poor health status in pregnant mothers which has a causal relationship with various complications during pregnancy and childbirth, contributing directly to increased maternal or neonate morbidity and mortality. In recent years, Delhi has been steadfast in its commitment to strengthening the health system, with a special focus in the areas of maternal and child health. Our concerted efforts have been focussed on reducing maternal mortality ratios and infant mortality rates with better screening and management of diseases which impact these indices.

One of the key challenges we face is Gestational Diabetes Mellitus (GDM), a significant risk factor for both expectant mothers and their babies. Through collaboration with experts, institutions and development partners, we have recognized the urgency of addressing GDM to safeguard the health of mothers and neonates alike.

I commend the tireless efforts of our team and extend my gratitude to the technical experts from various institutes and development partners whose invaluable contributions have brought these SOPs to completion. The primary objective of the SOP is to provide uniformity in screening and diagnosis of GDM. I am confident that by effectively implementing these SOPs in Delhi, we will not only enhance the well-being of mothers and newborns but also pave the way for the prevention of GDM Therefore, I urge all the concerned District Program Officers and other stakeholders in ensuring the successful implementation of these SOPs, thereby reducing the burden of GDM, and improving the management of GDM patients.

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Foreword

Gestational Diabetes Mellitus (GDM) is one of the most common medical disorders in pregnancy, adversely affecting maternal, fetal, and neonatal outcomes. GDM is traditionally defined as "Any degree of glucose intolerance with onset or first recognition during pregnancy." A simple intervention of screening for GDM by a one-step test (used for both screening and diagnosis) can significantly impact maternal and neonatal morbidity and mortality. Furthermore, long-term follow-up of these women is crucial as they are at an increased risk of developing Type 2 DM, metabolic syndrome, and coronary heart disease later in life.

The Directorate of Family Welfare, Delhi, took an initiative in preparing an elaborate Standard Operating Protocol (SOP) for State of Delhi based on evidence and guidelines of Ministry of Health & Family Welfare. The primary objective of the SOP is to provide simple, usable and uniform information for screening and diagnosis of GDM. Additionally, the SOP aims to empower healthcare workers in Delhi to manage GDM cases by imparting knowledge and necessary skills. Also, the SOP would be part of a series of SOPs under material health, the others being on anemia and other maternal health issues.

I am pleased that these Standard Operating Procedures (SOPs) were meticulously prepared by experts after numerous technical committee meetings. I extend my heartfelt gratitude to the Special Secretary for the inspiration providedfor framing these SOPs.

I take this opportunity to extend my best wishes to all those involved in implementing these SOPs at their respective facilities.

Finally, I believe that an earnest implementation of these SOPs would go along way in not only reducing but better management of GDM patients and also reduce the burden of Diabetes in future population cohorts.

Dr. Vandana Bagga

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Preface and Acknowledgement

As per the definition provided by the World Health Organization, Gestational Diabetes Mellitus (GDM) is characterized by hyperglycemia, with blood glucose levels exceeding normal but not reaching the threshold for diagnosis of diabetes. GDM manifests during pregnancy, posing increased risks of complications for both the mother and the baby.

Moreover, not only women diagnosed with gestational diabetes, but also potentially their offspring, face elevated risks of developing type 2 diabetes in the future. Maternal risks of GDM include polyhydramnios, pre-eclampsia, prolonged labour, obstructed labour, cesarean section, uterine atony, postpartum hemorrhage, infection and progression of retinopathy which are the leading global causes of maternal morbidity and mortality. Fetal risks include spontaneous abortion, intra-uterine death, stillbirth, congenital malformation, shoulder dystocia, birth injuries, neonatal hypoglycemia and infant respiratory distress syndrome. Importantly, Gestational diabetes is diagnosedthroughearly ante-natal screening rather than relying on reported symptoms.To an extent, GDM can also be predicted and hence pre-natal counseling also has a role. Equally important is the fact that neither a universal (2 time) screening nor detection is happening optimally as per the HMIS data visible at State level.

Therefore, the Directorate of Family Welfare, Delhi has taken a proactive approach by conducting a training of trainers and subsequently formulating these Standard Operating Procedures (SOPs) under the guidance of the Director-DFW. The primary objective of these SOPs is to sensitize service providers and toensure consistency in the screening and diagnosis of GDM. Furthermore, the SOPs aim to equip healthcare providers in Delhi with the necessary knowledge and skills to effectively screen, manage and also report GDM cases.

These SOPs have been meticulously formulated by experts to whom this Directorate is indebted. I also extend my sincere appreciation to the Director,DFW for her invaluable guidance and support in finalizing these SOPs.

Finally, I would also like to extend my best wishes to all those responsible for implementing these SOPs in their respective facilities. As a program officer, I firmly believe that the earnest implementation of these SOPs will play a pivotal role in alleviating the burden of GDM and improving the management of affected patients in the State of Delhi.It is hoped at the end that in due course the impact would be visible on maternal and peri-natal morbidity and mortality and also on future generations.

I also request the readers to provide constant inputs in the form of feed-back, action taken, impact and suggestions for improvisation of subsequent versions.

Dr. Jyoti Sachdeva

Abbreviations

1. ANM - Auxillary Nurse Midwife
2. ANC - Antenatal Care
3. APHRM - Age Predicted Heart Rate Maximum
4. APVO2R - Age Predicted Vo2 Reserve
5. ASHA - Accredited Social Health Activist
6. BMI - Body Mass Index
7. CTG - Cardiotocography
8. CS - Caesarean Section
9. DM - Diabetes Mellitus
10. DIPSI - Diabetes in Pregnancy Study Group of India
11. DKA - Diabetic Ketoacidosis
12. FBS - Fasting Blood Sugar
13. FIGO - The International Federation of Gynecology and Obstetrics
14. GDM - Gestational Diabetes Mellitus
15. IADPSG - International Association of Diabetes and Pregnancy Study Group
16. IDDM - Insulin Dependent Diabetes Mellitus
17. IGT - Impaired Glucose Tolerance
18. IUCD - Intrauterine Contraceptive Disease
19. HMIS - Health Management Information System
20. MCW - Maternity Child & Welfare Centre
21. MEC - Medical Eligibility Criteria
22. MH - Maternity Home
23. MNT - Medical Nutrition Therapy
24. MO - Medical Officer
25. NCD – Non-Communicable Diseases
26. NICE - National Institute for Health and Clinical Excellence
27. NIDDM - Non Insulin Dependent Diabetes Mellitus
28. NPH - Neutral Protamine Hagedorn
29. Ob- Obese
30. OGTT - Oral Glucose Tolerance Test
31. Owt- Overweight
32. PPBS - Post-Prandial Blood Sugar
33. PHC - Primary Health Center
34. PMSMA - PradhanmantriSurakshit Matritva Abhiyan
35. RBS - Random Blood sugar
36. RM - Repetition Maximum
37. RPE - Rate of Perceived Exertion
38. SMBG - Self Monitoring of Blood Glucose
39. SOP - Standard Operating Procedure

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Standard Operating Procedure for Gestational Diabetes Mellitus

Introduction

Gestational Diabetes Mellitus (GDM) is one of the most common medical disorder in pregnancy which adversely affects maternal, fetal and neonatal outcomes. GDM has traditionally been defined as "Any degree of glucose intolerance with onset or first recognition during pregnancy". However, to differentiate this from pregestational diabetes/overt diabetes/diabetes in pregnancy (all terms are used inter-changeably) the American Diabetes Association (2019) modified the definition as "diabetes diagnosed in the second or third trimester of pregnancy that was not clearly overt diabetes prior to gestation". A Simple intervention of screening for GDM by a one step test (which is used for screening as well as diagnosis) can have a significant impact on the maternal and neonatal morbidity and mortality. Besides, long term follow up of these women is important because they are at an increased risk of developing Type 2 DM, metabolic syndrome and coronary heart disease later in their lives. Hence a 'GDM testing Room' ('DIPSI Room') is the need of the hour in all secondary and tertiary health facilities.

This document consists of the suggested SOP for screening, diagnosis and management of a woman with hyperglycaemia in pregnancy at the different levels of care. It also defines the referral policy for GDM and the long term follow up of these women.

Objectives of the SOP

- To provide uniformity in screening and diagnosis of GDM
- Empower the HCW to manage a case of GDM by imparting knowledge and necessary skills
- Establish referral networks and define the indications of referral
- Establish linkages for the long term follow up of these patients with the NCD Clinics

Scope of the SOP

1. Indications and time of screening of the PW for GDM
2. Details of screening and place identification - to be ideally performed in a dedicated area within the ANC OPD (DIPSI Room).
3. Details of the MNT and pharmacotherapy
4. Indications for referral.
5. Long term follow up.

The SOP is suitable for the staff of the Primary, Secondary and Tertiary levels including the ASHA, ANM, Nurses, MO and the Obstetrician.

Beyond Scope

The alternative method for screening and diagnosis of GDM, which is the IADPSG criteria, adopted by World Health Organization in 2013 is also discussed briefly under the section of 'Screening for GDM'.

