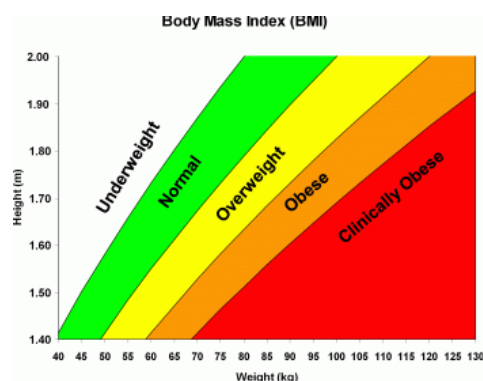




Obesity in pregnancy is defined as having a pre-pregnancy Body Mass Index (BMI) of 30 or higher. It is a high-risk condition that requires specialized prenatal care, as excess body fat significantly elevates the chances of complications for both the expecting mother and the developing fetus. Preconception counselling regarding weight reduction & optimum Gestational weight gain (GWG) is recommended

The **Body Mass Index (BMI)**, originally called the **Quetelet Index**, is a mathematical formula used to screen for weight categories—such as underweight, healthy weight, overweight, and obesity. It is calculated by dividing your weight in kilograms by the square of your height in meters (kg/m^2)



BMI (kg/m^2)	Interpretation
<18.5	Under weight
18.5-24.9	Normal
25-29.9	Over weight
≥ 30	Obese
30-34.9	Class 1 obese
35-39.9	Class II obese
≥ 40	Class III obese

Inclusion criteria is Singleton pregnancy, age >20 years and <35 years, BMI >18.5 kg/m^2

The national prevalence of obesity (BMI ≥ 25) among pregnant women in India is approximately 12%. However, rates vary widely; over 30 districts—such as Shopian in Jammu and Kashmir and Pathanamthitta in Kerala—report rates exceeding 40%.

Data indicates that obesity during pregnancy is closely tied to older maternal age, urban residency, and higher wealth quintiles. The **National Family Health Survey-6 (NFHS-6)** data released by the Union Health Ministry does not isolate a specific national statistic for obesity restricted exclusively to *pregnant* women. However, it reveals a massive surge in the overarching category of **women of reproductive age (15–49 years)**,

where the prevalence of being overweight or obese has spiked to **30.7%** (up from 24% in NFHS-5).

Historical tracking across previous NFHS cycles indicates that the national baseline for obesity among pregnant women is highly comparable to, and directly mirrors, this general female reproductive age bracket.

Adipose pathophysiology

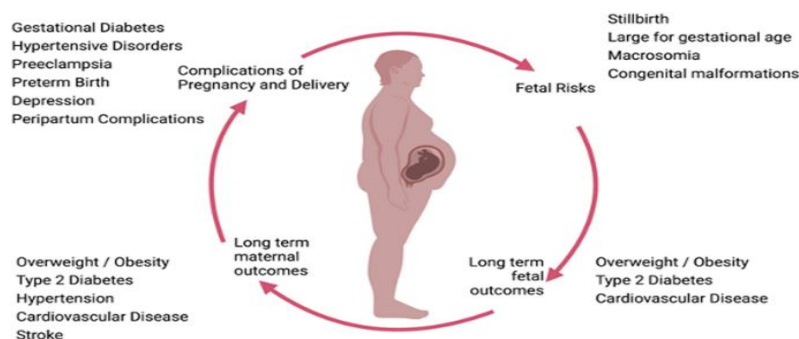
Maternal obesity transforms adipose tissue into an **active endocrine organ** that drives chronic systemic inflammation, severe insulin resistance, and oxidative stress. This dysfunctional state alters placental nutrient transport, frequently causing gestational diabetes, pre-eclampsia, and long-term metabolic complications for both the mother and the developing fetus

The underlying pathophysiology involves several critical mechanisms:

