

# MATERNAL ANALYSIS OF DEMOGRAPHICS

Total Patients at Baseline

**272**

Patients Excluded

**61**

Patients Observed

**211**

Avg PrePregnant BMI

**27**

Average Age

**26**

Minimum Age

**15**

Maximum Age

**43**

% of Patients with Chronic diabetes

**7**

% of Patients with GDM

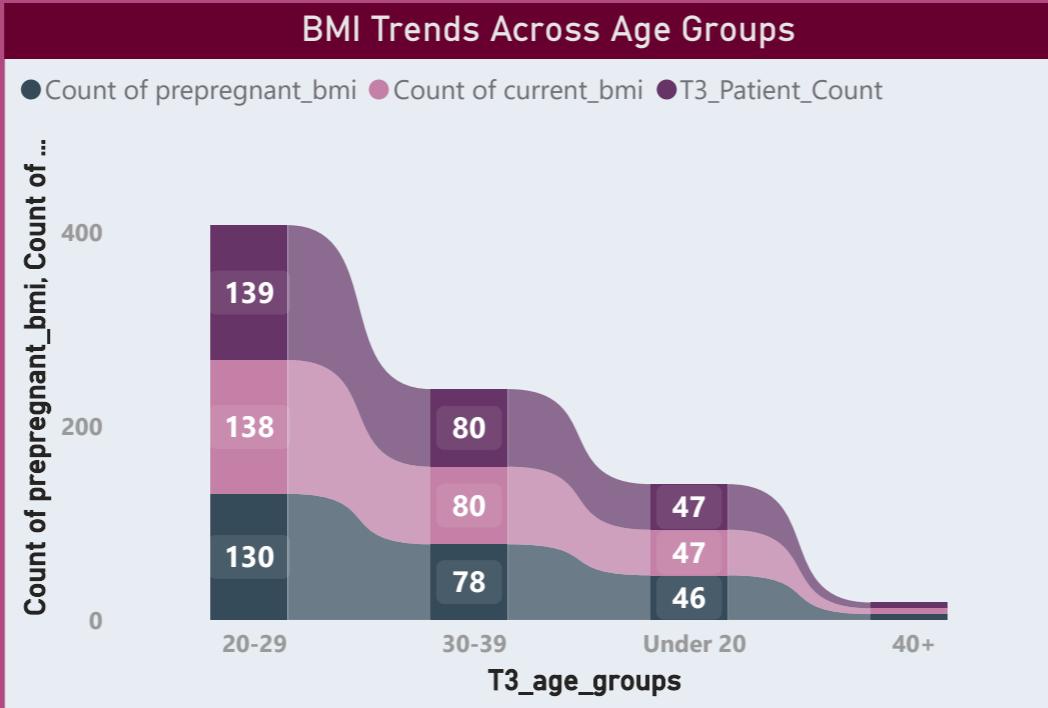
**9**

Chronic Hypertension

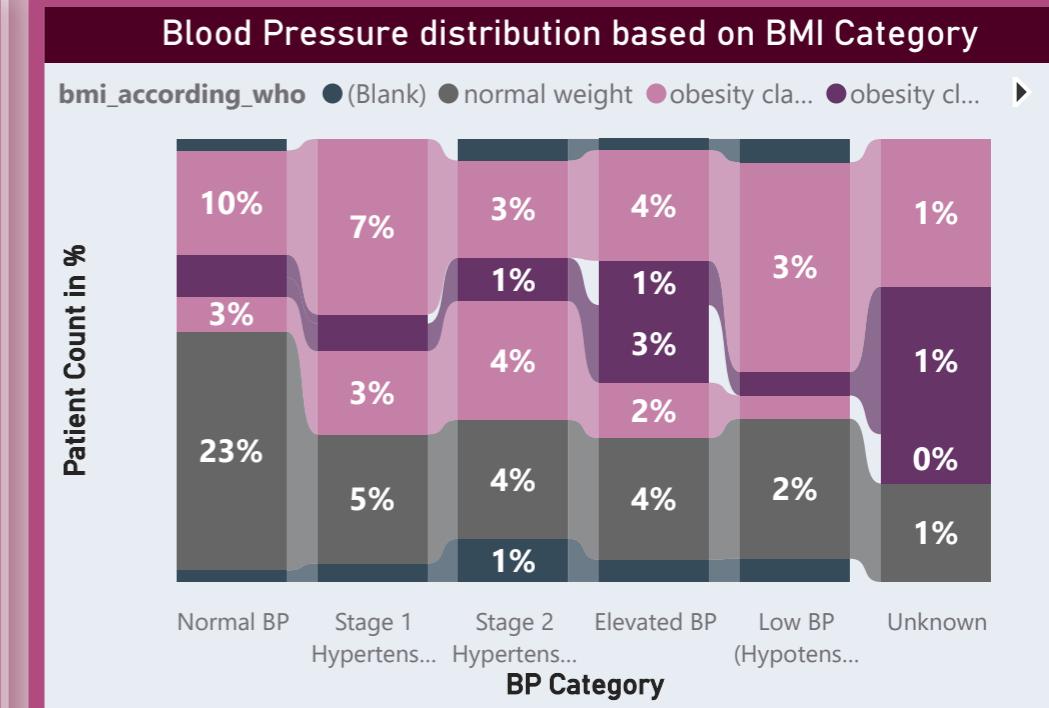
**4%**

Gestational Hypertension

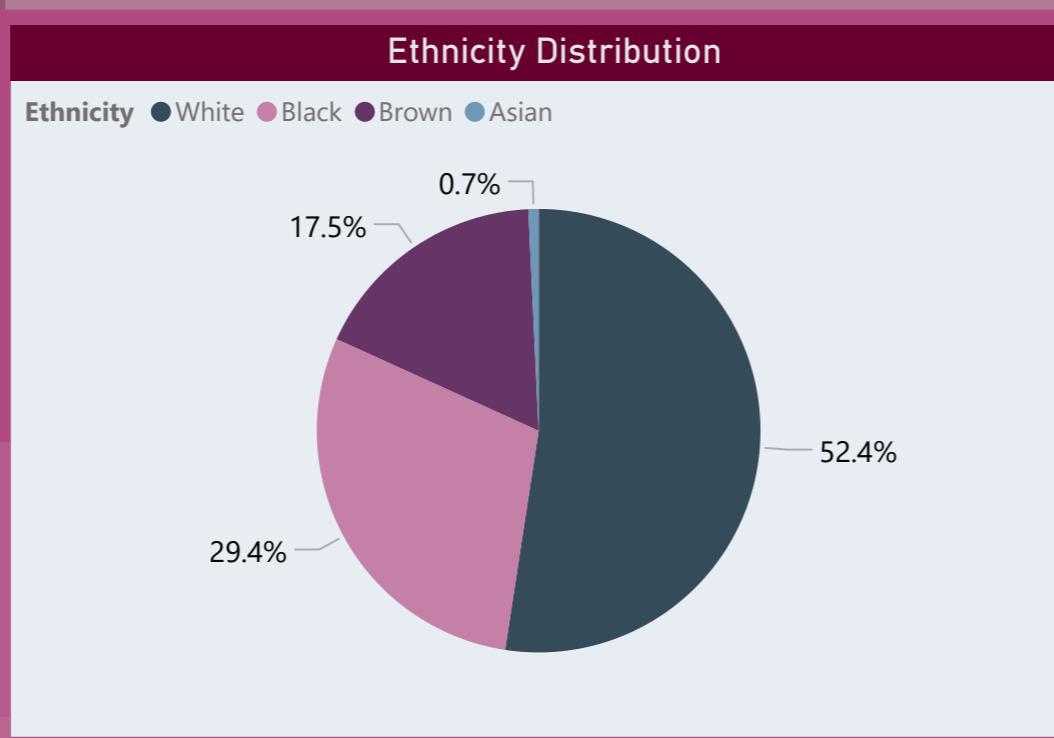
**12.9%**



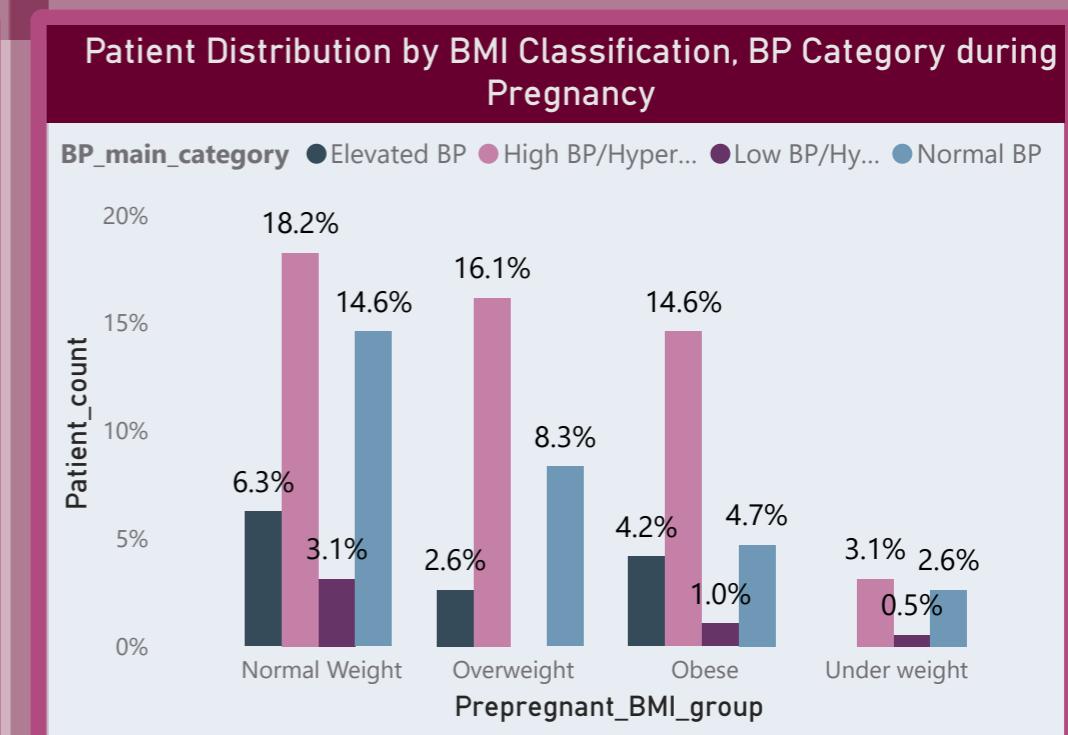