1. SOP forScreening/Testing for GDM

Sl	Activity	Responsibility	RemarksAnnexures
1.	Counseling all Antenatal women	ASHA/ANM//Nursing Staff	**Annexure 1:**All antenatal women attending the Health care facility to be counseled regarding importance of checking for blood sugar, how the test is to be done and what will be the follow up.
2.	Target population to be screened	ASHA/ANM/MO	**Annexure 2:**All pregnant women to be screened for GDM.
3.	All antenatal women to visit DIPSI corner/room	ASHA/ANM	Annexure 3:Site map directing ANC woman to the target area
4.	Action in DIPSI room/corner	Staff (Technician, Nursing) posted for the purpose	**Annexure 4** Action points in DIPSI room/corner **Annexure 5:** How to administer Glucose **Annexure6:** How to test capillary glucose with Glucometer
5.	Maintenance of records	Staff (Technician, Nursing)posted for the purpose	Register with all demographic details, contact numbers and next date of follow up visit in ANC Register
6.	Maintenance of equipment	Staff (Technician, Nursing) posted for the purpose	**Annexure 7,8** Specification & Calibration of Glucometer
7.	DIPSI Protocol	MO/Obstetrician	**Annexure 9**DIPSI flow chart
8.	Out of Scope	MO/Obstetrician	**Annexure 10**IADPSG protocol

2. SOP for Maternal Nutrition Therapy for Pregnant woman coming to the PHC'S, MH'S & Hospital

S.No.	Activity	Responsibility	Reference/Remarks
1.	All pregnant woman who are diagnosed as GDM for first time should be started on MNT and physical exercise	Medical Officer/Staff Nurse/ANM	All pregnant women who test positive for GDM for first time should be started on MNT. **Annexure 11,12**
2.	Nutritional Counselling: - a)Daily caloric requirement as per pre pregnancy BMI (individualisation)	Medical Officer/Staff Nurse/ANM	Mixed meal consisting of carbohydrate, protein fat and fibre is advised **Annexure 11**
	b)Caloric composition (normal requirement of adult + additional for fetal growth)		
	C)Caloric distribution across various meals		
3.	Practical Recommendation: - a) Sedentary work (1900+350) =2250Kcal/day	Medical Officer/Staff Nurse/ANM	Carbohydrate foods with low glycaemic index should be preferred **Annexure 13,14**
	b)Moderate work(2230+350)=2580Kcal/day		
	c)Heavy work (2850+350)=3200 Kcal/day		
4.	Caloric Requirement: - An addition of 350 Kcal/day above the adult requirement is recommended during second & third trimester		Addition or deduction of 500calories/day are recommended as :- (BMI/KG/m2) Underweight-18.5 Normal weight-18.5-22.9 Overweight-23-24.9 Obese>25 In case of underweight, add500Kcal/day In case of obese, deduct 500kcal/day
5.	Meal Plan composition for GDM mothers:-	Medical Officer/Staff Nurse/ANM	**Annexure15**
5 a.	Caloric distribution:-	Medical Officer/Staff Nurse/ANM	
	Breakfast-10-20%		
	Lunch-20-30%		
	Dinner-30-40%		
	Snacks-upto30%		
5 b.	50-60%fromcomplex carbohydrates,10-20%from protein,25-30%fromfat	Medical Officer/Staff Nurse/ANM	Restriction of carbohydrates with high glycaemic index is advised Food items that increase blood sugar rapidly like fruit juices/rice/potato/fried Food / red meat should be avoided.

			Jawar, Bajra, Ragi, Fruits & vegetables are complex carbohydrates.
5 c.	Fats:- Saturated fat intake should be less than 10% of total calories and dietary cholesterol less than 300mg/dl.	Medical Officer/Staff Nurse/ANM	Use less fat in cooking Avoid fried foods Prefer fruits/salad/baked and steamed food items
5 d.	Protein &Fibres:- Atleast 3 servings of protein are required daily	Medical Officer/Staff Nurse/ANM	Sources of protein-milk, egg, fish, chicken, pulses, nuts
5 e.	Fibre:- High fibre foods help in controlling blood sugar and delay in gastric emptying	Medical Officer/Staff Nurse/ANM	Fibre should be increase in diet

3. SOP for Pharmacotherapy in GDM

Sr No.	Activity	Responsible Person	Remarks
1.	Metformin administration	MO/Obstetrician	After 2 weeks of MNT and physical exercise in the second trimester or after 1 week in third trimester, fasting and 2 hrs PPBS (post meal) should be done. If blood sugar levels are >95 fasting or >120mgd after 2 hours post meal, pharmacotherapy is introduced. Refer to **Annexure 16** for details on metformindose and indications/contraindications
2.	Insulin administration	MO/Obstetrician	Insulin is the drug of choice and is recommended for use in pregnancy as it does not cross the placenta (I). It is beneficial to pair regular or rapid-acting insulin with intermediate or long-acting insulin, in order to simulate the physiologic insulin secretion throughout the day (II). Indications of insulin are shown in **Annexure 17** Profile of insulin which are approved for use in pregnancy currently is mentioned in **Annexure 18** Method of titration of insulin, administration is given in **Annexure 19 & 20** Insulin Technique is shown in **Annexure 21**
3.	Recognition/Response to hypoglycemia	MO/Obstetrician/ Staff Nurse/ANM	**Annexure 22**
4.	Referral policy of patient for pharmacotherapy to Endocrinologist or physician	MO/Obstetrician	**Annexure 23**

4. SOP for Management During Labour

Sr No.	Activity	Responsible Person	Remarks
1.	Decision about timing of delivery in well controlled GDM	MO/Obstetrician	In women with GDM with well controlled blood sugar induction of labour is indicated between 38- 39 weeks as Indian babies age earlier and risk of late stillbirth increases due to aging placenta (Level C)
2.	Decision about timing of delivery in poorly controlled GDM/pregestational DM	Obstetrician	In case of poorly controlled GDM/ pre-gestational diabetes, timing needs to be individualised with expert guidance supporting earlier delivery. Delivery is justified between 37w0d and 38w6d; and in case of associated other co-morbidities, abnormal foetal tests or failure of in-hospital glycaemic control, delivery between 34w0d and 36w6d may be is advocated. (Level C)
3.	Decision about mode of delivery in suspected macrosomia	Obstetrician	Vaginal delivery is preferred with caesarean reserved for only obstetric indications or foetal macrosomia after proper counselling. Based on the degree of suspected macrosomia, the risks and benefits of vaginal and caesarean delivery need to be individualized and the counselling is provided accordingly. (Level C) Induction is planned early morning. Morning dose of insulin is omitted. Blood sugar is charted every 2 hourly with target of 70-110mg/dl. 0.9% saline infusion given at the rate of 100ml/hr. Blood sugar > 120 mg% - continuous infusion of insulin to be started. In the Indian set up, estimated fetal weight > 4000 gm/ 3.45 Kg in diabetic mother is an indication for elective cesarean section at 39 weeks in case fetopelvic disproportion is suspected. (2+) Previous delivery of macrosomic baby with poor obstetrical outcome is again an indication for elective caesarean section in suspected macrosomia.

			Suspected macrosoma is not a contraindication to labour after caesarean, however consider the past and predicted birth weight (Level C). In case labour is prolonged or arrest occurs, caesarean is preferred to instrumental delivery as shoulder dystocia may occur even when estimated aby weight is normal. Delivery should be attempted by an experienced obstetrician who is trained in shoulder dystocia management. Delivery preferably in tertiary care centre or in a centre having facility for 24 x 7 caesarean section
4.	Place of delivery for well controlled GDM on MNT and no suspected macrosomia or any other complications like preeclampsia	MO/Obstetrician	May deliver at EmOC/District Hospital **Annexure 24**
5.	Place of delivery for well controlled GDM on metforming /insulin and no suspected macrosomia or any other complications like preeclampsia	MO/Obstetrician	May deliver at EmOC/District Hospital **Annexure 24**
6.	Place of delivery (vaginal or caesarean) for poorly controlled GDM/pregestational DM/ suspected macrosomia or any other complications like preeclampsia	Obstetrician	Tertiary level health facility Note- GDM on insulin therapy with uncontrolled blood sugar levels (2 hr PPBS > 120 mg/dL) or insulin requirement >20 U/ day or overt diabetes or end organ involvement or with other medical or obstetric complications, associated with hypoglycaemic attacks or DKA should be referred to tertiary care centre for delivery under care of obstetrician For detailed management during labour and CS see Annexure 25
7.	Management of neonate	MO/Paediatrician	The goal of neonatal management is to anticipate the complications and morbidities associated with maternal diabetes and maternal hyperglycaemia. The risk of complications varies depending on gestational age, birth weight and degree and severity of hyperglycaemia. The mode of delivery also determines certain morbidities like transient tachypnoea of newborn Refer to **Annexure 26** for immediate management of newborn

5. SOP for Indication of Referral Including Role of MO/LT/ANM/ASHA

The Indian health system needs to improve in provision of obstetric care by standardizing services at each level of health care and increasing the focus on emergency treatment and appropriate decision making for referral and improving referral communication and staff support.

To facilitate follow up of referred patients following as required

Pertinent history and physical examination finding

Initial lab tests

Designated facility for Referral

Sr No.	Activity	Responsible Person	Referral	Remarks
1	All pregnant Woman to be referred to primary healthcare provider (MO)	ASHA	From Community to PHC (DGD, SEED PUHC, MCW CENTERS, PVT CLINIC) referred by ASHA or self.	All pregnant woman to be screened for high risk factors and referred to PMSMA day clinic to be seen by specialist and followed up as per high risk protocol. **Annexure 27** all high risk factor.
2	All pregnant women with uncontrolled blood Suga to be referred –	MO/LT	From PHC to Secondary level Hospital/where MD Medicine/Endocrinologist is available or Pvt. Clinic	FBS > 126 mg/dl or RBS >200 mg/dl FBS > 95 mg/dl or 2 hour PPBS > 120 mg/dl even after metformin/insulin treatment PPBS >200Mg/dl at any point of tim during management Total dose of Insulin exceeds 20 units/day Co-existing medical or obstetric comorbidities. PW develops hypoglycaemia more than once a day Refusal to take injection Insulin **Annexure 22** for hypoglycaemia
3	GDM,PW needs to be referred for prenatal ultrasound	MO	From PHC to Secondary level Hospital where Ultrasound facility is available/Pvt. Hospital	18-20 weeks of gestation to rule outgross congenital anomaly

	ultrasound Pregnant woman with GDM are at in increased risk of foetal death hence vigilant foetal surveillance is required			28-30 wks growth scan 34-36 wks growth scan In both scans for foetal biometry & amniotic fluid estimation **Annexure28** for foetal surveillance
4	Birth Preparedness & Delivery Referral Pregnant women with GDM should ideally have institutional delivery provided by obstetrician	MO/ANM/ ASHA	From PHC to Secondary level / Tertiary Hospital where patient is registered for Delivery	Pregnant women with GDM & poor blood sugar control with risk factors like hypertention/ BOH requiring early delivery at or before 34 weeks need steroids for foetal lung maturity. Inj Dexamethasone 6mg IM 12 hrly for 2 days and vigilant monitoring for next 3-5 days. GDM with uncontrolled blood sugar on MNT or medicine to be referred at 34-36 wks. GDM with well controlled blood sugar should be scheduled for induction of labour at 39 wks. GDM with Macrosomia - LSCS should be done at 38-39 wks. **Annexure24** for birth preparedness