- **Adipokine Dysregulation:** In obesity, adipose tissue produces altered levels of adipokines. It secretes excess pro-inflammatory cytokines such as TNF- α and IL-6, alongside high levels of leptin. Concurrently, **levels of the insulin-sensitizing hormone adiponectin drop**. This shift promotes vascular endothelial dysfunction and raises the risk of hypertensive disorders of pregnancy.
- **Exaggerated Insulin Resistance:** Pregnancy inherently induces a state of physiological insulin resistance to ensure adequate glucose supply to the fetus. Excess visceral adipose tissue worsens this state by promoting lipolysis and flooding peripheral tissues and the liver with free fatty acids. This lipid overload inhibits downstream insulin signaling, often leading to Gestational Diabetes Mellitus (GDM).
- **Macrophage Infiltration:** Expanded adipose tissue recruits immune cells, particularly pro-inflammatory macrophages, amplifying "**metaflammation**". This inflammatory state causes placental dysfunction and is a key driver in the development of pre-eclampsia.
- **Ectopic Fat Deposition:** When the subcutaneous fat storage capacity is exceeded, **lipids begin to deposit in ectopic sites like the liver and skeletal muscles**. This accumulation drives further metabolic derangements.
- **Fetal Programming:** The intrauterine environment of a mother with obesity subjects the fetus to an excess of nutrients and inflammatory markers. This alters fetal **epigenetics, predisposing the offspring to a higher risk of developing obesity and metabolic syndrome later in life.**

In India, maternal obesity frequently leads to adverse outcomes, including:

- **Gestational Diabetes Mellitus (GDM)**
- **Pregnancy-Induced Hypertension (PIH)**
- Increased risk of requiring a **Cesarean section**
- Higher rates of **Postpartum Hemorrhage (PPH)**
- **Thromboembolism**
- Neonatal complications such as **macrosomia** and increased **NICU admissions**



Antepartum Management

For pregnant women with obesity (pre-pregnancy BMI ≥ 30), Indian and international medical guidelines recommend a total weight gain of just **5 to 9 kilograms** (11 to 20 pounds). Limiting weight gain to this range helps minimize the risks of gestational diabetes, preeclampsia, and delivery complications.

Doctors do not recommend losing weight during pregnancy, even for women with obesity. The goal is to focus on nutrient-dense foods to ensure healthy fetal development and limit total weight gain to 5--9 kg (11--20 lbs). This helps prevent gestational diabetes and hypertension, which are more common with high pre-pregnancy BMI.

Recommended Dietary Focus

- **High-Quality Proteins:** Include protein in every meal to support fetal growth without excess calories. Examples include lentils (dal), eggs (cooked thoroughly), paneer, sprouts, chicken, and fish.
- **Complex Carbohydrates & Fiber:** Prioritize whole grains like brown rice, oats, millet (jowar, bajra, ragi), and whole wheat over refined flours. Add plenty of green leafy vegetables to keep you full and prevent constipation.
- **Healthy Fats:** Use moderate amounts of nuts (almonds, walnuts) and seeds (flax, chia) for essential omega-3 fatty acids
- **Crucial Micronutrients:** Women with obesity often require higher doses of specific micronutrients. A higher dose of folic acid (5 mg) in the first trimester and 10 micrograms of Vitamin D, along with iron and calcium supplements. [[1](#), [2](#), [3](#)]

Sample Indian Meal Plan

- **Breakfast:** Besan (gram flour) or moong dal chilla stuffed with vegetables, or veggie-rich poha or oats, paired with mint or coriander chutney.
- **Mid-Morning:** Seasonal fruits (like guava, orange, apple) or coconut water.
- **Lunch:** 1-2 multigrain or whole wheat chapatis, a bowl of mixed vegetable sabzi, dal, and a side of cucumber-onion salad or low-fat dahi (yogurt).
- **Evening Snack:** Roasted makhana, roasted chana, or a small handful of unsalted nuts.
- **Dinner:** Vegetable khichdi, brown rice with rajma, or a light vegetable soup with paneer salad.



Foods to Avoid

Completely avoid alcohol, tobacco, unpasteurized dairy, raw or undercooked meats and eggs, and high-mercury fish. Limit intake of processed foods, fried snacks (like samosas or bhujia), and added sugars to prevent excessive weight gain.



