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Role Of Physiotherapy Management In Gestational Diabetes Mellitus

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Abstract: Gestational Diabetes Mellitus (GDM) is a metabolic disorder characterized by glucose intolerance first recognized during pregnancy, affecting approximately 4–14% of pregnancies worldwide. It results from insulin resistance and β-cell dysfunction caused by placental hormones such as human placental lactogen, progesterone, and cortisol. Uncontrolled GDM poses risks for both the mother and fetus, including macrosomia, preeclampsia, and future development of Type 2 diabetes.Physiotherapy plays a vital role in managing GDM by promoting glucose control, improving insulin sensitivity, maintaining optimal body weight, and enhancing overall maternal health. Structured exercise programs including aerobic exercises (walking, swimming, cycling), resistance training, and flexibility routines help regulate blood glucose levels and prevent complications. Following the FITT (Frequency, Intensity, Time, Type) principle, moderate-intensity physical activity for at least 150 minutes per week, combined with strength training twice weekly, is recommended.This study emphasizes that physiotherapy-based exercise interventions are safe, effective, and essential components of GDM management when integrated with medical nutrition therapy and pharmacological care. Regular physiotherapy-guided physical activity improves metabolic control, reduces insulin requirements, and contributes to healthier pregnancy outcomes for both mother and child.

Keywords: Gestational Diabetes Mellitus, Physiotherapy, Exercise Therapy, Insulin Resistance, Pregnancy, Aerobic Exercise, Strength Training.

I. INTRODUCTION

Gestational Diabetes Mellitus is defined as a ―carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy. Approximately 4% of all pregnancies are complicated by gestational diabetes mellitus while the prevalence may range from 1–14% of all pregnancies depending on the population and the method of screening. Gestational diabetes causes high blood sugar that can affect the pregnancy and the baby's health.

In the United States the prevalence is higher amongst African American, Hispanic American, Native American, Pacific Islander, and South or East Asian women than in Caucasian women. The prevalence was found to be ranging from <5% in countries such as Pakistan, Belgium, Denmark, Estonia, South Korea, South Africa, to a prevalence as high as 20% in Bermuda and Nepal.

Causes includes the pancreatic beta-cell dysfunction or the delayed response of the beta cells to the glycaemic levels, the marked insulin resistance secondary to placental hormonal release. The human placental lactogen is the main hormone related to increased insulin resistance in gestational diabetes mellitus, other hormones related to the development of this disease are growth hormone, prolactin, corticotropin-releasing hormone, Progesterone. These hormones contribute to the stimulation of insulin resistance and hyperglycaemia in the pregnancy.

Signs and symptoms include elevated blood glucose (hyperglycaemia), frequent urination (polyuria), excessive thirst (polydipsia), extreme hunger (polyphagia), increased fatigue, irritability, numbness or tingling in the extremities (hands, feet), slow healing wounds or sores, unexplained weight loss, High chances of infections, blurry vision.

Clinical risk factors for developing gestational diabetes includes increased body weight (a body mass index greater than 25), decreased physical activity, a first degree relative with diabetes mellitus, prior history of gestational diabetes or a newborn with macrosomia, metabolic comorbidities like hypertension, low HDL(high density lipoprotein), triglycerides greater than 250, polycystic ovarian syndrome, haemoglobin A1C greater than 5.7, abnormal oral glucose tolerance test, any significant marker of insulin resistance (acanthosis nigricans), past medical history of cardiovascular diseases.

Overweight or obesity, excessive gestational weight gain, westernized diet, age and ethnicity, genetic polymorphism, advanced maternal age, intrauterine environment (low or high birthweight), family and personal history of gestational diabetes, polycystic ovarian syndrome, inactivity, pre-diabetes.

Diagnosis includes glucose challenge test and glucose tolerance test. Medical management consists of oral antidiabetic drug that includes metformin and Insulin therapy.

Physical management includes exercise that maintains glucose control which may prevent, reduce or delay the need for insulin. Physical activity lowers the blood glucose level, regular exercise can be an effective way to manage gestational diabetes.

Common recommendation for gestational diabetes mellitus at 150 minutes (2 hours and 30 minutes) of moderate-intensity activity a week and strengthening exercises on 2 or more days a week. Exercising ranging from low exerting forces such as yoga to higher exerting forces such as aerobic classes and jogging. It is safe for both mother and foetus. Aerobic exercise can consist of any activity that uses large muscle groups in a continuous rhythmic manner. It includes walking, jogging, aerobic dance, swimming, hydrotherapy, rope skipping, rowing. Resistance strengthening training includes weightlifting and flexibility exercises.

DEFINITION

Gestational Diabetes Mellitus (GDM) is defined as a carbohydrate intolerance of varying degrees of severity with onset or first recognition during pregnancy.

- Metzger BE

The period of onset of hyperglycaemia, specifically within 24-28 week of gestation and a natural dispelling of the hyperglycaemic condition after child birth.

- Coustan

Gestational Diabetes Mellitus (GDM) is defined as Impaired Glucose Tolerance (IGT) with onset or First recognition during pregnancy.

- Farrar. D

EPIDEMIOLOGY

The prevalence varies worldwide and even within a country`s population, depending on the racial and ethical composition of the residents.

In the United States the prevalence is higher amongst African American, Hispanic American, Native American, Pacific Islander, and South or East Asian women than in Caucasian women.

The prevalence of gestational diabetes mellitus (GDM) differs depending on the variety of screening strategies (universal or selective), diagnostic criteria and the prevalence of type2 diabetes mellitus (T2DM) in any specific country.

The prevalence was found to be ranging from <5% in countries such as Pakistan, Belgium, Denmark, Estonia, South Korea, South Africa, to a prevalence as high as 20% in Bermuda and Nepal.

International Diabetes Federation estimated that worldwide 16% of live births in 2013 were complicated by hyperglycaemia during pregnancy and it is most likely that the prevalence of gestational diabetes will increases due to the increase in risk factors like obesity and physical inactivity.

ETIOLOGY

Gestational diabetes etiology is apparently related to:

1) The pancreatic beta-cell dysfunction or the delayed response of the beta cells to the glycaemic levels

2) The marked insulin resistance secondary to placental hormonal release. The human placental lactogen is the main hormone related to increased insulin resistance in GDM (Gestational Diabetes Mellitus).