6. SOP for Postpartum Care in GDM Women and Long Term Follow up

S. No.	Activity	Responsibility	Reference/Remarks
1.	Early Breast feeding	ASHA /ANM/Nurse/MO	Prevent Hypoglycaemia in New born Initiate new-born blood sugar monitoring 1st hr of birth repeated every four hourly till 4 normal readings (>45 mg/dL) **Annexure 26**
2.	Counseling & Sensitization of future risks	ASHA/ANM/MO/ Resident/MO	GDM (40%), Type 2 Diabetes (10Fold), Metabolic syndrome (30%), Cardiovascular disease (2-fold)
3.	Lifestyle modification – Dietary advises Exercise Weight reduction (if Obese/overweight)	ASHA/ANM/MO Diet Chart to be provided	Diet Chart and exercise chart to be provided **Annexure 11 & 12**
4.	Contraception- IUCD/ Barrier- MEC1 Rest- MEC 2	ASHA/ANM/MO	**Annexure 29**
5.	OGTT at 6 weeks 75 gm glucose load (ANM to prepare a list and Follow up)	LT/ MO	Cut off Fasting > 126 mg/dl 2 hours Post prandial Normal < 140 mg/dl IGT 140-199 mg/dl Diabetes ≥200 mg/dl
6.	Test Normal- Annual Screening	ASHA/ANM/MO	75 gm OGTT yearly
7.	Test Abnormal- Refer to NCD Clinic/ endocrinologist -Medical therapy	Medical Specialist / endocrinologist	Medical treatment
8.	Follow up from NCD Clinic 1.Counsel or medication adherence and procurement of medicine from dispensary 2. Regular physical activity, healthy eating & weight management 3.Hypoglycemia & it's management & other complications 4. If put on insulin check on injection technique& blood sugar monitoring	ASHA	**Annexure 30**
9.	Pre-pregnancy counselling for next pregnancy-with proper spacing	ASHA/ANM/MO	Desired Blood Sugar Levels- Fasting< 100mg/dl Post prandial< 140 mg/dl

7. Self-Care Interventions for GDM

Self-care interventions have the potential to increase choice and autonomy when they are accessible, acceptable, and affordable. The WHO is working closely on evidence-based recommendations on key public health self-care interventions, including for advancing sexual and reproductive health and rights (SRHR). It is an approach to reach Universal Health Coverage. Self Care Interventions in GDM as suggested by World Health Organisation are shown in Annexure 31.

8. Recording and Reporting Data Related to GDM in HMIS

It is a responsibility of the Health Care Providers to record and report the relevant data in the HMIS. The information related to GDM is shown in Annexure 32. A new data element has also been added since April 2023, regarding number of women started on metformin as shown in the Annexure 32.

Annexure 1: Agenda for Counselling of Antenatal Women Regarding Gestational Diabetes

Collect a group of antenatal women and make then sit comfortably.
Ask them if they know the importance of having normal blood sugar during pregnancy.
Ask them if there is any history of high blood sugar in previous pregnancies or if they are already on some medication for high sugar. In such cases they will be referred to higher center.
Inform them about the risk of having high blood sugar.
The risks to be told are

- Complications like recurrent infections, damage to kidney, heart and eyes in case of very high blood sugar.
- Malformations in the fetus such as cardiac and spinal deformities, high birth weight.

Inform them as to how the blood sugar will be checked and at which period of pregnancy.
In case of values higher than the cut off (140 mg/dl) what will be the follow up i.e they will be started on Medical Nutritional therapy and referred to higher center for further management.

Annexure 2 : Screening of Pregnant Women for GDM

All pregnant women to be screened during first visit and directed to DIPSI room/corner

Procedure:

In the DIPSI room, a pregnant woman, has to be given a 75 g oral glucose load, irrespective of whether she is in the fasting or non-fasting state and without regard to the time of the last meal. A venous blood sugar testingor testing by plasma calibrated glucometer is performed after 2 hours for estimating plasma glucose by the GOD-POD method. GDM is diagnosed if 2-hour PG is ≥ 140 mg/dL (7.8 mmol/L).

All antenatal women who have been tested in first trimester and were screen negative,will undergo second testing at 24-28 weeks.

Antenatal women coming after 28 weeks for first test will undergo only one test.

Terminologies for hyperglycaemia in pregnancy

Interpretation of DIPSI for diagnosis of hyperglycaemia in pregnancy, 2hours after 75 gm oral glucose load is as follows:

Plasma Glucose level (mg/dl)	Diagnosis
≥140-199	Gestational Diabetes Mellitus
≥ 200	Pregestational Diabetes/Overt diabetes/diabetes in pregnancy/ Type1 or Type2

Diabetes in pregnancy is also known as "overt diabetes" or"pregestational". It diabetes may be Type1 DM /IDDM or Type 2 DM /NIDDM. It may be diagnosed before pregnancy or during pregnancy if fasting plasma glucose level is≥ 126mg/dl or if random, post glucose load or post prandial plasma glucose level anytime is ≥200 mg/dl.

GDM: If 2 hours after 75 gm glucose load plasma glucose is between 140-199mg/dl

Annexure 3 : Suggested Poster for Directing Pregnant Women to DIPSI Corner/Room

Annexure 4: SOP to be followed in DIPSI Room/Corner

SOP in DIPSI room/corner once patient arrives

Greet and made to sit comfortably

Registration

Explaining the procedure

Administration of test glucose dose(75 grams) dissolved in 300 ml of water.

Directed to wait in designated area, advised not to eat/ do vigorous activity.

Dietary counseling for a normal pregnancy and in case of Diabetes carried out in designated waiting area using IEC material.

Test sample taken at 2 hours by collecting venous sample or capillary blood sugar by glucometer.

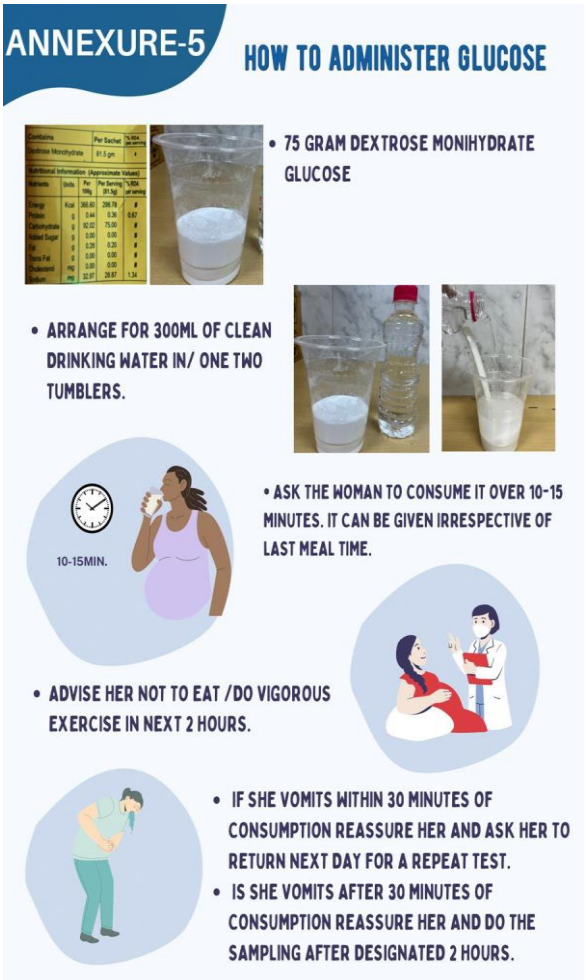
In case of glucometer report immediately shared with patient and recorded.

In case of venous (plasma) sample patient asked return at a designated date/day for the report.

Annexure 5 : Administration of Glucose for DIPSI Test

How to administer Glucose

Arrange for 300ml of clean drinking water in/ one two tumblers.
Dissolve the 75 grams sachet into 300ml water
Ask the woman to consume it over 10-15 minutes. It can be given irrespective of last meal time.
Advise her not to eat /do vigorous exercise in next 2 hours.
If she vomits within 30 minutes of consumption reassure her and ask her to return next day for a repeat test.
Is she vomits after 30 minutes of consumption reassure her and do the sampling after designated 2 hours.
Biomedical waste disposal to be followed with color coded bins.



Annexure 6:Procedure for Testing Capillary Blood Sugar with Glucometer

How to test capillary blood sugar with Glucometer

A blood drop sample is usually collected from a fingertip prick. Wash and dry hands.

The recommended site on palm: Side of distal ends of fingertips to minimize injury to the bone. Avoid the little finger as the tissue may not be deep enough to prevent injury to the bone.