The majority (51.10%) of patients fall within the 20-29 age group, followed by 30-39 (29.41%), under 20 (17.28%), and 40+ (2.21%). This distribution shows that most pregnancies occur in the 20-29 age range, which is the most common reproductive age.



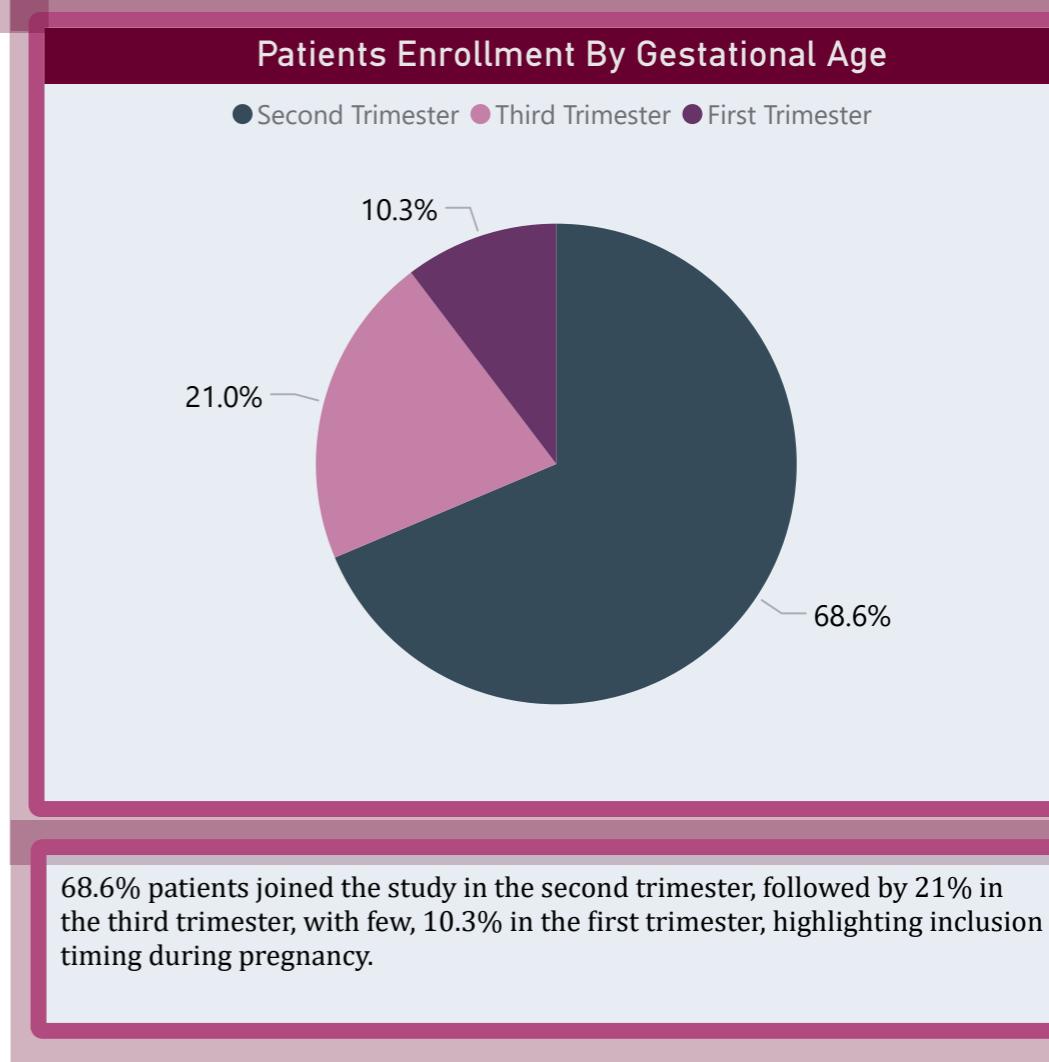
At the initial stages of Pregnancy, 3% of the patients had hypertension and 4% of the patients had elevated BP which implies that they are under the state of developing hypertension.



Most of the women in this dataset belong to White Ethnicity group showing 52%.