3) Other hormones related to the development of this disease are

- Growth hormone,
- Prolactin,
- Corticotropin-releasing hormone,
- Progesterone.

These hormones contribute to the stimulation of insulin resistance and hyperglycaemia in the pregnancy.

CLINICAL FEATURES

Signs & symptoms of gestational diabetes mellitus includes:

- Elevated blood glucose (hyperglycemia)
- Frequent urination (polyuria)
- Excessive thirst (polydipsia)
- Extreme hunger (polyphagia)
- Increased fatigue

- Irritability
- Numbness or tingling in the extremities (hands, feet)
- Slow healing wounds or sores
- Unexplained weight loss
- High chances of infections
- Blurry vision

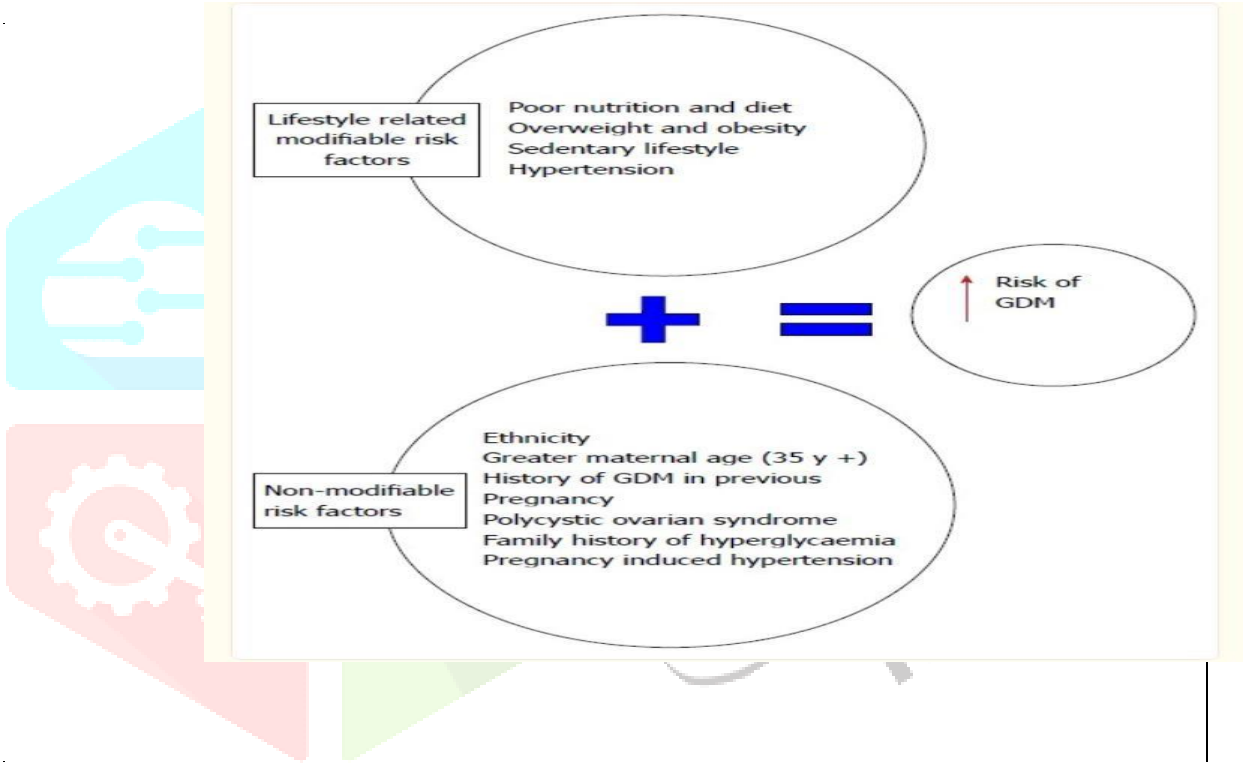


Fig 11: Risk factors of Gestational Diabetes Mellitus

MANAGEMENT

Guiding Principles:

All Pregnant women who test positive gestational diabetes mellitus for the first time should be started on Medical Nutrition Therapy (MNT) and physical exercise for 2 weeks. The woman should walk/exercise for 30 mins a day. After 2 weeks on Medical Nutrition Therapy and physical exercise, 2 hrs PPBS (Post Prandial Blood Sugar) post meal should be done.

If 2hr Post prandial blood sugar is <120mg/dl, repeat test as per high risk pregnancy protocol. to undertake 8 tests (4 regular tests and 4 additional). It is recommended to conduct at least one test every month during 2^{nd} and 3^{rd} trimester. More follow-up tests can be done as recommended by the treating physician.

If 2hr Post prandial blood sugar is > 120mg/dl, medical management

(metformin or insulin therapy) to be started as per guidelines.