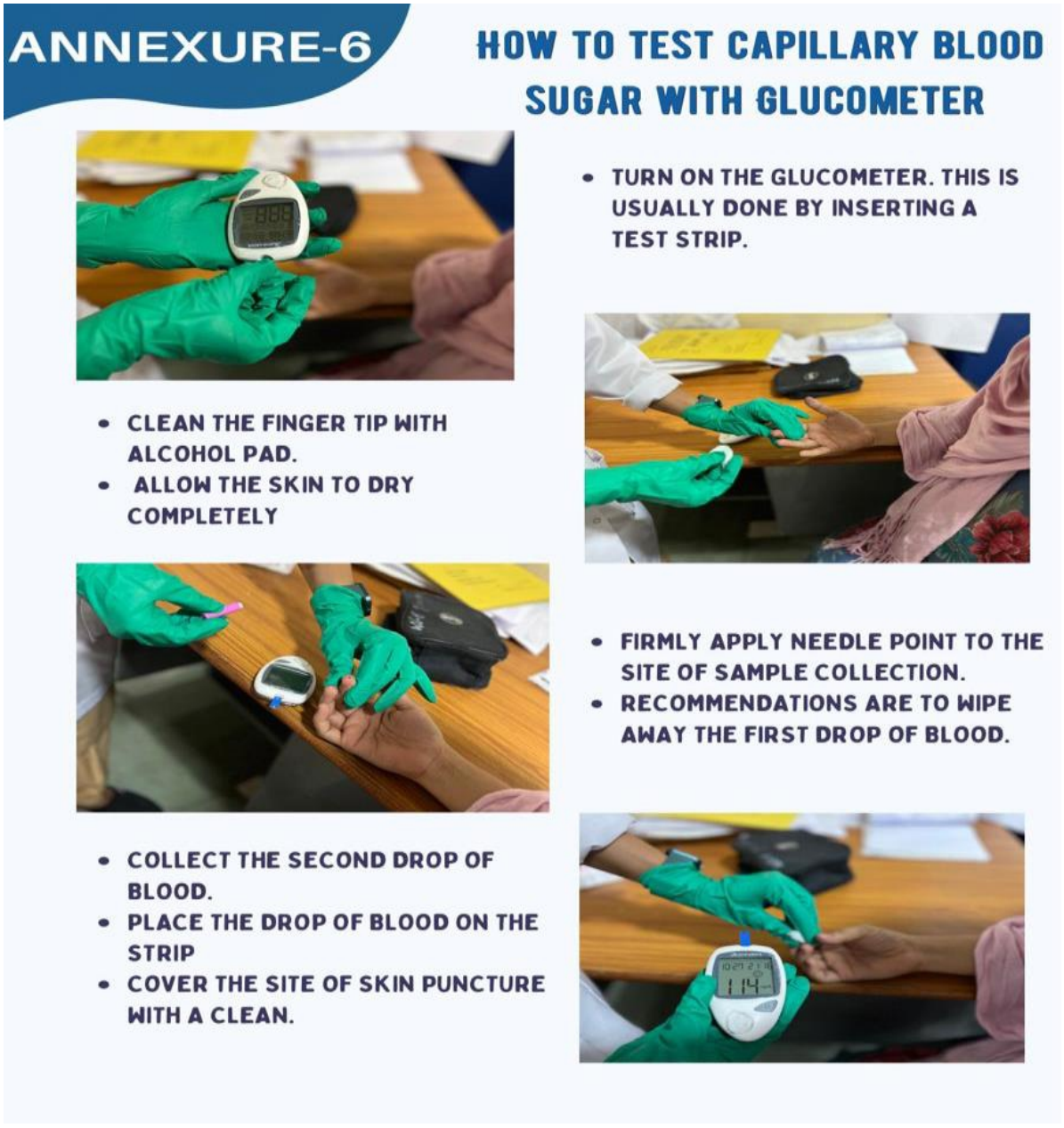
Remove the glucose testing strip without touching the sensor tip from the container. Insert glucose testing strip into the glucometer; this turns on the glucometer.

Firmly apply needle point to the site of sample collection. Wipe away the first drop of blood with clean gauze and collect the second drop of blood as it forms by touching the tip of the glucose testing strip.

Place glucometer down and cover the site of skin puncture with a clean tissue. The machine normally provides a result at this stage. If an error displays on the glucometer, troubleshoot as appropriate.

Wash hands and replace equipment in storage bag container.

Make a note of test results relative to diet, exercise, and/or medication use as appropriate.



Annexure 7: Specifications of Glucometer

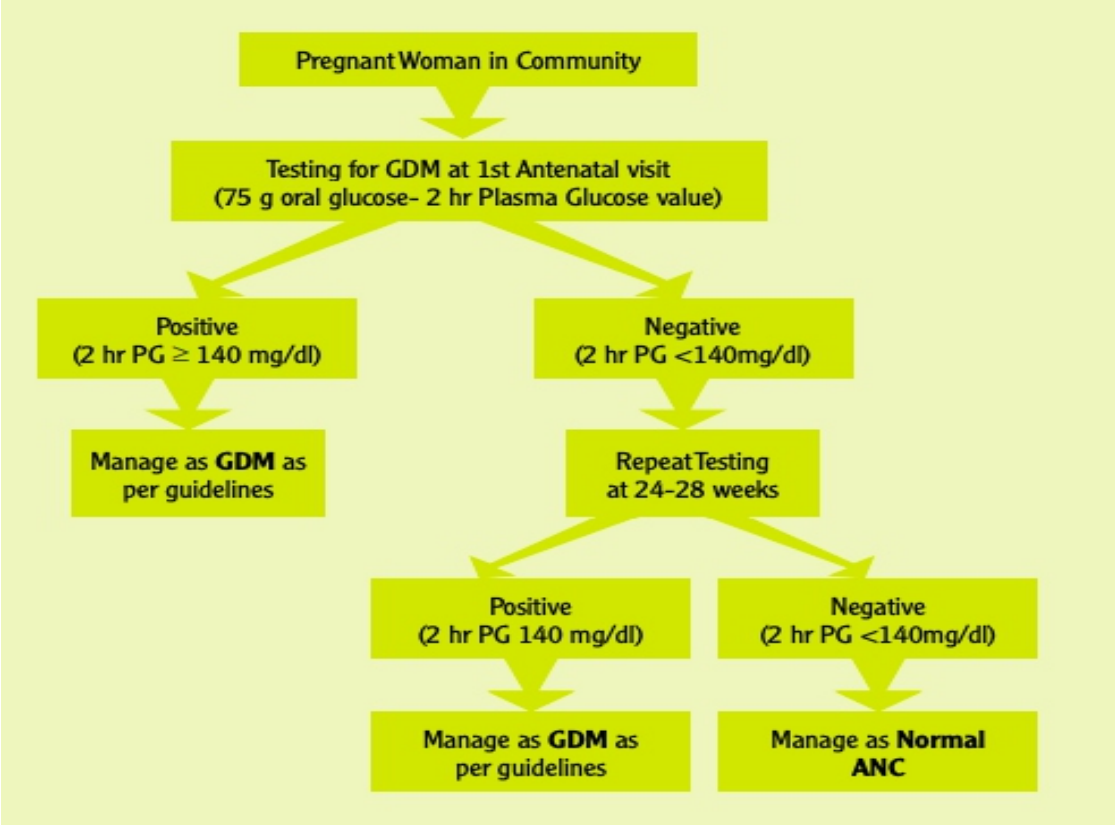
Construction - Hand-held
Blood volume – should be <1µL
Sample of blood used - Fresh whole blood Measuring time should be less than <10 seconds
Reported result range 20–600 mg/dL
Unit of measure - mg/dL.

Assay method - Glucose oxidase biosensor. Should be able to work at high altitude up to 10,000 feet
Test strip storage conditions - 2°C to 35°C. Meter storage temperature range -25°C to 70ºC
System operating conditions - 5°C to 45ºC .Relative humidity operating range - 10% to 90%
Memory capacity of glucometer - 500 blood glucose results with time and date
Automatic power off
Power supply - One replaceable battery
Calibration – should be plasma-equivalent.
Calibration strips/fluid should be provided along with it.
Automatic shut off 2 minutes after last action.

Annexure 8 : Calibration of Glucometer

Calibration means checking accuracy and correctness of glucometer. It should be done regularly to check correctness of glucometer.
Glucometer needs to be calibrated regularly to get accurate results.
If glucometer calibration shows out of range result i.t should not be used for testing It should be sent back to manufacturers for calibration corrections.
Calibration is carried out by calibration strip or calibration fluid. It will be demonstrated during training of glucometer.

Annexure 9 : DIPSI Flow chart



Annexure 10 : IADPSG criteria for GDM

Measure fasting blood sugar

↓

Administer 75 grams anhydrous glucose

↓

Measure blood glucose after 1 and 2 hours

Interpretation: Normal Test if -

Fasting blood glucose < 92 mg/dl

1 hour PP <180 mg/dl

2 hours PP <153 mg/dl

Any single abnormal value gives a diagnosis of GDM

Annexure 11: Meal Plan for Women with GDM

Diet Chart

Should be ideally prescribed by the dietician as per the patient's pre-pregnancy BMI if available. Otherwise, Specialist/MO/Nurse/ASHA should explain according to the points given below:

Meal plan should be divided in to 3 major meals-breakfast, lunch and dinner and 2-3 snacks in between them.

Women should eat food, which is easily available at her home with little modification in the diet like she should reduce the number of chapattis she has in one meal. At one time, she should eat either rice or chapatti.