Challenges of Prenatal Care

- Close monitoring to detect HTN ,GDM
- Standard screening for Foetal Anomalies & Growth Surveillance with USG limitations of high specificity & poor sensitivity for FGR & low predictive value for macrosomia
- Antepartum external FHR monitoring is also challenging at times

Intra-partum Management

Less chance of spontaneous labour , increased incidence of IOL & failure of IOL

Managing obese pregnant women in India involves a **multidisciplinary approach** prioritizing **early antenatal consultation**, careful **left-uterine displacement**, and **regional anesthesia** whenever possible to avoid difficult airway complications.

Due to high rates of comorbidities like **gestational diabetes and hypertensive disorders**, **careful peripartum planning** is essential to **prevent maternal and neonatal morbidity**.

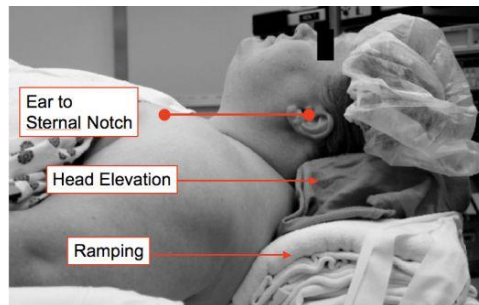
Preoperative Preparation & Assessment

- **Early Consultation:** Current obstetric guidelines recommend that parturients with a Body Mass Index (BMI) greater than 40 kg/m² undergo a formal anesthetic evaluation in the third trimester.
- **Airway & Respiratory Screening:** Anesthesiologists specifically screen for **Obstructive Sleep Apnea (OSA)**, difficult intubation risks, and decreased functional residual capacity, as pregnancy naturally shifts metabolic demands.

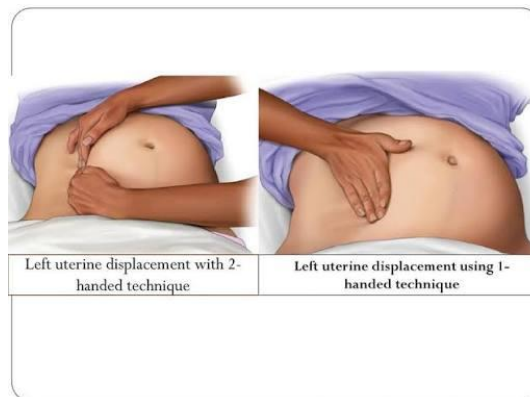
- **Equipment Readiness:** Indian tertiary care centers ensure that difficult airway carts, video laryngoscopes, and appropriately sized spinal/epidural needles are immediately available prior to delivery

Positioning

- **Ramped Positioning:** To counteract the increased risk of maternal hypoxia and aortocaval compression, the "ramp" position (using pillows or commercially available elevation devices to align the sternum and the ear) is heavily utilized.



Left Uterine Displacement (LUD): A strict 15° to 30° tilt is applied to all obese parturients in the supine position to prevent venous return obstruction.



Key intrapartum strategies across Indian tertiary and secondary care facilities include:

Labour Analgesia & Anaesthesia Techniques

- **Neuraxial Preference:** Regional anesthesia (spinal, epidural, or combined spinal-epidural) remains the technique of choice for labor analgesia and

cesarean sections. It helps avoid general anesthesia, which carries a much higher risk of failed intubation and gastric aspiration.

- **Drug Sparing Effect:** Lower doses of local anesthetics (e.g., bupivacaine) are typically required for spinal blocks in obese pregnant women due to reduced cerebrospinal fluid (CSF) volume and heightened neural sensitivity.
- **Epidural analgesia** is placed early due to increased risks of epidural failure and difficult regional blocks. Early IV access is secured. If general anesthesia is required, the risk of maternal aspiration rises significantly, necessitating rapid sequence induction and specialized airway equipment.