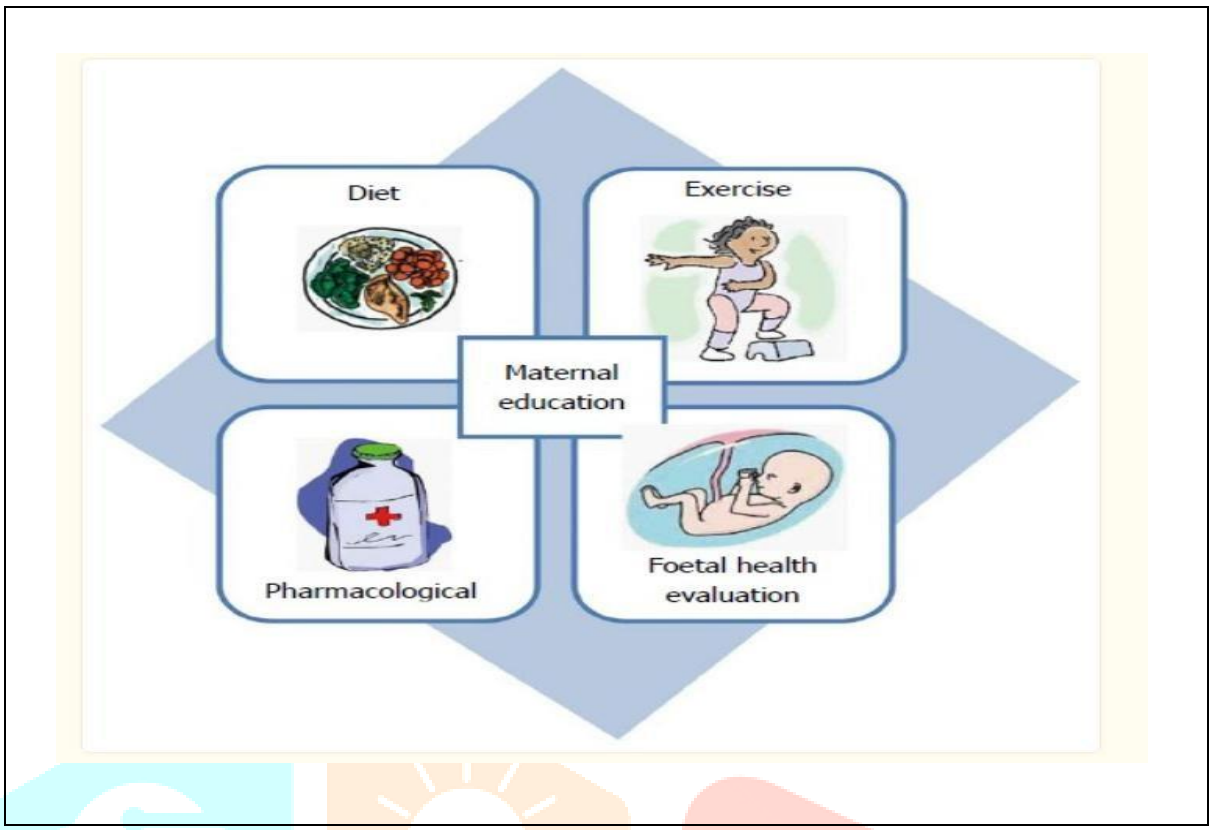


Fig 13: Gestational Diabetes Mellitus Management

MEDICAL MANAGEMENT

Oral Antidiabetic Drug-Metformin and Insulin Therapy:

Metformin or Insulin therapy is the accepted medical management of pregnant women with GDM (Gestational Diabetes Mellitus) not controlled on MNT (Medical Nutrition Therapy). Insulin is the first drug of choice and metformin can be considered after 20 weeks of gestation for medical management of GDM (Gestational Diabetes Mellitus).

Insulin can be started any time during pregnancy for GDM (Gestational Diabetes Mellitus) management. If pregnant women with GDM (Gestational Diabetes Mellitus) before 20 weeks, and Medical Nutrition Therapy (MNT) failed, Insulin should be started.

Metformin can be started at 20 weeks of pregnancy, if MNT (Medical Nutrition Therapy) has failed to control her blood sugar. If the woman's blood sugar is not controlled with the maximum dose of metformin (2gm/ day) and medical nutritional therapy (MNT), insulin to be added. The dose of metformin is 500 mg twice daily orally up to a maximum of 2 gm/day.

Hypoglycaemia and weight gain with metformin are less in comparison to

Insulin.

If Insulin is required in high doses, metformin may be added to the treatment.

At PHC (Primary Healthcare Centre), MO (Medical Officer) should initiate treatment & refer pregnant women with GDM (Gestational Diabetes Mellitus) to a higher centre if blood sugar levels are not controlled or there is some other complication.

At Community Healthcare centre, Specialist/Gynaecologist/Physician/Medical officer can start metformin or insulin.

Any pregnant women on insulin therapy should be instructed to keep sugar/jaggery/glucose powder handy at home to treat hypoglycaemia if it occurs.

The common side-effect that occurs with metformin include diarrhoea, nausea, stomach pain, heartburn, gas and the serious side-effects are lactic acidosis and low blood sugar.

Pregnant woman who has discontinued the medical management should be referred to facility for evaluation and initiation of further management.

Very high 2 hr PPBS (Post Prandial Blood Sugar):

If 2hr PPBS (Post Prandial Blood Sugar) is >200 mg/dL at diagnosis, starting dose of insulin should be 8 units pre-mixed insulin.

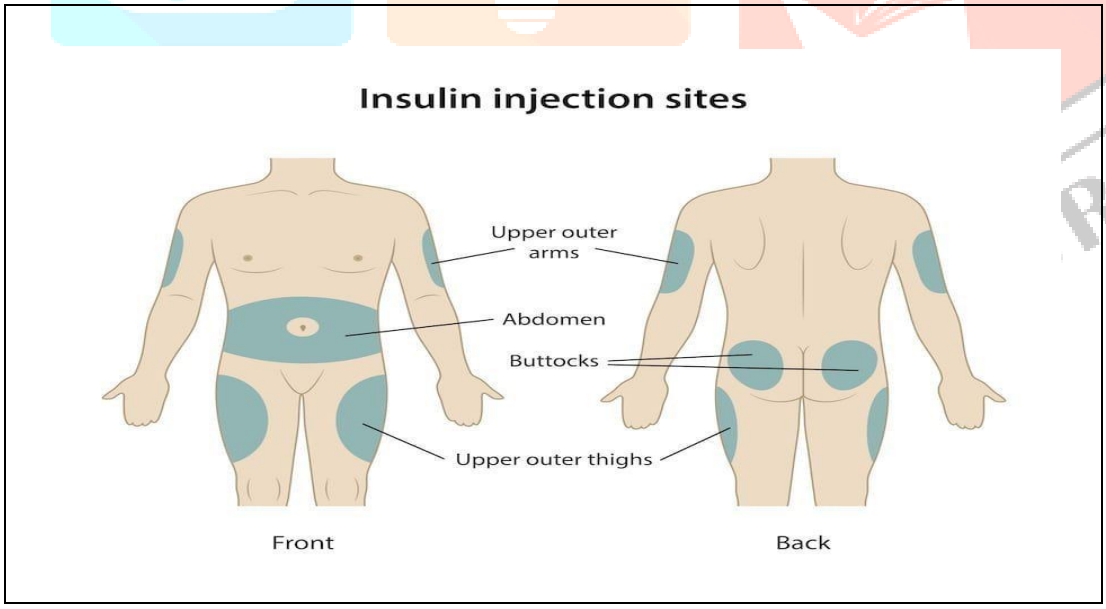
The dose to be adjusted on follow-up and at the same time MNT (Medical Nutrition Therapy) and physical exercise has to be followed. Frequency of monitoring to be decided by the treating Physician / Gynaecologist / Medical officer.