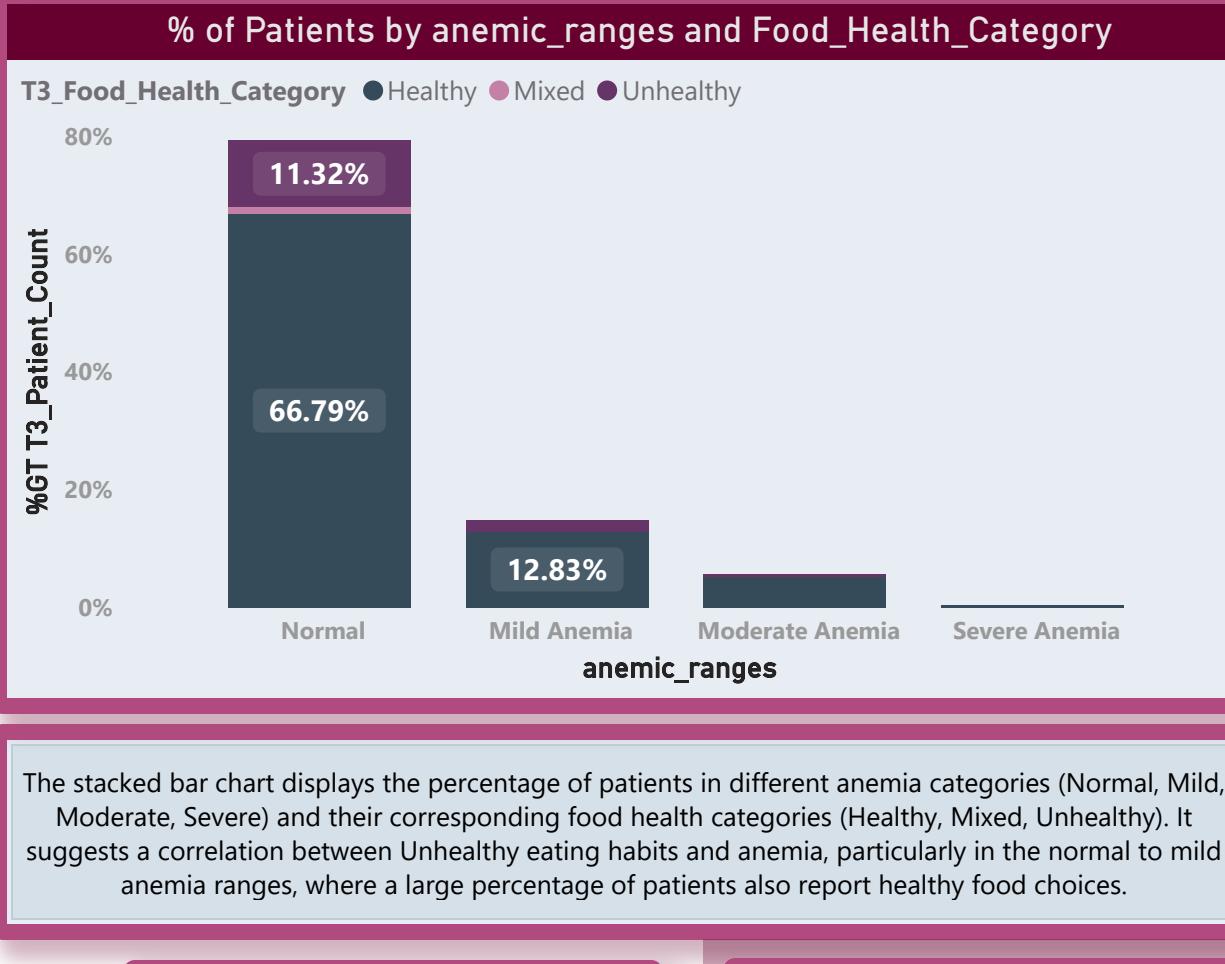


Number of High BP/Hypertension women are more in all BMI categories.

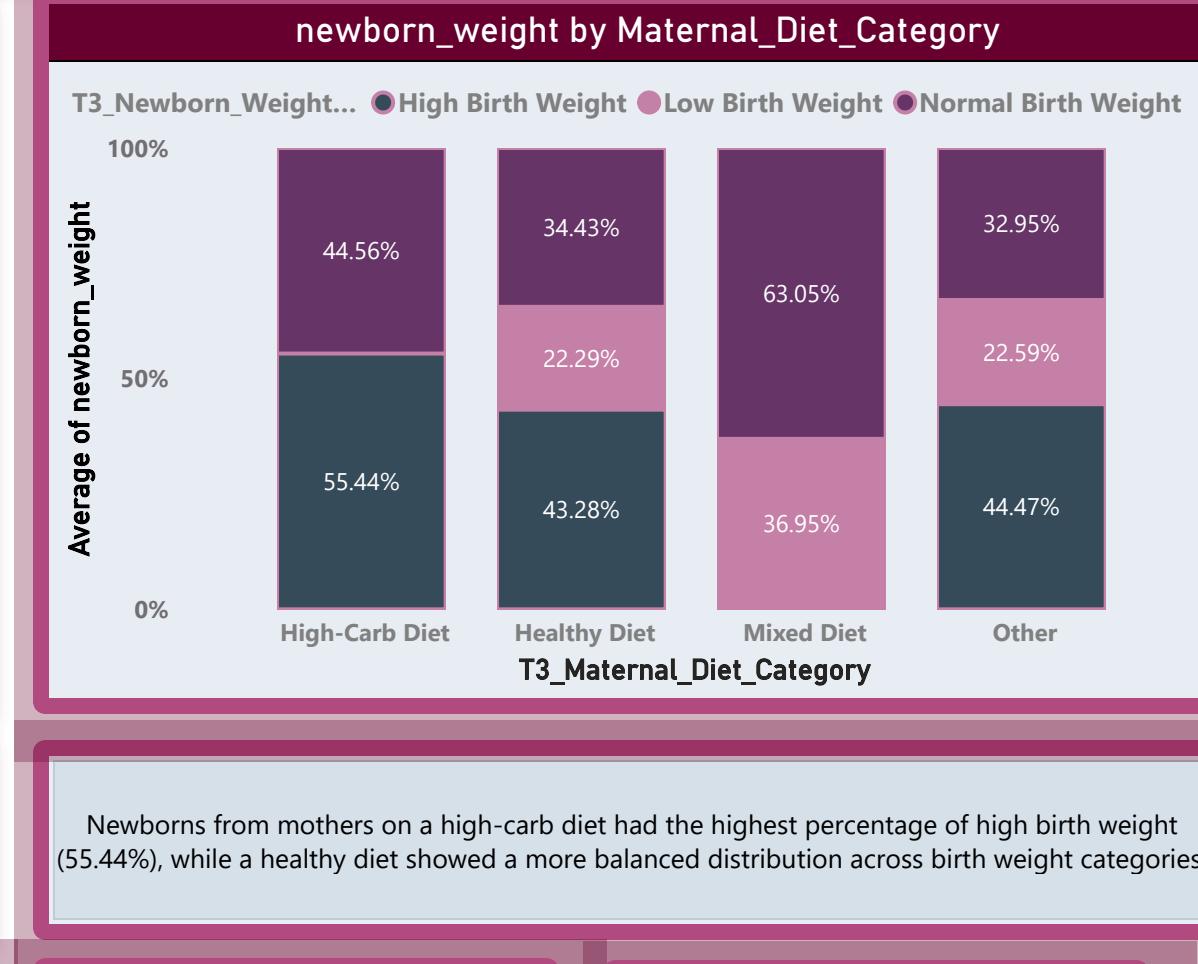


68.6% patients joined the study in the second trimester, followed by 21% in the third trimester, with few, 10.3% in the first trimester, highlighting inclusion timing during pregnancy.