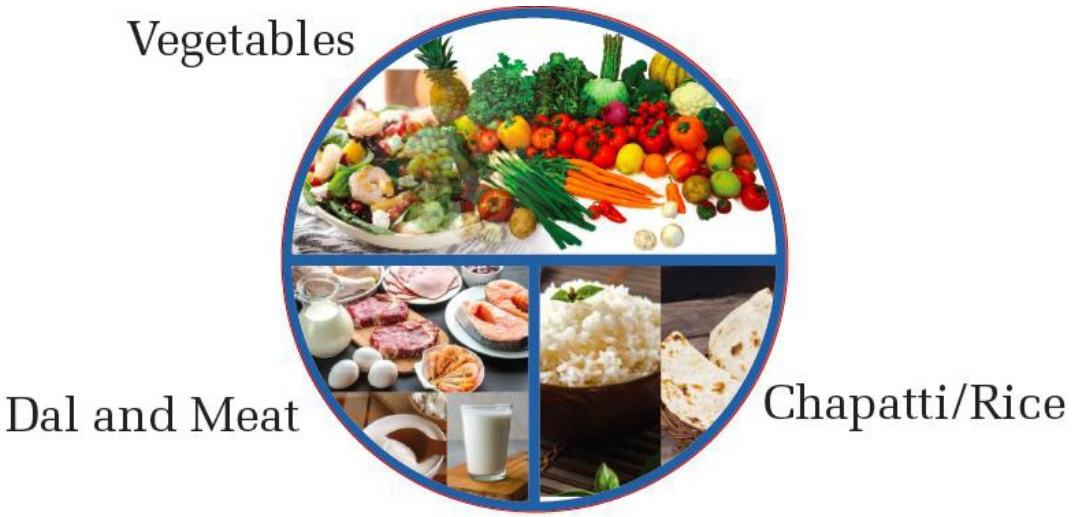
The woman should follow discipline regarding meal timings. Eat food at the same time daily.

Avoid fried food, sweets, juices red and organ meat.

Meal thali should be divided in 2 halves. Fill one-half with vegetables, salads and fruits. Divide other half-in 2 equal halves one for daal /meat, curd and other half for roti or rice.

She should include all food groups in her daily diet i.e. cereal, whole grains, pulses, milk and milk products, fruits, vegetable, and little amount of fat.

The woman must drink water, buttermilk, soups, soy milk and other unsweetened healthy beverages instead of soda or fruit juices.



Annexure 12 : Physical Activity for Women with GDM

Physical Activity / Exercise

Exercise may provide

Maternal benefits: minimize weight gain, improve glycemic control, and prepare for physical rigor of labor

Fetal benefits: potential reduction in fetal adiposity

Schedule of exercise

Schedule Planned physical activity 20 -30 min daily at least 5 times a week

Moderate exercise with Low fall risk

Most days of a week in the absence of contraindications

Carbohydrate based snack prior to exercise may be needed

Exercise guidelines for gestational diabetes mellitus

Type of exercise	Intensity	Duration	Frequency
Aerobic (large muscle activities in a rhythmic manner) *e.g*, walking, running, swimming and cycling	Moderate 60%-90% of APHRM RPE 12-14 Previously sedentary Owt/Ob should begin training at 20%-30% of APVO$_2$R RPE 12-14 Vigorous RPE 14-16	≤ 30 min continuously (up to 45 min if self-paced)	No more than two consecutive days without exercising
Resistance (multi joint exercises, large muscle groups) *e.g*, dumbbells, resistance band and pregnancy Pilates	Moderate 50% 1RM 5-10 exercises 8-15 repetitions 1-2 sets	60 min	At least 2 but ideally 3 times a week

APHRM: Age predicted heart rate maximum; RPE: Rate of perceived exertion; Owt: Overweight; Ob: Obese; APVO$_2$R: Age predicted VO$_2$ reserve; RM: Repetition maximum.

(ACOG guidelines)

Exercise guidelines for gestational diabetes mellitus

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APHRM: Age predicted heart rate maximum; RPE: Rate of perceived exertion; Owt: Overweight; Ob: Obese; APVO$_2$R: Age predicted VO$_2$ reserve; RM: Repetition maximum.

Annexure 13: 1800 Calories Sample Meal Plan for GDM

Meal	Menu	Amount	Number of carbohydrate serves as per exchange list
Breakfast (7-8 am)	Dalia/Porridge/Oats Milk	½ cup 1 cup	2 Other varieties can be included in meal plan as per the exchange list
Mid- Morning (10-10.30 am)	Mung bean sprouts (ankurit mung)/Roasted Mung	½ cup	1
Lunch (1-1.30 pm)	Chapati Or chapati + Rice	2 1+1/3 cup	2-3
	Vegetables	1 cup	
	Yogurt/Curd	¾ cup	
	Soya nugget (soya badi) curry/Dal	½ cup	
Evening (4.30-5 pm)	Seasonal fruit (medium size)	1	1-2
	Murmura chat with vegetables/idli with sambhar	1 ½ cup/1	
Dinner (8-8.30 pm)	Chapati Or chapati + Rice	2 1+ 1/3 cup	2-3
	Vegetable	1 cup	
	Dal Or Fish (curry/grilled/ steamed)	½ cup ½ cup	
Bed time (10-10.30 pm)	Milk	1 cup	1
	Brown bread	1	
Total fat/d		4 tsp/d	

* Meal plan containing 1800 kcal approximately provides 70 gm protein, 60 gm fat and 247 gm carbohydrate

Annexure 14: 2000 Calories Sample Meal Plan for GDM

Meal	Menu	Amount	Number of carbohydrate serves as per exchange list
Breakfast (7-8 am)	Whole grain Bread (Brown Bread)	2	2
	Egg bhurji/egg omelet	1	
Mid- Morning (10-10.30 am)	Vegetable Dalia	½ cup	1
Lunch (1-1.30 pm)	Chapati	3	3-4
	Or		
	chapati + Rice	2+1/3 cup	
	Vegetables	1 cup	
	Yogurt/Curd	¾ cup	
	Soya nugget curry/Dal	½ cup	
	Or		
	Chicken/fish curry	1 cup	
Evening (4.30-5 pm)	Seasonal fruit (medium size)	1	1-2
	Vegetable Poha/vegetable upma	½ cup	
Dinner (8-8.30 pm)	Chapati	2	2-3
	Or	1+ 1/3 cup	
	chapati + Rice		
	Vegetable	1 cup	
	Dal	½ cup	
Bed time (10-10.30 pm)	Milk	1 cup	1
	A bowl of cut mixed fruits	1	
Total fat/d		5 tsp/d	

* Meal plan containing 2000 kcal approximately provides 80 gm protein, 65 gm fat and 270 gm carbohydrate

Annexure 15: Food Exchange List of Commonly Eaten Items

Cereal/starch food exchange list is a comprehensive guide to make you understand amount of particular food to be taken in place of other food without affecting the total amount of carbohydrate.

For example – if you are taking one cup of rice (cooked) and want to change with idli, as per list, one third cup of white rice will be equal to one three inch round idli or 1 chapati.

Food Groups	Food	Portion
Cereal/Starch Exchange Serving Choose any serving of the food mentioned here,each serving will provide – 75 calories 15 gm carbohydrates 2 gm protein 0-1 gm fat	Bread	1 slice (1oz)
	Idli (plain)	3" round - 1
	Naan	½ of 8"x2"
	Dosa (plain)	1
	Rice white or brown (cooked)	1/3 cup
	Roti (atta, bajra, corn, juwar)	1 (6")
	Murmura (puffed rice)	¾ cup
	Millet (cooked)	1/3 cup
	Museli	¼ cup
	Oats (cooked)	1/3 cup
	Pasta (cooked)	1/3 cup
	Pop-corn (no fat)	3 cups
	Biscuit (2 ½" across)	1
	Chowmein noodles	½ - 1/3 cup
	Muffin (small)	1 piece
	Poha (cooked)	1 cup
	Starchy vegetables:	
	Potato (baked or boiled)	1½ cup
	Potato (mashed)	½ cup
	Yam, sweet potato (plain)	1 small; ½ cup
Fruit Exchange Serving Choose any serving of the fruits mentioned here, each serving will provide – 45 calories 10 grams carbohydrate 1 gm protein Negligible fat	Apple (medium)	1 (4 oz)
	Apricots (dry)	3 pieces
	Cherries	15-20 pieces
	Blueberries	¾ cup
	Dates	3
	Grapes	¾ cups (10-12 nos)
	Guava (medium)	1
	Mango (medium)	½ cup
	Orange (medium)	1
	Papaya (cubes)	1 cup
	Peaches (medium, fresh)	1 (6 oz)

Annexure 15 contd.

	Pear (medium) Pineapple (fresh) Plums (small) Sapota, Chikoo (medium) Strawberries (whole) Watermelon (cut and diced) Kiwi (medium) Banana	1½ ¾ cup (2 slices) 2 ½ approx 24 in nos. 2 cups 1 ½
Pulse Exchange Serving Choose any serving of the fruits mentioned here, each serving will provide – 100 calories 17 grams carbohydrate 7 gm protein	All lentil/dals cooked Sprouted pulses Soya nuggets	1 cup ¾ cups ¼ cup - 10 chunks
Vegetable Exchange Serving 1 serving = ½ cup cooked (100 gms-150 gms) or 1 cup raw vegetables . Choose any serving of the food mentioned here, each serving will provide- 30 calories 2.5-3.5 gms carbohydrate 2-3 gms protein 0 gm fat	Amaranath (chaulai) Bathua French beans Bean sprouts (moong) Beets (chukander) Bitter gourd (karela) Bottle gourd (lauki) Broad beans (papdi) Broccoli Brussels sprouts Cabbage Carrots Cauliflower Cluster beans (guvar) Cucumber Drumsticks (surgavo) Eggplant (brinjal) Fenugreek leaves Green onion Green papaya Jack fruit (kathal) Lady's finger (bhindi) Mustard leaves (sarson) Onion Parwal Peas	
	Pumpkin Radish Ridge gourd (torai or turia) Salad greens Spinach (physical activity levelak) Tomatoes fresh Zucchini	
Milk Exchange Serving Choose any serving of the food mentioned here, each serving will provide – 180 calories 12 gms carbohydrate 8 gms protein	**Skim and very low fat milk (1-3gm fat)** Skimmed milk powder Non-fat buttermilk (chaaj) Yogurt (plain) Paneer **Whole milk (buffalo)** Whole milk (cow's milk) Goat's milk Lassi, regular	 1 cup ¼ cup 2½ cups 1 cup ¼ cup (40 gms) (200 ml) <1 cup 1 cup (240 ml) 1 cup 1 cup

Annexure 16: Administration of Metformin in GDM

Although Insulin is the first line drug of choice for managing GDM, Metformin is recommended for use by National Technical Guidelines for management of hyperglycemia in pregnancy, DIPSI, NICE, FIGO.