Pregnant women require more than 20 units insulin/day or metformin more than 2g/ day, she should be referred to higher health-care centre.

Site of Insulin Injection:

Front/Lateral aspect of the thigh or over abdomen.

Insulin injection is to be given subcutaneously only.



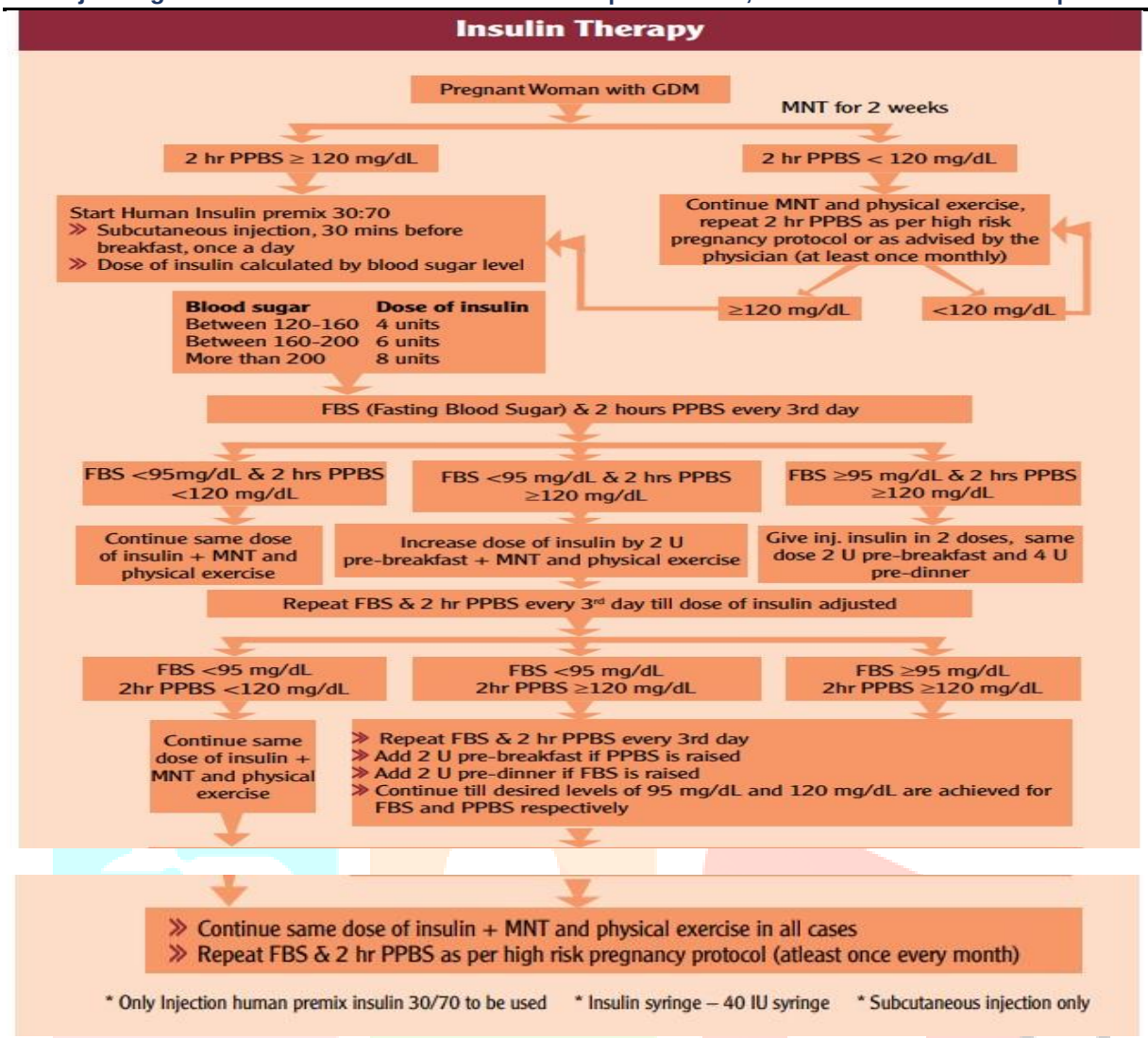


Table 2: Insulin therapy

(PPBS-Post Prandial Blood Sugar, MNT-Medical Nutritional Therapy, FBS-Fasting Blood Sugar)

- **Medical Nutrition Therapy (MNT)**

Principles of MNT

- Healthy eating during pregnancy

All pregnant women with GDM (Gestational Diabetes Mellitus) should get Medical Nutrition Therapy (MNT) as soon as diagnosis is made. Medical Nutrition Therapy for GDM (Gestational Diabetes Mellitus) primarily involves a carbohydrate controlled balanced meal plan which promotes

- Optimal nutrition for maternal and fetal health
- Adequate energy for appropriate gestational weight gain
- Achievement and maintenance of normoglycemia.
- The importance of the individualized nutrition assessment in GDM
- Nutrition assessment in GDM (Gestational Diabetes Mellitus) should be individualised. This assessment includes defining Body Mass Index (BMI) or percentage of desirable pre-pregnancy body weight and optimal pattern of weight gain during pregnancy.
- Calories and GDM (Gestational Diabetes Mellitus)

Individualisation is important when determining energy requirement, and adjustments should be made based on weight change patterns.

Energy requirement during pregnancy includes the normal requirement of adult and an additional requirement for foetal growth plus the increase in the body weight of pregnant woman.

Energy requirement does not increase in the first trimester unless a woman is underweight.

Energy requirement increases during second and third trimester. Energy intake should be adequate enough to provide appropriate weight gain during pregnancy.

As per Indian ICMR (Indian Council of Medical Research) guidelines, for an average weight gain of 10-12 Kg, an addition of 350 kcal/ day above the adult requirement is recommended during second and third trimester.

Severe caloric restriction is not recommended as it may result in ketonemia and ketonuria and impair physical and mental development in offspring.

Equations proposed by ICMR (Indian Council of Medical Research) expert group can be used to calculate adult energy requirement which are as follows:

- l Energy requirement (kcal/d) = BMR ×PAL
- BMR= Basal Metabolic Rate
- B W = Body Weight
- PAL= Physical activity level Diagnosis and management of Gestational Diabetes Mellitus Technical and Operational Guidelines 8 l BMR
  (kcal/d) for adult females (18-30 years) = 14×B.W (Kg) + 471 l BMR (kcal/d) for adult females (30-60 years) = 8.3×B.W (Kg) + 788
- Body weight: Pre-pregnancy body weight to be taken into consideration when calculating the requirement.