# LIFESTYLE & NUTRITIONS



The stacked bar chart displays the percentage of patients in different anemia categories (Normal, Mild, Moderate, Severe) and their corresponding food health categories (Healthy, Mixed, Unhealthy). It suggests a correlation between Unhealthy eating habits and anemia, particularly in the normal to mild anemia ranges, where a large percentage of patients also report healthy food choices.



Newborns from mothers on a high-carb diet had the highest percentage of high birth weight (55.44%), while a healthy diet showed a more balanced distribution across birth weight categories.

Alcohol Percentage

**16.9%**

Tobacco Percentage

**19.5%**

Drug Percentage

**3.7%**

Balanced Diet

**22%**

Please select the substance category

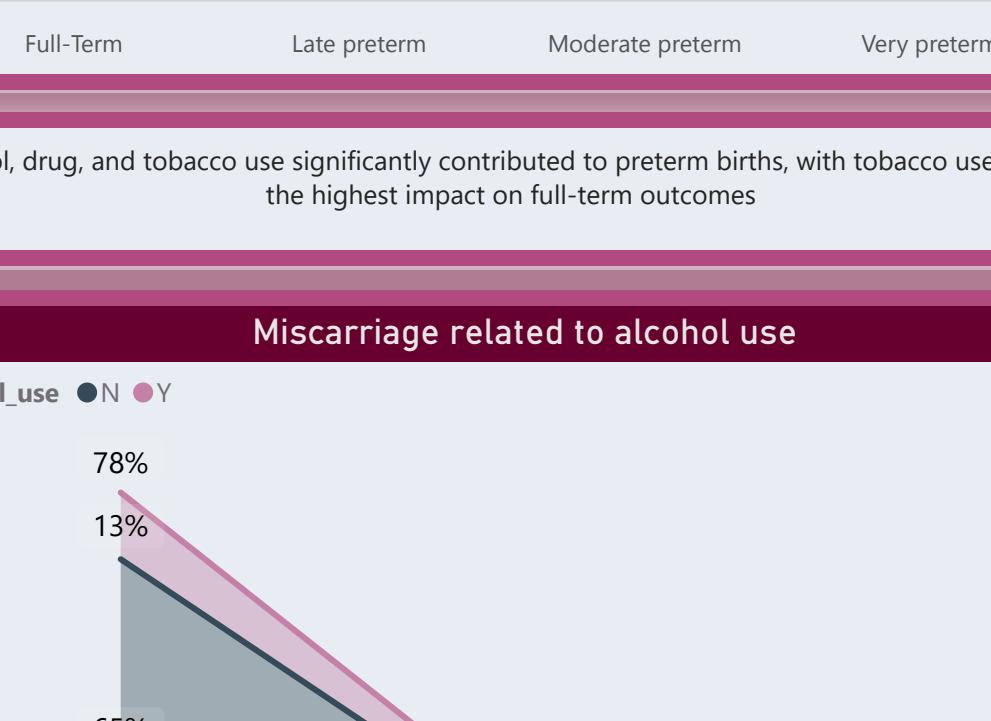
Alcohol Use

Drug Use

No Use

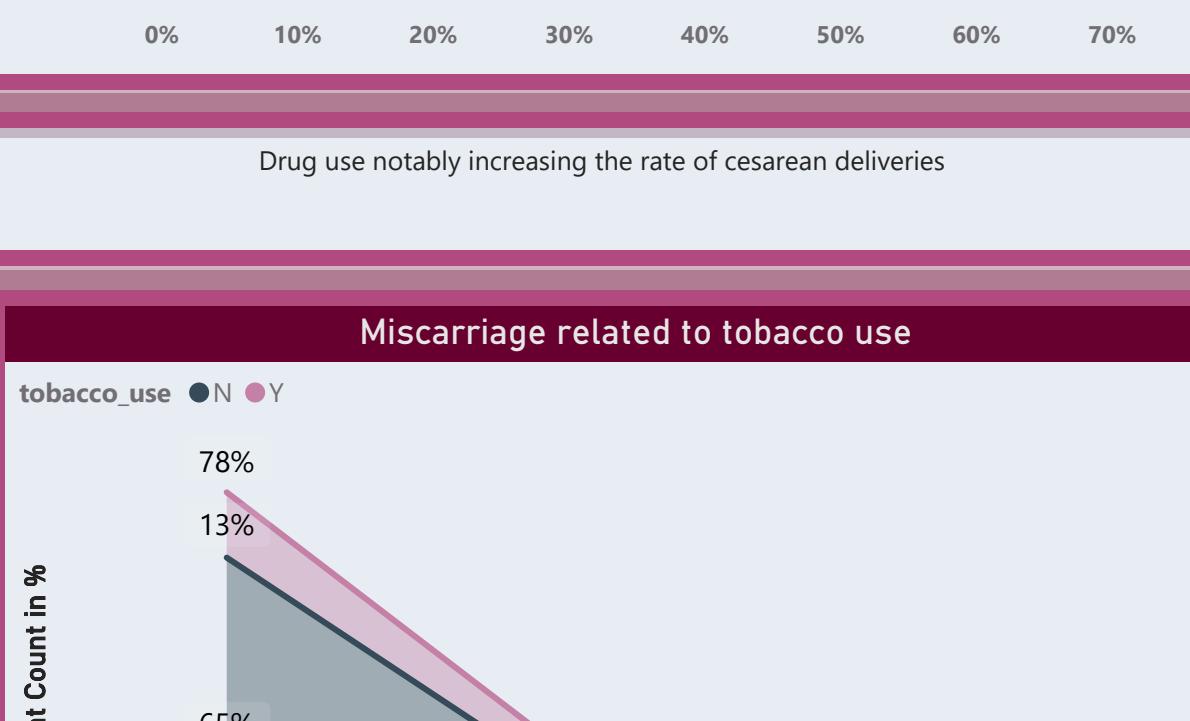
Tobacco Use

Impact of Drug, Alcohol, and Tobacco Use on Gestational Age at Birth



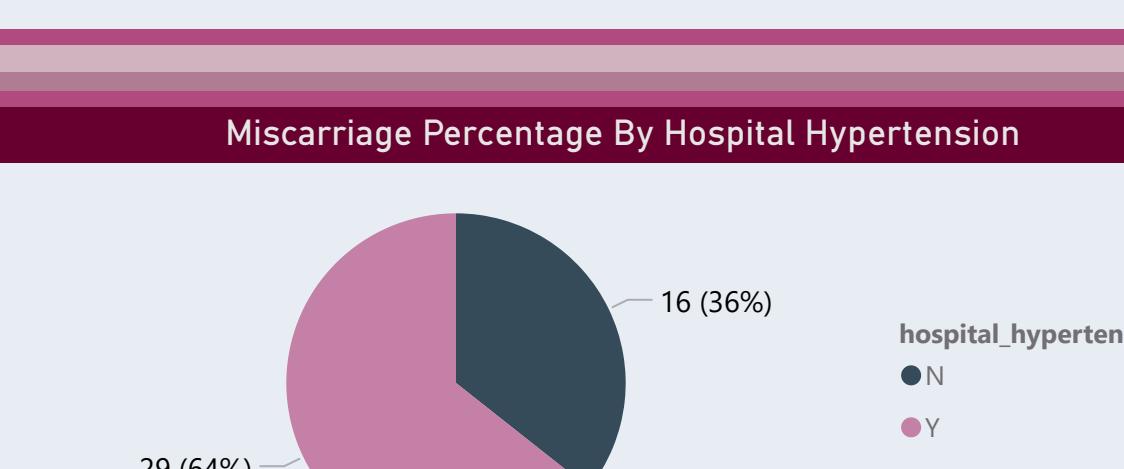
Alcohol, drug, and tobacco use significantly contributed to preterm births, with tobacco use showing the highest impact on full-term outcomes