Caesarian Delivery/Vaginal Delivery

- Prioritizes **continuous electronic fetal monitoring** due to higher risks of **shoulder dystocia** and **fetal distress**.
- Because of elevated rates of **gestational diabetes** and **hypertensive disorders**, active management focuses on **oxytocin augmentation** for prolonged labor, preventing **postpartum hemorrhage (PPH)**, and preparing for higher **cesarean delivery** rates
- **Labor Progression & Augmentation:** First stages of active labor are often prolonged in obese gravidas. Continuous monitoring is essential, and augmented labor with **oxytocin** is frequently used, though care teams must closely monitor for uterine atony.
- **PPH Prevention:** Uterine atony is highly prevalent in obese women. Active management of the third stage of labor (AMTSL) is standard practice. Prophylactic uterotonics (e.g., oxytocin, methylergometrine, or carboprost) are administered routinely, and blood loss is meticulously weighed and documented.
- **Cesarean & Wound Care:**

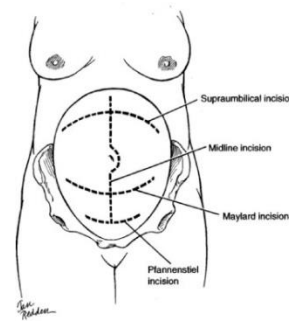
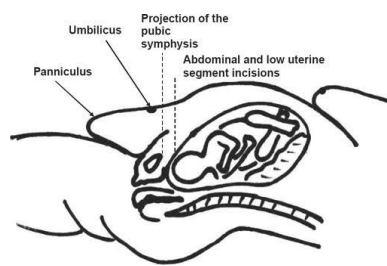
Performing a Lower Segment Cesarean Section (LSCS) on an obese pregnant woman requires careful, individualized incision planning to minimize wound complications like infections or dehiscence. Skin incisions may include low transverse (Pfannenstiel), high transverse, or vertical approaches, which are often dictated by the size of the patient's abdominal panniculus (fat apron).

Key Surgical Considerations & Techniques

- **Skin Incision Choice**

Transverse Incision: Generally preferred over vertical incisions as they carry a significantly lower risk of wound complications. This can involve a **Pfannenstiel incision** below the pannus, a **suprapannicular** (above the fat apron) approach or a **transverse supraumbilical** incision for morbidly obese patients with a voluminous panniculus.

Vertical Incision: Offers faster entry in extreme emergency situations but is associated with a higher risk of wound breakdown and poor cosmetic outcomes.



- **Uterine Incision:** The standard remains a low transverse incision on the uterus. Vertical skin incisions can inadvertently increase the risk of requiring a vertical classical uterine incision, which should be avoided. If a lower-segment cesarean section (LSCS) is required, the risk of surgical site infection and wound dehiscence is elevated. Protocols emphasize **weight-adjusted prophylactic antibiotics** (e.g., higher doses of cefazolin), meticulous **hemostasis**, and **subcutaneous tissue closure** if the fat layer exceeds 2 cm.
- Negative Pressure Wound Therapy (NPWT) for obese LSCS (Lower Segment Caesarean Section) wounds provides a closed, sterile environment that manages fluid and supports healing. While prophylactic NPWT is sometimes used to reduce **surgical site infections (SSIs)**, recent studies (such as those from [National Institutes of Health](#)) show it does not entirely eliminate or prevent all wound complications, and standard dressings may perform comparably well.
- **Thromboprophylaxis:** Obese patients have a significantly higher baseline risk of **venous thromboembolism (VTE)**. Sequential compression devices (SCDs) are applied in the intrapartum and immediate postpartum period, with early ambulation and prophylactic low-molecular-weight heparin (LMWH) prescribed based on individual risk scores.

Postpartum Monitoring: Patients are closely monitored for **postpartum hemorrhage (PPH)**, hemodynamic instability, and respiratory depression in a high-dependency unit.

Neonatal Care

SCBU /NICU may be required

Way Forward

- Optimising Pre-pregnancy BMI
- Bariatric Surgery has shown promise in improving fertility & reduction of maternal & foetal morbidity