Carbohydrates

Carbohydrate foods and daily intakes

Carbohydrate foods are essential for a healthy diet of mother and baby. Once digested, carbohydrate foods are broken down to glucose which goes into blood stream. The type, amount and frequency of carbohydrate intake has a major influence on blood sugar readings.

Foods sources of carbohydrate include cereals (wheat, bajra, ragi, corn rice etc.) and its products (suji, refined flour, breads, pasta, noodles etc), pulses (green gram, bengal gram, black gram etc.), starchy vegetables (potato, sweet potato, corn tapioca etc), fruits, sweets, juices etc.

Large amounts of carbohydrate foods eaten at one time will lead to high blood sugar level and should be avoided. Spreading carbohydrate foods over the day will help to prevent this. It is better to spread carbohydrate foods over 3 small meals and 2–3 snacks each day than taking 3 large meals.

Complex carbohydrates (like whole-grain cereals like oats, bajra, jowar, ragi, whole pulses, vegetables and fruits with skins) should be preferred over simple carbohydrates like food with lots of added sugar or honey, or foods that are made from refined white flour. Some examples of simple carbohydrates include sweets, cakes, puddings, sweet biscuits, pastry, juice, soft drinks, chips, white bread, naan, pizza etc.

Counting the number of carbohydrates serves that a mother eats during the day will help her to eat the right amount of carbohydrate. As a guide, aim should be for 2–3 carbohydrate serves at each major meal and 1–2 carbohydrate serves at each snack.

One serve = approximately 15 grams of carbohydrate.

Fat Intake during Pregnancy

Saturated fat intake (sources - ghee, butter, coconut oil, palm oil, red meat, organ meat, full cream milk etc) should be less than 10 % of total calories and dietary cholesterol should be less than 300 mg/dL. In obese and overweight patients, a lower-fat diet overall can help slow the rate of weight gain.

Use less fat in cooking and avoid frying of foods.

Using low-fat dairy products in place of whole milk or full cream products.

Choosing low fat snacks like substituting fresh fruit, salads, baked and steamed food items for high-fat snacks such as cakes, biscuits, chocolates, pastries, samosas and pakoras etc.

Using lean meat in place of red meat.

Protein

Protein requirement in pregnancy is increased (additional 23 g/day) to allow for foetal growth. At least 3 serving of protein foods are required every day to meet the increased demand. Sources of protein are milk and milk products, egg, fish, chicken, pulses (dal), nuts etc

Fiber

High fibre foods especially soluble fibre may help control blood sugar by delaying gastric emptying, retarding the entry of glucose into the blood stream and lessening the postprandial rise in blood sugar. Soluble fibre in flax seed, psyllium husk, oat bran, legumes (dried beans of all kinds, peas and lentils), and pectin (from fruit, such as apples) and forms in root vegetables (such as carrots) are helpful.

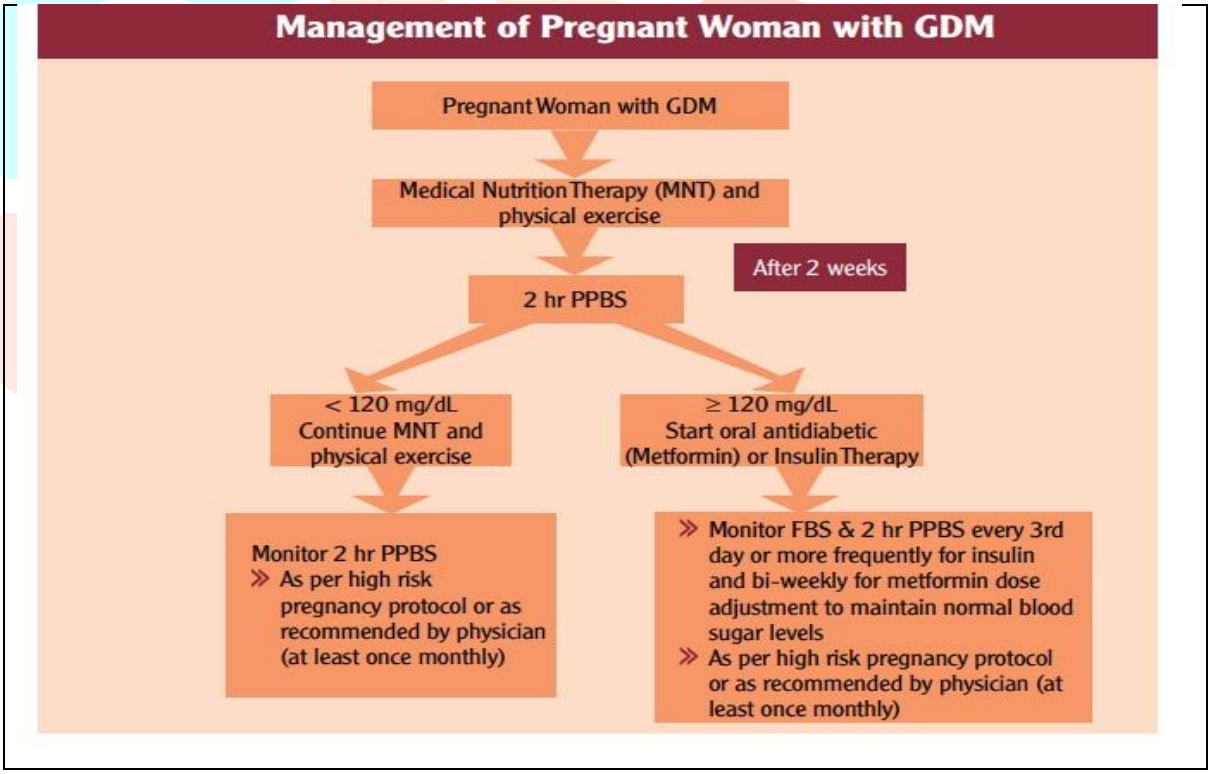


Fig 5: Management of gestational diabetes

PHYSIOTHERAPY ASSESSMENT

SUBJECTIVE EXAMINATION

- Name
- Age
- Gender
- Occupation
- Address
- Chief complaint
- problem Associated
- Weight
- Height
- Body mass index

Present Medical History -

Past Medical History -

- Hypertension
- Obesity
- Hypercholesterolemia
- Thyroid

Personal History

- Smoking
- Habits
- Diet plans
- Physically active/inactive
- Bladder problems
- Bowel problems

Family History

- Any other family member of the patient has gestational diabetes or any other type of diabetes.