Delivery Modes vs. Drug, Alcohol, and Tobacco Use by Patients



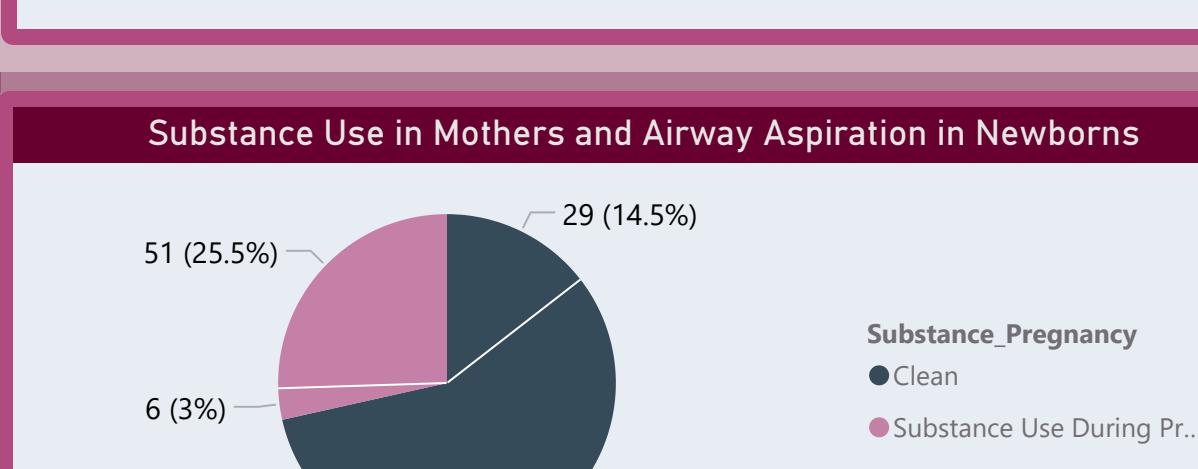
Drug use notably increasing the rate of cesarean deliveries

Miscarriage related to alcohol use



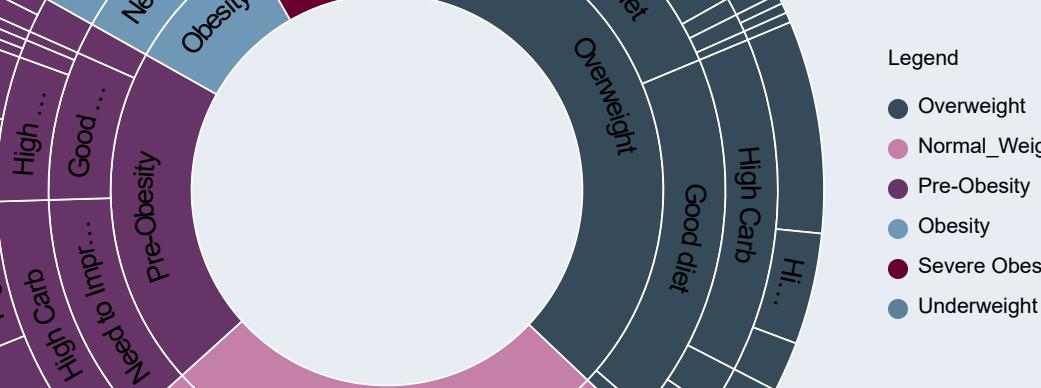
16% of the total patients had miscarriage and among this, 3% are reported to have alcohol use.

Miscarriage related to tobacco use



16% of the total patients had miscarriage and among this, 5% are reported to have Tobacco use.

Miscarriage Percentage By Hospital Hypertension



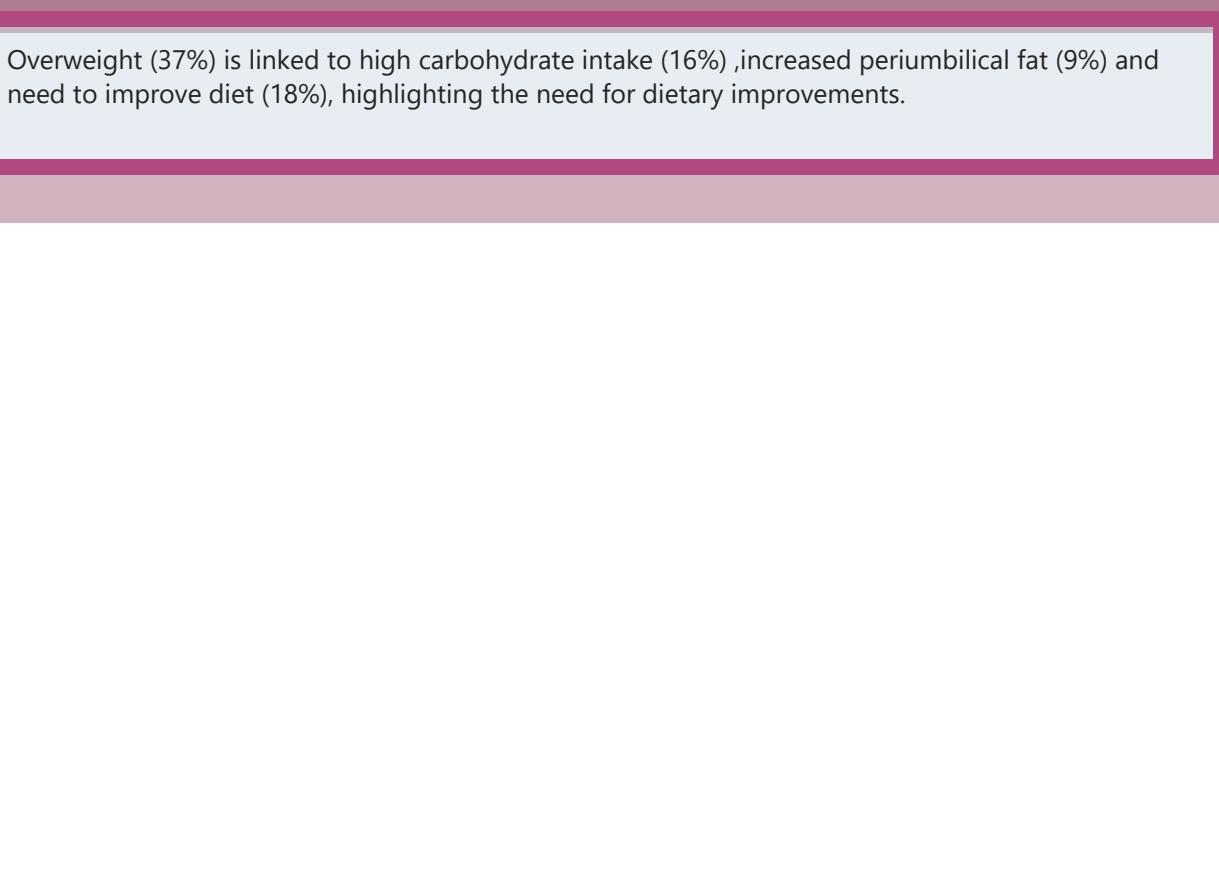
64.36 % of patient has hypertension with miscarriage. The miscarriage percentage increases significantly with the severity of hypertension

Substance Use in Mothers and Airway Aspiration in Newborns



Of all the newborns with airway aspiration, 17% of them had mothers who used either alcohol or tobacco, or both during pregnancy and 87% of them had mother who were clean of substance use.