As it is most important to achieve euglycemia during pregnancy, metformin therapy may be used as it is more convenient, less expensive, requires less monitoring and if preferred by patient, it may enhance treatment adherence.

Metformin is an insulin sensitizer. It inhibits hepatic gluconeogenesis and glucose absorption and stimulates glucose uptake in peripheral tissues.

Metformin is initiated as 500 mg OD for a week, then 500mg twice a day to a maximum of 2 gm daily. Common side effects are abdominal pain and diarrhoea which may be reduced by sustained release preparations. It is contraindicated in patients with liver, renal or cardiac dysfunction.

Metformin is useful for obese women or for women who are already on high doses of insulin as it improves insulin sensitivity and causes less weight gain during pregnancy**.**

Metformin also reduces the chances of neonatal hypoglycaemia **(II)**

It has a failure rate of 26-50% and these patients may eventually need insulin. Metformin therapy is associated with increased incidence of preterm labour **(II).**

Metformin should not be prescribed for women with GDM if there is any significant organ dysfunction, if accompanied with hypertensive disorders of pregnancy, fetal growth is restricted or fetal macrosomia is present, or the woman has a high risk factor which predisposes her to preterm birth.

Recently European Union has approved use of Metformin from preconception throughout pregnancy.

Annexure 17: Indications for Insulin Therapy

Early insulin therapy without waiting for trial of MNT may be considered in cases where a woman already having GDM-related complications like hypertensive disorders of pregnancy, FGR, macrosomia or polyhydramnios and with high glucose levels such as pre-prandial glucose values > 110 mg/dl and 1-hour post-prandial glucose values > 140 mg/dl, hyperglycemia is diagnosed before 20wks or >30weeks, if the woman is on antenatal corticosteroid therapy or if she is in labour or in ketoacidosis (III).

Insulin is also started ifglycemic targets are not achieved by Metformin therapy or if the woman cannot tolerate Metformin.

Annexure 18: Profile of Insulin Safe for Use in Pregnancy

Insulin name	Type	Onset	Peak effect	Duration	Dosing interval
Aspart	Rapid acting	15 min	60 min	3-5 hrs	At start of each meal
Lispro	Rapid acting	15 min	60 min	3-5 hrs	At start of each meal
Regular	Short acting	30-60 min	2-4 hr	6-8 hrs	60-90 minutes before meal
NPH	Intermediate Acting	2 hr	4-6 hr	12-20hrs	Every 8-12 hr
Insulin detemir	Long acting	2 hr	-	24 hrs	Every 24 hr
Insulin Degludac	Long acting	-	-	> 24 hrs	> 24 hr

Note-

Insulin analogs like as part and lispro which are rapidly acting insulin, have advantage over regular insulin as they can be injected at the start of a meal and the peak effect corresponds to the highest glucose excursion after a meal and reduce the likelihood of hypoglycemia as their effect lasts for 3-5 hrs.

Intermediate and long-acting inulin - Basal insulin suppresses hepatic glucose production and maintains near normoglycemia in the fasting state. NPH (Neutral Protamine Hagedorn), Detemir, Degludec are safe for use during pregnancy.

Insulin type, injection technique, insulin antibodies, site of injection and individual patient response differences can affect the onset, degree and duration of insulin activity.

Annexure 19 : Titration of Insulin in GDM

Insulin dosage should be adjusted according to blood glucose levels as assessed by 7 point glucose profile initially.

Self-monitoring of blood glucose (SMBG) is recommended for all pregnant women with diabetes, 3−4 times a day:

Fasting: once daily, following atleast 8 hours of overnight fasting

with postprandial: 2-3 times daily, 2 hours after the onset of meals.

Or rotating paired pre and 2hrs. post meals at different on different days of the week

Since there are many other confounding factors which dictate dose apart from weight, we feel that weight based insulin regimen results in over-insulinization for women with GDM.

Regular and NPH insulin has better efficacy and safety due to flexibility of titration of prandial insulin depending upon the degree of derangement. In case patient is not comfortable on Regular and NPH insulin, pre-mix insulin is an alternative option.

Initiate with regular insulin dose of 2 units 30 minutes before that particular meal if postprandial value is 120-150 mg/dl; 3 units if 151-180 mg/dl and 4 units if value is 181- 200 mg/dl.

Initial dose for basal insulin should be 2 units around 10 pm, if fasting value is 95-120 mg/dl; 3 units if 121-140 mg/dl and 4 units if value is 141-160 mg/dl.

As a practice point for every 20-30 mg rise in blood glucose, approximately 1 Unit of insulin may be started. Requirement varies depending on the insulin resistance and other individual characteristics of the patient.

In GDM insulin is generally given as pre-meal short or rapid human insulin along with intermediate insulin at bedtime if there is fasting hyperglycemia.

If the control is unsatisfactory, potential sources of the problem such as faulty diet, concurrent medication, intercurrent illness or infections, stress, lack of exercise and faulty lifestyle need to be explored and rectified. For a single abnormal blood glucose value, dietary readjustment is advisable.

Only if > 20% values are deranged after 1week, titration of insulin dose should be done.

For checking the accuracy of plasma calibrated glucometer, one venous blood sugar level should be checked intermittently e.g. every 2 weekly in 3rd trimester and monthly in the 1st and 2nd trimester.

Annexure 20: Suggested Follow-up Log for Blood Sugar Monitoring

Day	BBF	ABF	BL	AL	BD	AD
Mon	X	X				
Tue			X	X		
Wed					X	X
Thru	X	X				
Fri			X	X		
Sat					X	X
Sun	X	X	X	X	X	X

The blood sugar should be monitored in pre and post prandial pairs, for instance as shown in the above figure, pre and post breakfast sugar is tested on Monday, pre and post lunch on Tuesday and pre and post dinner on Wednesday. This kind of testing gives a holistic picture of the sugar control and helps in modifying the insulin doses/dietary interventions.

Annexure 21 : Technique of Insulin Administration

Site: Front/Lateral aspect of the thigh or over abdomen

Mode: subcutaneous

Insulin syringe– 40 IU syringe

Insulin vial – 40 IU/mL is to be used

Storage of insulin vial & syringe: Insulin vials have to be made available along with disposable syringe to the pregnant women for use.

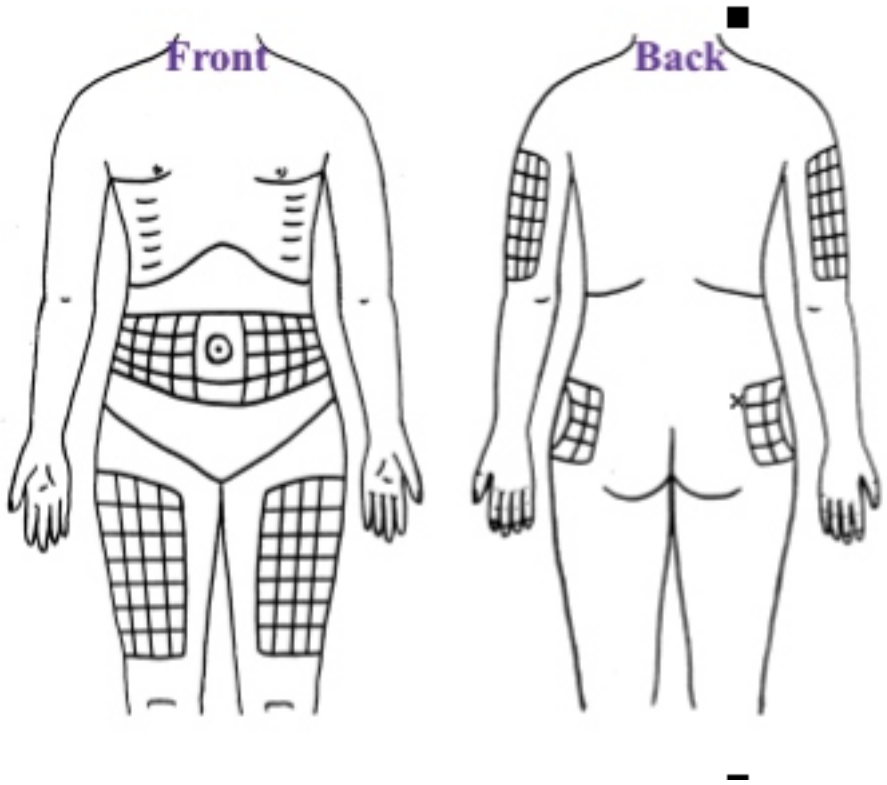
Storage in refrigerators at 4º–8°C (in the door of the refrigerator). Vial should never be kept in freezer compartment of refrigerators. If by mistake, vials are stored in freezer and frozen, they should be not be used at all and discarded. Once opened, vial should be used within a month.

Insulin vials should not be exposed to direct heat/sunlight, and are stable up to 25º-30°C

Single insulin syringe can be *used safely for 14 injections* if capped & stored properly.

Never clean needle with spirit or any other disinfectant.

Tip of needle should not come in contact with anything else except cleaned skin



Annexure 22: Recognition and Response Towards Hypoglycemia

How to recognise & manage hypoglycemia?

- Any Pregnant women on insulin can develop hypoglycemia at any time
- Hypoglycemia is diagnosed when blood sugar level is < 70 mg/dL
- Important to recognise symptoms of hypoglycemia & treat immediately

How to recognise hypoglycemia?