Socio-economic status

- Poor/Fair/Good

OBJECTIVE EXAMINATION

On observation

- Built
- Consciousness
- Facial appearance
- Skin changes
- Posture analysis
- Gait analysis
- Edema
- Swellings
- Fluid retention
- Attitude of limbs

On palpation:

- Tenderness
- Spasm
- Crepitus
- Edema

On Examination:

Vital signs

- Blood pressure
- Pulse rate
- Heart rate
- Temperature
- Respiratory rate

Sensory examination (Ask the patient to close the eyes while performing sensory examination)

- **Superficial sensation**

  Superficial

  Deep

- **Temperature**

  Hot

  Cold

- **Deep sensation**

  Vibration

  Proprioception

- **Visual**

  Vestibular or Auditory problems

Motor Examination:

- **Muscle Tone**
- **Range of Motion**
- **Muscle Power**
- **Reflexes**
- **Superficial reflex**

  Abdominal reflex

  Plantar reflex

- **Deep tendon reflex**

Upper limbs

Biceps jerk

Supinator jerk

Triceps jerk

Lower limbs

Knee jerk

Ankle jerk

FUNCTIONAL EVALUATION:

- **Upper limbs**

  Dressing

  Combing

  Washing

  Eating

  Perineal and back hygiene

- **Lower limbs**

  Walking

  Stair climbing

  Squatting

  Cycling

INVESTIGATIONS:

- Glucose challenge test
- Glucose tolerance test

DIAGNOSIS:

MEDICAL MANAGEMENT:

- Medical Nutritional Therapy (MNT)
- Oral antidiabetic drugs – Insulin therapy

SHORT TERM GOALS:

- To control the body weight
- To maintain the body active
- To maintain optimal blood glucose
- To maintain optimal lipids and proteins in their diet

LONG TERM GOALS:

- To maintain optimal blood pressure
- To delay complications of the disease

PHYSIOTHERAPY MANAGEMENT:

- Aerobic exercises
- Strength training
- Flexibility exercises.

AIMS:

1. To control the blood glucose level in the blood.
2. To control the weight.
3. To maintain optimum blood glucose level.
4. To maintain optimum lipid level.
5. To delay complications of diabetes.

ROLE OF EXERCISE IN GESTATIONAL DIABETES MELLITES MANAGEMENT:

Exercise has to be an effective tool in glucose control which may prevent, reduce or delay the need for insulin. Glucose control is considered in the gestational patient, considering the risk of poor health outcomes for mother and child in the presence of hyperglycaemia.

Physical activity lowers the blood glucose level, regular exercise can be an effective way to manage gestational diabetes. Common recommendation for at least 150 minutes (2 hours and 30 minutes) of moderate-intensity activity a week and strength exercise on 2 or more days a week.

EXERCISE GUIDELINES (FITT PRINCIPLE):

- **FREQUENCY:**

  Women who were previously sedentary it is more convenient for them to start an exercise program in the second trimester.

  Women with little physical activity history should begin with continuous aerobic exercises 3 times a week and increased to at least 4 times a week. Each training session should include 5-10 exercises involving the major muscle groups (upper body, lower body and core).

- **INTENSITY:**

  Moderate intensity exercises are highly recommended

- **TYPE:**

  Exercising ranging from low exerting forces such as yoga to higher exerting forces such as aerobic classes and jogging which are safe for both mother and foetus.

  Aerobic exercise can consist of any activity that uses large muscle groups in a continuous rhythmic manner. It includes walking, jogging, aerobic dance, swimming, hydrotherapy, rope skipping, rowing.

Resistance strength training includes weightlifting and flexibility exercises

- **TIME (DURATION):**

  Women with little physical activity history should begin with 15 minutes of continuous aerobic exercises with a graded increase to 30 minutes and 10-15 repetitions for each exercise.

Type of exercise	Intensity	Duration	Frequency
Aerobic	Moderate 60%-90%	30 minutes Continuously	No more than two consecutive days without exercising
Resistance	Moderate 50% 1RM 5-10 Exercises	60 minutes	At least 2-3 times a week

Table 3: Exercise guidelines (RM-repetition maximum)

1. TO CONTROL THE BLOOD GLUCOSE LEVEL:

- **LEGS UP THE WALL POSE**

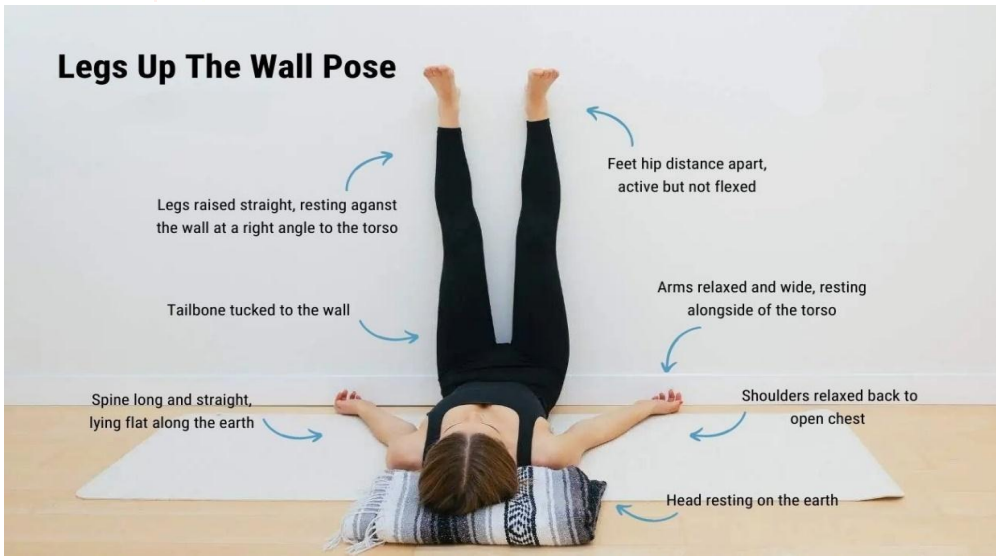


Fig 16: Leg up the raise pose

- This pose has remarkable impact on gestational diabetes.
- This pose helps to stimulate the internal organs.
- Process:

  Keep a towel under the head and lie alongside the wall for some support.
  Raise the legs and make an angle of 90 degrees with legs parallel to the wall.
  Relax neck, chin, and head.