Impact of High Carb Diet On BMI and Fat



Overweight (37%) is linked to high carbohydrate intake (16%), increased perumbilical fat (9%) and need to improve diet (18%), highlighting the need for dietary improvements.

# FAT ASSESSMENT AND ANTHROPOMETRY

Avg\_Waist\_Hip\_Ratio

0.88

## Key influencer for body fat

### Key influencers Top segments

What influences body\_fat\_class to be Obese

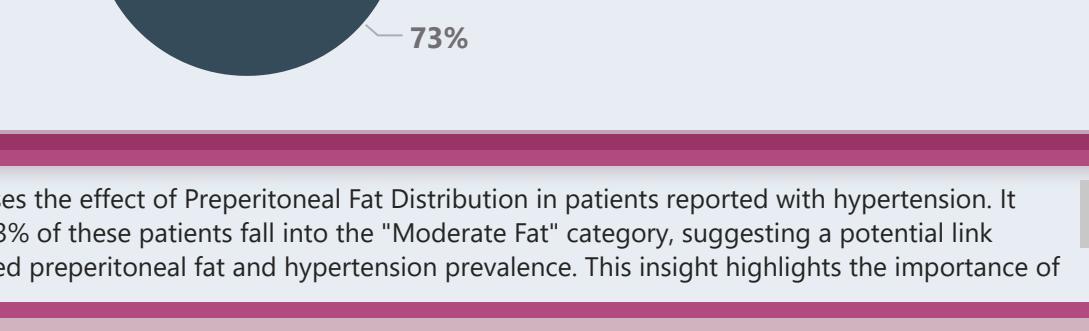
When...  
waist\_hip\_ratio is High  
...the likelihood of body\_fat\_class being Obese increases by 1.44x

body\_fat\_class is more likely to be Obese when waist\_hip\_ratio is High than otherwise (on average).

Only show values that are influencers

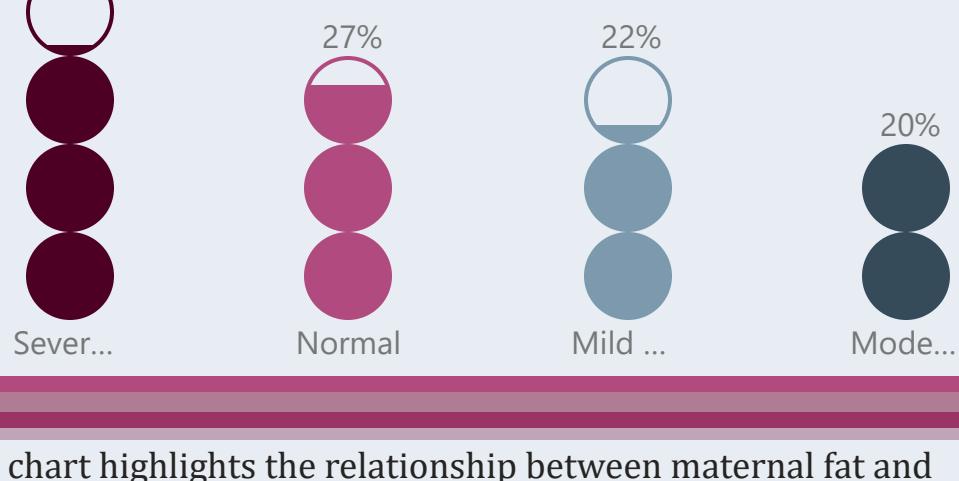
This chart shows the key influencers for obese body fat. When considering GDM, Hypertension and Waist Hip Ratio, we get to observe that WHR increases the chances of obesity by 1.44 times.

## Preperitoneal Combined Fat Distribution with Hypertension past reported



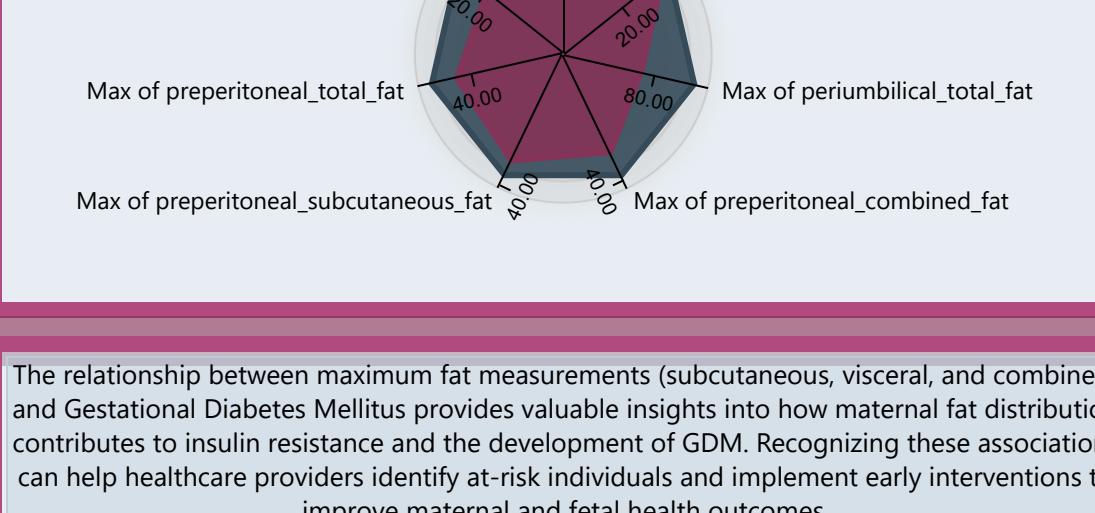
The graph assesses the effect of Preperitoneal Fat Distribution in patients reported with hypertension. It reveals that 72.73% of these patients fall into the "Moderate Fat" category, suggesting a potential link between increased preperitoneal fat and hypertension prevalence. This insight highlights the importance of

## Effect of Fat on Hemoglobin



This chart highlights the relationship between maternal fat and hemoglobin. Most women with high fat levels suffer from severe anemia, while 20% maintain moderate anemia, indicating that fat