- **Early symptoms -** Tremors of hands, sweating, palpitations, hunger, easy fatigability, headache, mood changes, irritability, low attentiveness, tingling sensation around the mouth/lips or any other abnormal feeling
- **Severe -** Confusion, abnormal behaviour or both, visual disturbances, nervousness or anxiety.
- **Uncommon -** Seizures and loss of consciousness

How to manage hypoglycemia?

- Ask pregnant women to take 3TSF of glucose powder (15-20 grams) dissolved in a glass of water
- If glucose is not available, take one of the following: Sugar - 6TSF in a glass of water/fruit juice/honey/anything which is sweet/any food
- After taking oral glucose, she must take rest & avoid any physical activity
- 15 minutes after taking glucose, she must eat one chapati with vegetable/rice/one glass of milk/idli/fruits/anything eatable which is available
- If hypoglycemia continues, repeat same amount of glucose and wait
- Take rest, eat regularly and check blood sugar if possible
- If pregnant women develops >1 episode of hypoglycemia in a day, she should consult any doctor immediately

Annexure 23A: Guidelines for Referral to District Hospital

Glucose values are not controlled despite 4 weeks of follow up with any regimen
Insulin requirement > 20 U/day
Diabetes in Pregnancy/Overt diabetes
Glycosuria 2+ or more, not responding to treatment

Annexure 23B: Referral to Tertiary Care Hospital

Fetal growth restriction/polyhydramnios/ macrosomia
Recurrent hypoglycaemia/ DKA
Development of pregnancy related complications like hypertensive disorders
Presence of organ dysfunction of liver, kidney, eye and heart.

Annexure 24 : Format for Individual plans (Birth Preparedness)

Name: Age:

Husband's name:

HH income

LMP

EDD

Past pregnancy history (Include abortion, if any):

Order of pregnancy	Date of delivery (Month and Year)	Place of delivery: Home, SC, PHC, CHC, DH, Private Nursing Home	Type of delivery: Natural, Forceps, C-Section	Birth Outcome: Live Birth, Stillborn,	Age and Status of child currently	Any other complications: Fever, Bleeding
First						
Second						
Third						

- Any risk factors:
- Nearest SBA: Phone:
- Nearest 24X7 PHC: Distance: Time: Cost
- Nearest Sub-Centre with a Skilled Birth Attendant
- Nearest CHC with facilities to manage complications: Distance: Time: Cost
- Distance to District Hospital:
- How much is transport going to cost?
- Is the vehicle fixed: Owner: Phone No.:
- Will we need extra money for the treatment ? How to organise it?
- Who will take care of the children when mother goes to the facility?
- Who will accompany her to the facility?
- Where will they stay?
- How will they finance their stay?
- Have they organised clothes and blankets for the baby?

Annexure 25: Management of GDM During Labour and Caesarean Delivery

Maternal hyper glycemia during labor and delivery is associated with neonatal hypo glycemia, in both GDM and T2DM. Maternal hyper glycemia during labor is also associated with birth asphyxia and non -reassuring fetal heart rate tracings .

The glycemic target during labour is to maintain a plasma glucose level of 70 to 120 mg/dl and PG should be checked with glucometer every 1- 2 hourly in active labour and urinary ketones should be checked 4 hourly.

Pregnant women with GDM with good control of blood sugar (2 hr PPBS <120 mg/dL) levels may be delivered at their respective health facility ideally have institutional delivery

Induction of labour can be done by PGE2 gel, misoprostol or foley's catheter.

A strict glycemic control during labour is important to prevent neonatal hypo glycemia after birth. It is important to administer the dose of intermediate acting insulin on the night prior to termination of pregnancy. Morning dose of insulin is withheld on the day of induction/ labour and the patient should be started on 2 hourly monitoring of capillary glucose.

Woman should be allowed to take oral fluids during induction and early labour.

As the mother has to utilize lot of energy during labour, the requirement of insulin is significantly reduced. Most GDM women will not require insulin.

Insulin is titrated according to capillary glucose level as shown in the table below:

Table Insulin therapy during intra partum period

Blood sugar level	Amount of insulin added in 500ml NS	Rate of NS infusion
90-120 mg/dl	0	100ml/hr(16 drops/min)
120-140mg/dl	4 U	100ml/hr(16 drops/min)
140-180mg/dl	6U	100ml/hr(16 drops/min)
>180mg/dl	8U	100ml/hr(16 drops/min)

An infusion of 5% dextrose is started @ 125ml/hr if plasma glucose is < 100mg/dl, no insulin is required.

Other methods of insulin delivery in labor include neutralizing drip, intermittent subcutaneous boluses of insulin or continuous subcutaneous insulin infusion (CSII).

Fetal monitoring during intrapartum period should be done as per high-risk protocol with CTG.

As diabetic women are predisposed to infections, strict asepsis is to be maintained during labour and number of per vaginum examination should be restricted.

It is essential to carefully watch for progress of labour and maintain a partogram.

In case of protracted labour, early decision for caesarean section should be taken.

Management during Caesarean Delivery

Elective caesarean section should be scheduled as the first case in the morning.

The usual dose of intermediate insulin is given on the night before surgery. The patient is kept fasting after midnight, her usual morning dose of insulin is withheld.

If surgery is delayed, give basal insulin (approx. $1/3^{rd}$ of morning NPH dose in 5 % dextrose infusion to avoid ketosis)

In the morning fasting plasma glucose and serum electrolytes are sent.

Regional anesthesia is desired because an awake patient permits earlier detection of hypoglycemia.

The blood sugar levels during surgery should be maintained between 70-100 mg/dl with regular monitoring.

Prophylactic antibiotic is recommended 30 min to 1 hour before surgery after test dose. Strict monitoring of plasma glucose after surgery and early resumption of oral intake is recommended.

Pneumatic compression stockings and early mobilization should be encouraged to avoid risk of thromboembolism.

Annexure 26: Management of the Newborn of Diabetic Mother

- After thorough initial evaluation, routine neonatal care, immediate skin to skin care and breastfeeding should be practiced.
- A comprehensive newborn examination is a must. Laboratory screening of hypoglycaemia (at birth, 6 hours of life, 12 hours of life, 24 hours of life and 48 hours of life) and polycythemia (clinically indicated) at prescribed intervals should be done. The recommended target blood glucose in the first 24 hours of life is 40mg per dL and 50 to 60 mg per dL after 24 to 48 hours of life.
- Vigilant watch and timely intervention for detection of hyperbilirubinemia, hypocalcaemia and hypomagnesemia should be done since the incidence of these adverse events is increased in IDM.

Signs of Hypoglycemia in New born

- Stupor or Apathy
- Jitteriness or tremors
- Episodes of cyanosis
- Convulsions
- Intermittent apnoeic spells or tachypnoea
- Weak and high pitched cry, limpness and lethargy
- Difficulty in feeding
- Eye rolling
- Episodes of sweating
- Any unexplained clinical feature in baby of diabetic mother

Testing of Blood Glucose of New Born

- Wash hands and wear gloves
- Select the heel site for puncture
- The back of the heel should be avoided
- The site chosen for the sampling should be free from previous injury
- Ensure baby is laying in a safe and secure place
- Hold the baby's heel
- Hold the ankle with index and middle finger
- Use other fingers to steady the baby's leg
- Partly encircle the baby's heel with thumb
- Clean the proposed puncture site with disinfectant
- Allow the area to dry
- Gently compress the heel and hold the skin under tension
- Puncture the skin in a steady manner
- Relax the tension and wipe away the initial blood flow with cotton
- Whilst maintaining the grip, hold the heel so that blood is allowed to come out
- Gently but firmly press the baby's heel to form a large droplet of blood
- Do not squeeze
- Hold the capillary tube or blood bottle to the blood droplet and touch
- Momentarily release the pressure to collect subsequent blood then reapply pressure allowing theblood to flow
- Continue until sufficient blood has been obtained
- Once the sample has been obtained apply pressure to the site with gauze, maintain the pressureuntil bleeding has stopped

- Use the hypoallergenic tape
- Baby should be kept comfortable and handed to mother
- Equipments should be disposed
- The staff doing the puncture should wash hands after the procedure
- The sample should be sent for analysis as soon as possible

Annexure 27 : Important High Risk Conditions in Pregnancy

Some common High Risk Conditions of Pregnancy that are not to be missed by the health care provider during and ANC checkup are as enumerated below;

Severe Anemia (Hb less than 7 gm/dl)
Pregnancy induced hypertension, pre-eclampsia, pre-eclampsia toxemia
Syphilis/HIV Positive
Gestational Diabetes Mellitus
Hypothyroidism
Young Primi (less than 20 years) or Elderly gravid (more than 35 year)
Twim/ Multiple pregnancy
Malpresentation
Previous LSCS
Low lying placenta, Placenta previa
Positive bad obstetric history (History of still birth, abortion, congenital malformation, obstructed labor, premature birth etc)
Rh negative
Patient with History of any current systemic illness(es)/Past history of illness

Annexure 28: Fetal Surveillance in Pregnant Women with GDM

- Pregnant women with GDM are at an increased risk for fetal death in utero and this risk is increased in pregnant women requiring medical management. Hence vigilant fetal surveillance is required.
- Fetal heart should be monitored by auscultation on each antenatal visit.

Pregnant women should be explained about Daily Fetal Activity Assessment. One simple method is to ask her to lie down on her side after a meal and note how long it takes for the foetus to kick 10 times. If the foetus does not kick 10 times within 2 hrs, she should immediately consult a health care worker and if required should be referred to a higher centre for further evaluation.