  Keep the arms beside the body and stretch them.

  Keep up with this pose for about 5- 10 minutes, and gently slide the legs towards the floor/ ground.

- **RECLINING BOUND ANGLE:**

- It relaxes the whole body and helps to normalise the levels of blood sugar.
- This pose also improves blood circulation.
- This pose is very effective in managing gestational diabetes.
- Process:

  Lean on the hand by bending the back towards the floor. Bring torso near the floor and support the head and neck by keeping a towel under it.
  Start rotating the inner thighs in an outward direction. Widen the knees by bringing them away from hips. Laying arms on the floor, make an angle of 45 degrees from the torso.
  Stay in this pose for about 1 minute.

  Press thighs together with the hands and push the back away from the floor.

- **HALF LORD OF THE FISH POSE:**

This pose helps build up strength and improve the stimulation of the blood.

- Process:

Put the right foot on the mat outside of the left knee.

Raise the left hand towards the ceiling. Put the left elbow on the right knee.
Inhale and exhale more often.

Repeat this pose on the other side.

2. TO MAINTAIN THE OPTIMUM BLOOD LIPID LEVEL IN THE BODY & TO DELAY THE COMPLICATIONS OF GESTATIONAL DIABETES:

⊓ WALKING

- Walk in a continuous rhythmic manner
- Duration: 30minutes continuously
- Frequency: No more than two consecutive days without exercising.

JOGGING

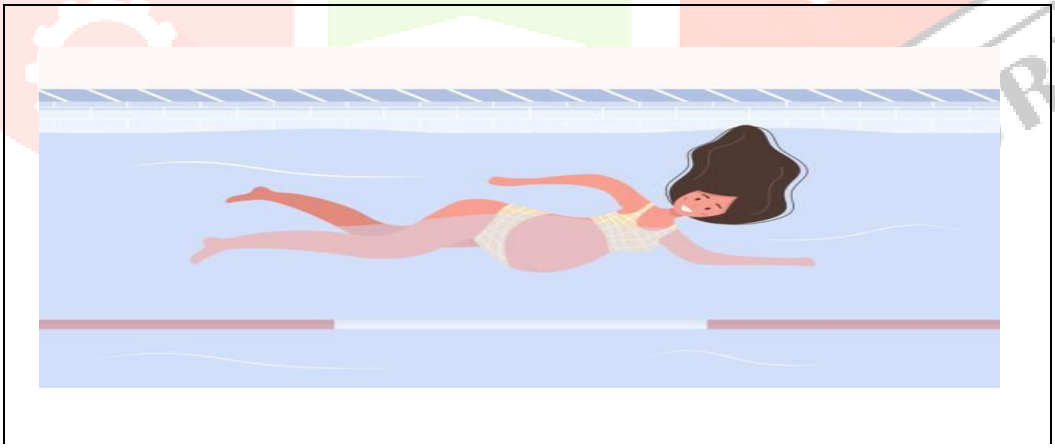
- Duration: 30minutes continuously
- Frequency: No more than two consecutive days without exercising.

3. TO CONTROL THE WEIGHT:

- **CYCLING:**

- It helps reduce stress, promotes better sleep and it can increase the self esteem.
- Duration: 30minutes continuously
- Frequency: No more than two consecutive days without exercising.

SWIMMING:



- It relieves pain, improves sleep patterns and fitness.
- It is considered a safe form of exercise during all three trimesters.
- Duration: 30minutes continuously
- Frequency: No more than two consecutive days without exercising.

4. TO DELAY THE COMPLICATIONS:

WEIGHT LIFTING:

- Lifting weights while pregnant can strengthen the abdominal and back muscles, increase stamina for labour and delivery, and even boost the mood.
- USES:

Better weight management.

Lower risk of gestational diabetes (GDM).

Lower risk of preeclampsia.

Better mood.

Protects against lower back pain.

Helps with baby‘s development**.**

CASE STUDY 1

SUBJECTIVE EXAMINATION

- Name : N. Jayanthi
- Age : 27 years
- Gender : Female
- Occupation : House wife
- Address : Poranki, Vijayawada
- Chief complaints : Increased blood glucose level is 230mg/dl

History of Present illness:

- Associated problems : No significant problems
- Sphincter disturbances : Increased urine frequency

Past Medical History

- Hypertension : Yes
- Obesity : Yes
- Hyper cholesterolemia : No

Personal History

- Smoking : No
- Alcoholism : No
- Habits : No

- Diet : Improper diet
- Physically active/inactive : Inactive
- Bladder and bowel problems : Yes

Family History

- Not significant

OBJECTIVE EXAMINATION

ON OBSERVATION

- Built : Endomorph
- Skin changes : No obvious changes
- Posture analysis : No significant deviations
- Gait analysis : No significant deviations
- Consciousness : Alert
- Facial appearance : Tired
- Posture analysis : Lumbar lordosis
- Gait analysis : Waddling gait
- Edema : Seen in lower limbs
- Swellings : Seen in lower limbs
- Fluid retention : Seen in lower limbs
- Attitude of limbs : Normal

ON PALPATION

- Tenderness : Nil
- Vital signs :
- Blood pressure : 125/90mmHg
- Heart rate : 60 beats /minute
- Pulse rate : 70/minute

SENSORY EXAMINATION

- Superficial sensation : Intact Deep sensation : Intact

MOTOR EXAMINATION

- Muscle tone : Normal
- Range of motion : Normal
- Strength : Normal

REFLEXES:

Superficial reflex : Normal

Deep tendon reflexes

Biceps jerk : Normal

Knee jerk : Normal

Ankle jerk : Normal

Triceps jerk : Normal

INVESTIGATION:

GLUCOSE TOLERANCE TEST: 250mg/dl

DIAGNOSIS:

Gestational Diabetes Mellitus

MEDICAL MANAGEMENT

Metformin

Insulin

Glimepiride

SHORT TERM GOALS

- To maintain optimal blood glucose levels
- To maintain optimal lipid levels
- To maintain optimal protein levels
- To maintain optimal blood pressure
- To control the body weight
- To maintain the body active

LONG TERM GOALS

- To delay the complications of pregnancy
- To maintain both mother and foetus health.