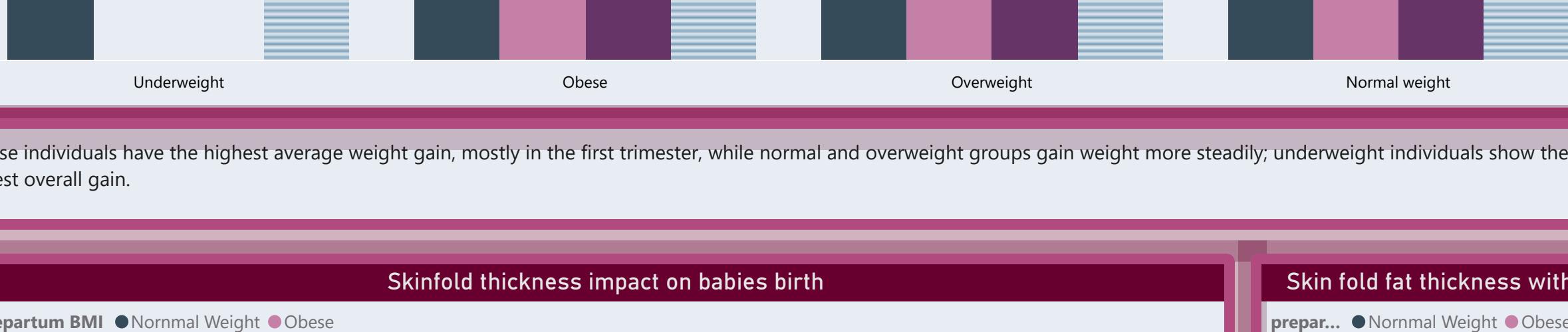
## Association of Maximum Fat Measurements with Gestational Diabetes Mellitus in Pregnancy



The relationship between maximum fat measurements (subcutaneous, visceral, and combined) and Gestational Diabetes Mellitus provides valuable insights into how maternal fat distribution contributes to insulin resistance and the development of GDM. Recognizing these associations can help healthcare providers identify at-risk individuals and implement early interventions to improve maternal and fetal health outcomes.

## Weight Gain across every trimester

Legend  
● Avg of first trim ● Avg of second trim ● Avg of third trim ● Avg of Total Gain



Obese individuals have the highest average weight gain, mostly in the first trimester, while normal and overweight groups gain weight more steadily; underweight individuals show the lowest overall gain.

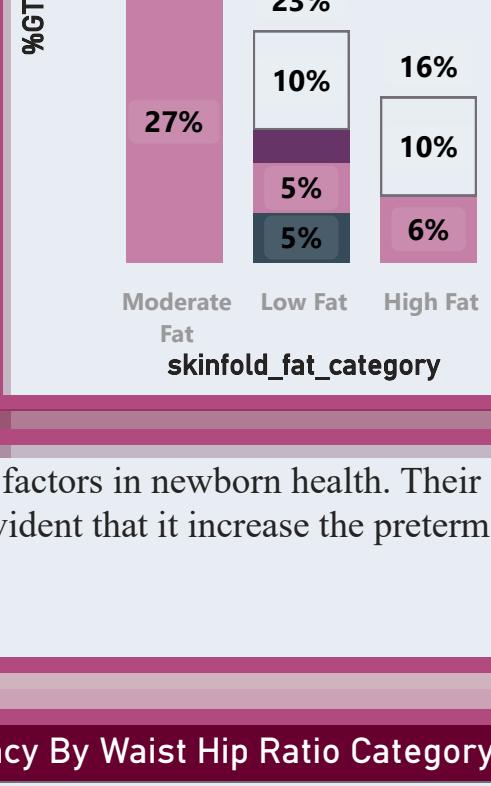
## Skinfold thickness impact on babies birth

Prepartum BMI ● Normal Weight ● Obese



## Skin fold fat thickness with BMI

prepar... ● Normal Weight ● Obese

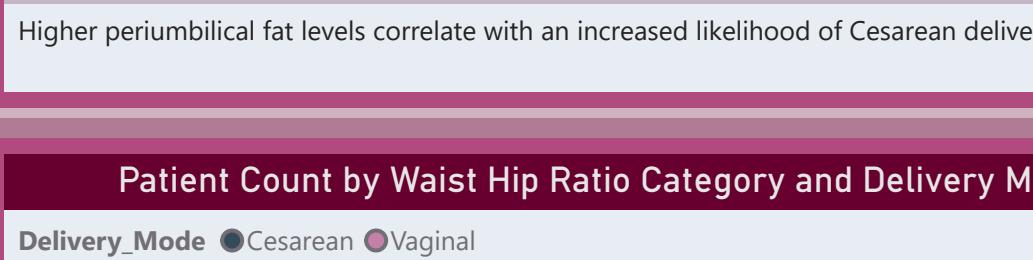


Gestational age at birth (how long the baby stays in the womb) and total skinfold thickness (a measure of body fat) are important factors in newborn health. Their relationship can provide insights into fetal growth, fat distribution, and metabolic health. With high fat distribution, it is clearly evident that it increases the preterm birth.

<30 --> Low Fat ,30-50 --> Moderate Fat,>50 --> High Fat

## Perumbilical Combined Fat Impact on Delivery Mode

Delivery Mode ● Cesarean ● Vaginal



Higher perumbilical fat levels correlate with an increased likelihood of Cesarean deliveries.

## Gestational Diabetes Mellitus Pregnancy By Waist Hip Ratio Category



61.11% of patient with high waist hip ratio are at a significantly greater risk of developing gestational diabetes mellitus,

## Patient Count by Waist Hip Ratio Category and Delivery Modes

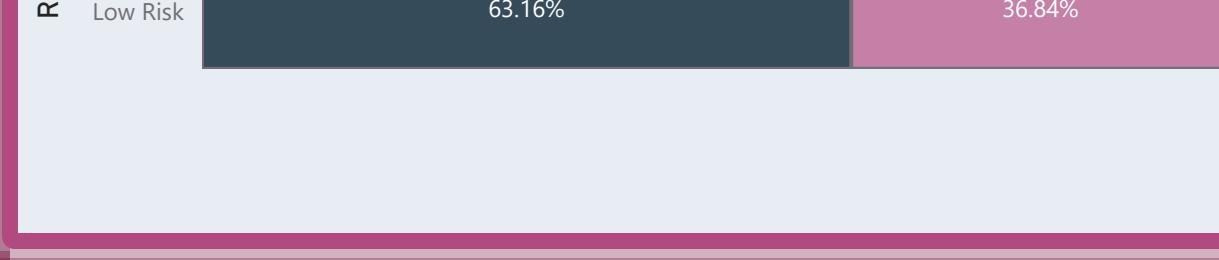
Delivery\_Mode ● Cesarean ● Vaginal



As Waist to Hip Ratio increases, the chances of having Cesarean section delivery also increase.