Annexure 29A : Contraception in Women with History of GDM

= Use the method = Do not use the method I = Initiation of the method C = Continuation of the method — = Condition not listed; does not affect eligibility for method NA = Not applicable **Condition**	Combined oral contraceptives	Monthly injectables	Combined patch and combined vaginal ring	Progestin-only pills	Progestin-only injectables	Implants	Emergency contraceptive pills*	Copper-bearing intrauterine device	Levonorgestrel intrauterine device	Female sterilization*
Diabetes										
History of gestational diabetes	1	1	1	1	1	1	—	1	1	A[q]
Non-vascular diabetes										
Non-insulin dependent	2	2	2	2	2	2	—	1	2	C[iq]
Insulin dependent[z]	2	2	2	2	2	2	—	1	2	C[iq]
With kidney, eye, or nerve damage[z]	3/4[r]	3/4[r]	3/4[r]	2	3	2	—	1	2	S
Other vascular disease or diabetes of > 20 years' duration[z]	3/4[r]	3/4[r]	3/4[r]	2	3	2	—	1	2	S

q- If blood glucose is not well controlled, referral to a higher-level facility is recommended.

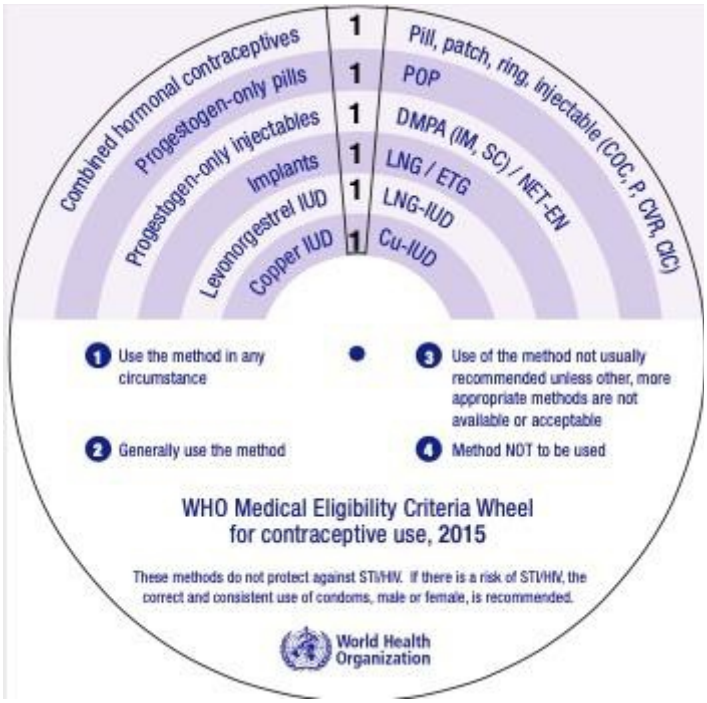
r- Assess according to severity of condition.

A-Accept:There is no medical reason to deny the method to a person with this condition or in this circumstance

C- Caution: The method is normally provided in a routine setting, but with extra preparation and precautions.

S- Special : The procedure should be undertaken in a setting with an experienced surgeon and staff, equipment needed to provide general anaesthesia, and other backup medical support. The capacity to decide on the most appropriate procedure and anaesthesia support also is needed. Alternative, temporary methods of contraception should be provided if referral is required or there is otherwise any delay.

Annexure 29 B: MEC Contraceptive wheel for patients with history of GDM



Annexure 29 C: MEC Contraceptive wheel for patients with Non Vascular Diabetes

Annexure 30 : Role of ASHA for NCD Follow-up

ASHA should motivate those with high blood sugar levels to:

- Increase consumption of foods rich in fibre - variety of seasonal and fresh fruits, vegetables (including green leafy vegetables); whole grains and whole pulses and their products.
- Decrease consumption of refined cereals, foods rich in excess amount of fat/oil, foods rich in salt and sugar.
- Reduce the amount of salt: A maximum of 1 teaspoon (5 gms) of salt for the whole day should be consumed by those who have high blood pressure.
- Sugar should be avoided amongst those diagnosed with diabetes.
- Stop the use of tobacco in any form (smoking or chewing), also avoid exposure to second-hand smoke.
- Reduce the intake of alcohol.
- Decrease excess amount of tea, coffee, cola drinks (all are rich in caffeine).
- Maintain healthy weight; people who are overweight need to lose weight.
- Ensure regular and adequate physical activity.
- Adopt strategies to cope with stress.
- Help the individual to maintain a healthy blood pressure and control of blood sugar levels by preventing and controlling the risk factors and ensure monthly monitoring of blood pressure and blood sugar.
- Follow-up of the patients referred to the health facilities/referral centres and support them through the consultation and diagnostic processes as required.
- Compliance to treatment plan for drugs as advised by the medical doctor.
- Be alert to new signs and symptoms - they may be due to side-effects of the medicines being taken.
- Regular check-up at the PHC/CHC or higher facilities as advised.
- Ensure that the patient and their family members receive education on diabetes management and life style modifications.
- Regularly conduct home-visits by prioritising those households which are vulnerable and marginalised, where there are treatment defaulters or those who experience complications and bring these cases to the notice of the ANM and the Medical Officer.
- Several people in your community will ask you about home remedies or other medicines from Ayurveda, Homeopathy etc. You should tell them to consult themedical officer before changing any medication.

Annexure31: SelfCare Interventions in GDM Suggested by World Health Organisation

The following self care interventions are recommended for diabetes during pregnancy

1. **Regular Monitoring of Blood Glucose Levels:**

   Check blood glucose levels as recommended by your doctor. Ensure that you stay in the normal range. Keep consulting your nearby doctor or ANM for higher glucose levels

   Keep a log of your blood sugar readings to track patterns and identify trends under the guidance of your doctor or ANM.

2. **Balanced Diet:**

   Follow a well-balanced diet rich in whole grains, fruits, vegetables, lean proteins, and low-fat dairy.

   Monitor portion sizes and spread meals throughout the day to maintain steady blood sugar levels.

   Limit intake of refined sugars and processed foods.

3. **Regular Physical Activity:**

   Engage in moderate-intensity exercises as advised by thedoctor.

   Activities like walking, and prenatal yoga can help control blood sugar levels.

4. **Weight Management:**

   Maintain a healthy weight during pregnancy.

   Consult with doctors to determine a safe and appropriate weight gain.

5. **Medication Adherence:**

   Take prescribed medications as directed by your doctor.

   Inform your doctor about any changes in your health or if you experience side effects.

6. **Open Communication with Service providers:**

   Maintain open and frequent communication with your service providers, including Asha workers, ANM and doctors. Discuss any concerns about your high gulucose levels or symptoms you may be experiencing.

7. **Blood Pressure Control:**

   Monitor and control blood pressure regularly to reduce the risk of complications.

   Follow recommendations for lifestyle modifications and medications as prescribed.

8. **Regular Prenatal Checkups:**

   Attend all scheduled prenatal appointments with doctors at the nearby Public Health facility.

   Discuss any concerns or changes in your condition during these visits.

9. **Hydration:**

   Stay well-hydrated by drinking plenty of water.

   Limit intake of sugary beverages and opt for water or other sugar-free options.

10. **Stress Management:**

    Practice stress-reducing techniques such as deep breathing techniques, meditation, or prenatal yoga.

    Seek support from friends, family, or closed ones

11. **Foot Care:**

    Inspect feet regularly for any signs of swelling, redness, or sores.

    Report any foot problems to your healthcare provider.

12. **Fetal Movement Monitoring:**

    Pay attention to your baby's movements and report any significant changes to your doctor

13. **Emergency plan and Contact Information:**

    Know the signs of high and low blood sugar levels.

    Keep contact information for your nearby healthcare facility. It should be accessible in case you need to reach the facilities urgently

Annexure 32 : HMIS Monitoring in relaton to GDM

The data related to GDM which has to be filled in the HMIS is as follows

1.5.1 Number of PW tested for Blood Sugar using OGTT (Oral Glucose Tolerance Test)
1.5.2 Number of PW tested positive for GDM out of total OGTT Conducted
1.5.3 Number of PW given Insulin out of total tested positive for GDM
1.5.4 Number of PW given metfo rmin out of total tested positive for GDM (New element added in April 2023 - see explanation below)

Explanation for new data element added in HMIS monitoring of PW: Total number of pregnant women who were given metformin out of total pregnant women who were found positive for GDM

Guideline: Metformin can be started at 20 weeks of pregnancy, if Medical Nutrition Therapy has failed to control blood sugar. The dose of met form in is 500 mg twice daily orally up to a maximum of 2 gm/day. Number of Women who have been started on met form in to be reported for the first time only. If the women's blood sugar is not controlled with the maximum dose of metformin (2gm/day) and MNT, insulin to be added.

Any person other than pregnant woman getting met for min tablets should not be reported here.

Suggested Reading

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3. Helen R. Murphy. 2020 NICE guideline update: Good news for pregnant women with type 1 diabetes and past or current gestational diabetes. Diabetic Medicine. 2021;38:e14576 DOI: 10.1111/dme.14576 https://doi.org/10.1111/dme.14576
4. Diabetes in pregnancy: Management from preconception to the postnatal period NICE guideline. 2015, Updated Dec 2020 https://www.nice.org.uk/guidance/ng3
5. Society for Maternal-Fetal Medicine: Publications committee. pubs@smfm.org, Reddy UM; Deshmukh U, Dude A, et al. Society for Maternal-Fetal Medicine (SMFM) Consult Series #58: Use of antenatal corticosteroids for individuals at risk for late preterm delivery. SMFM Consult Series. 2021; B 36-42 https://doi.org/10.1016/j.ajog.2021.07.023
6. Seshiah, V., Balaji, V., Chawla, R. et al. Diagnosis and management of gestational diabetes mellitus guidelines by DIPSI (Revised). Int J Diabetes Dev Ctries 43, 485–501 (2023). https://doi.org/10.1007/s13410-023-01222-3
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