PHYSIOHERAPY MANAGEMENT

- Aerobic exercises: Walking
Jogging Cycling
Swimming
- Flexibility exercises: Quadriceps stretch
Hamstrings stretch
Hip flexors stretch
Hip adductors stretch

CASE STUDY-2

- Name : M. Mahathi
- Age : 22 years
- Gender : Female
- Occupation : Software engineer
- Address : Satyanarayanapuram Vijayawada.
- Chief complaints : Increased blood glucose level is 250mg/dl

History of Present illness:

- Associated problems : Obesity
Fatigue
Extreme hunger
Excessive thirst
- Sphincter disturbances : Increasing urine frequency

Past Medical History

- Hypertension : Yes
- Obesity : Yes
- Hyper cholesteraemia : No

Personal History

- Smoking : No
- Alcoholism : No
- Habits : No
- Diet : Improper diet
- Physically active/inactive : Inactive
- Bladder and bowel problems : Yes

Family History

- Not significant

OBJECTIVE EXAMINATION

ON OBSERVATION

- Built : Endomorph
- Skin changes : No obvious changes
- Consciousness : Alert
- Facial appearance : Tired
- Posture analysis : Lumbar lordosis
- Gait analysis : Waddling gait
- Edema : Seen in lower limbs
- Swellings : Seen in lower limbs
- Fluid retention : Seen in lower limbs
- Attitude of limbs : Normal

ON PALPATION

- Tenderness : Nil
- Vital signs :
- Blood pressure : 125/90mmHg
- Heart rate : 60 beats /minute
- Pulse rate : 70/minute

SENSORY EXAMINATION

- Superficial sensation : Intact
- Deep sensation : Intact

MOTOR EXAMINATION

- Muscle tone : Normal
- Range of motion : Normal
- Strength : Normal

REFLEXES:

- Superficial reflex : Normal
- Deep tendon reflexes
- Biceps jerk : Normal
- Knee jerk : Normal
- Ankle jerk : Normal
- Triceps jerk : Normal

INVESTIGATION:

- Glucose tolerance test: 250mg/dl

DIAGNOSIS:

- Gestational Diabetes Mellitus

MEDICAL MANAGEMENT:

- Metformin
- Insulin
- Glimepiride

SHORT TERM GOALS:

- To maintain optimal blood glucose levels
- To maintain optimal lipid levels
- To control the body weight
- To maintain the body active
- To maintain optimal protein levels

LONG TERM GOALS:

- To maintain optimal blood pressure To delay the complications of pregnancy
- To maintain both mother and foetus health.

PHYSIOHERAPY MANAGEMENT:

- Aerobic exercises
  Walking
  Jogging
- Strength training
  Weight lifting
- Flexibility exercises Hip flexors stretch
  Hip adductors stretch

CASE STUDY- 3

- Name : B. Bhavya
- Age : 25 years
- Gender : Female
- Occupation : Teacher
- Address : Krishnalanka, Vijayawada
- Chief complaints : Increased blood glucose level is 280mg/dl

History of Present illness:

- Associated problems : Obesity
  Polyuria
  Blurry vision
  Weakness
- Sphincter disturbances : Increasing urine frequency

Past Medical History

- Hypertension : Yes
- Obesity : Yes
- Hyper cholesterolemia : No

Personal History

- Smoking : No
- Alcoholism : No
- Habits : No
- Diet : Improper diet
- Physically active/inactive : Inactive
- Bladder and bowel problems : Yes

Family History

- Not significant

OBSERATIVE EXAMINATION

ON OBSERVATION

- Built : Endomorph
- Skin changes : No obvious changes
- Consciousness : Alert
- Facial appearance : Tired
- Posture analysis : Lumbar lordosis
- Gait analysis : Waddling gait
- Edema : Seen in lower limbs
- Swellings : Seen in lower limbs
- Fluid retention : Seen in lower limbs
- Attitude of limbs : Normal

ON PALPATION

- Tenderness : Nil
- Vital signs :
- Blood pressure : 125/90mmHg
- Heart rate : 60 beats /minute
- Pulse rate : 70/minute

SENSORY EXAMINATION

- Superficial sensation : Intact
- Deep sensation : Intact

MOTOR EXAMINATION

- Muscle tone : Normal
- Range of motion : Normal
- Strength : Normal

REFLEXES:

Superficial reflex : Normal

Deep tendon reflexes

Biceps jerk : Normal

Knee jerk : Normal

Ankle jerk : Normal

INVESTIGATION:

- Glucose tolerance test: 250mg/dL

DIAGNOSIS:

- Gestational diabetes mellitus

MEDICAL MANAGEMENT:

- Metformin
- Insulin
- Glimepiride

SHORT TERM GOALS

- To maintain optimal blood glucose levels
- To maintain optimal lipid levels
- To maintain optimal protein levels
- To maintain optimal blood pressure

LONG TERM GOALS

- To delay the complications of pregnancy
- To maintain both mother and foetus health.

PHYSIOHERAPY MANAGEMENT

- Aerobic exercises
  - Jogging
  - Cycling
- Strength training
  - Weight lifting
- Flexibility exercises
  - Quadriceps stretch
  - Hamstrings stretch

CONCLUSION

All pregnant women should engage in physical activity and may benefit from planned and programmed exercise. Women with gestational diabetes mellitus have extra physiological challenges that when left unattended to, have the potential to increase negative pregnancy outcomes for both mother and child. Exercise can be used as a tool of treatment as part of the continuum of care for women with gestational diabetes mellitus.

General guidelines encourage these women to engage in moderate intensity aerobic and strength training along with recreational physical activity. Overweight and obese women have an increased risk of developing gestational diabetes mellitus leading to complications during pregnancy, birth and neonatally.

The clinical management of obese pregnant women and women with gestational diabetes mellitus is a challenge and puts additional stress on the healthcare system. It seems more and more clear that maternal metabolic characteristics are crucial determinants of insulin resistance during pregnancy and in offspring and interventions, especially in the form of exercise, weight loss and a healthy diet before, during and after pregnancy might be a key to prevent the vicious circle that contributes to the epidemic of obesity, insulin resistance and type2 diabetes mellitus.

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