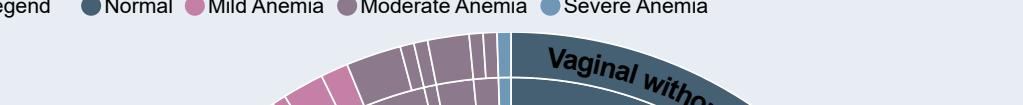
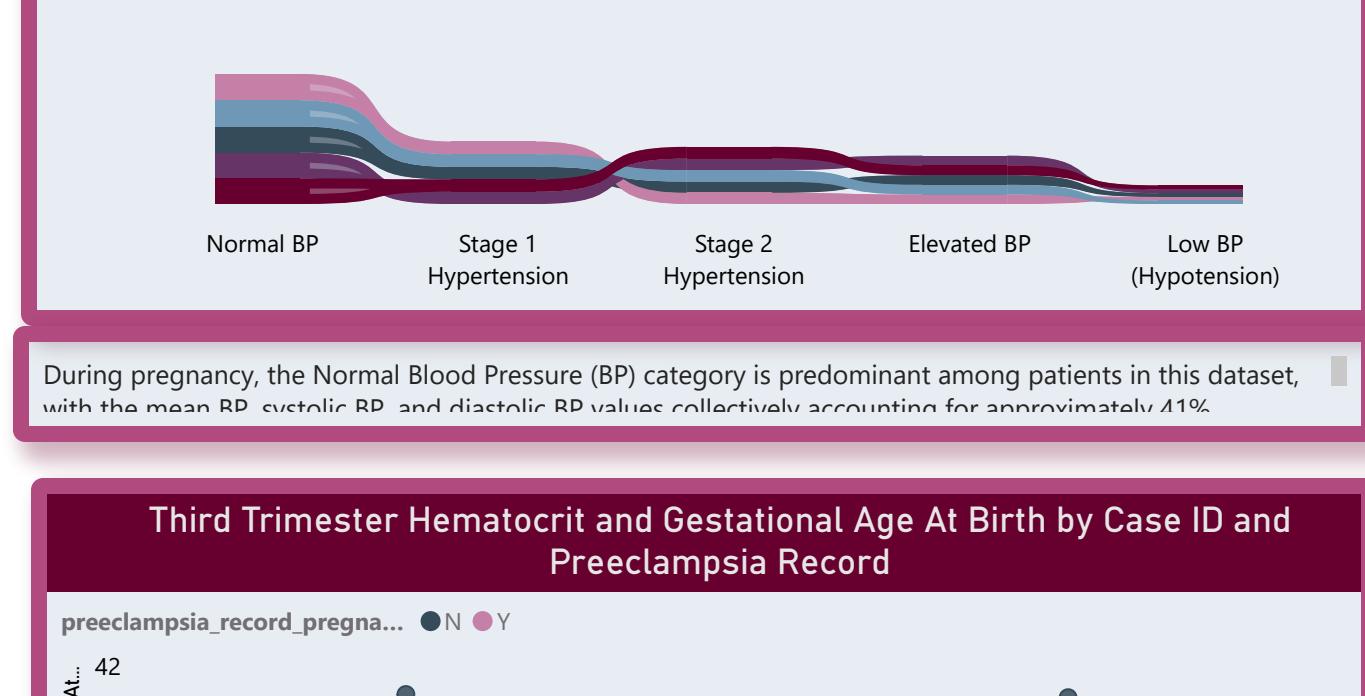
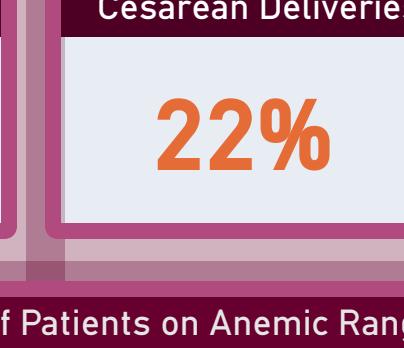
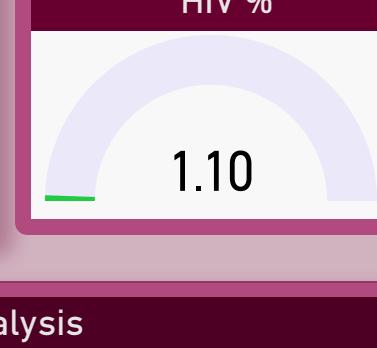
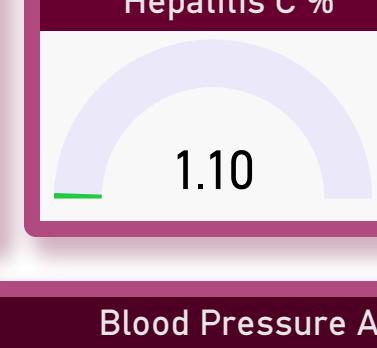
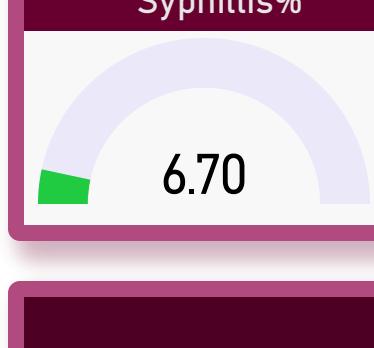
## Skinfold Fat by Hypertension

● Hypertensive ● Hypotensive

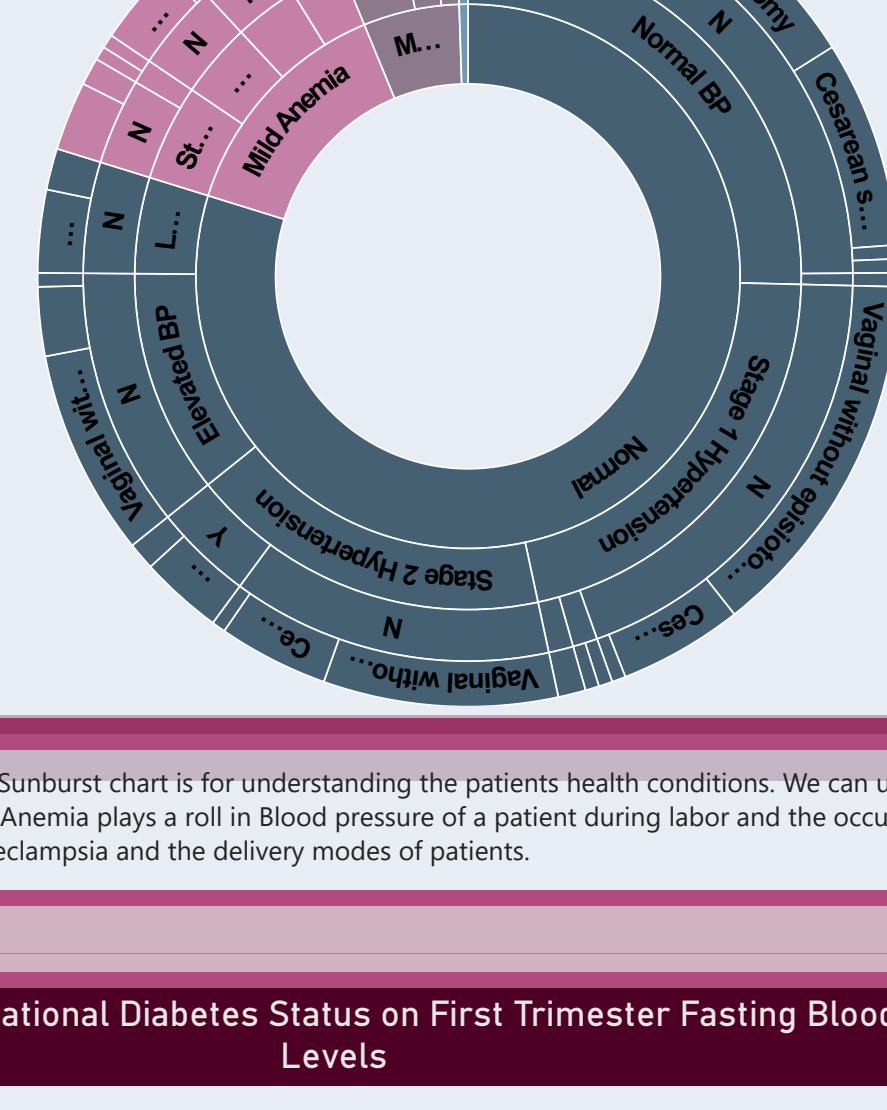


The Hypertension is increasing with High Risk category based on the Skin fold fat increase

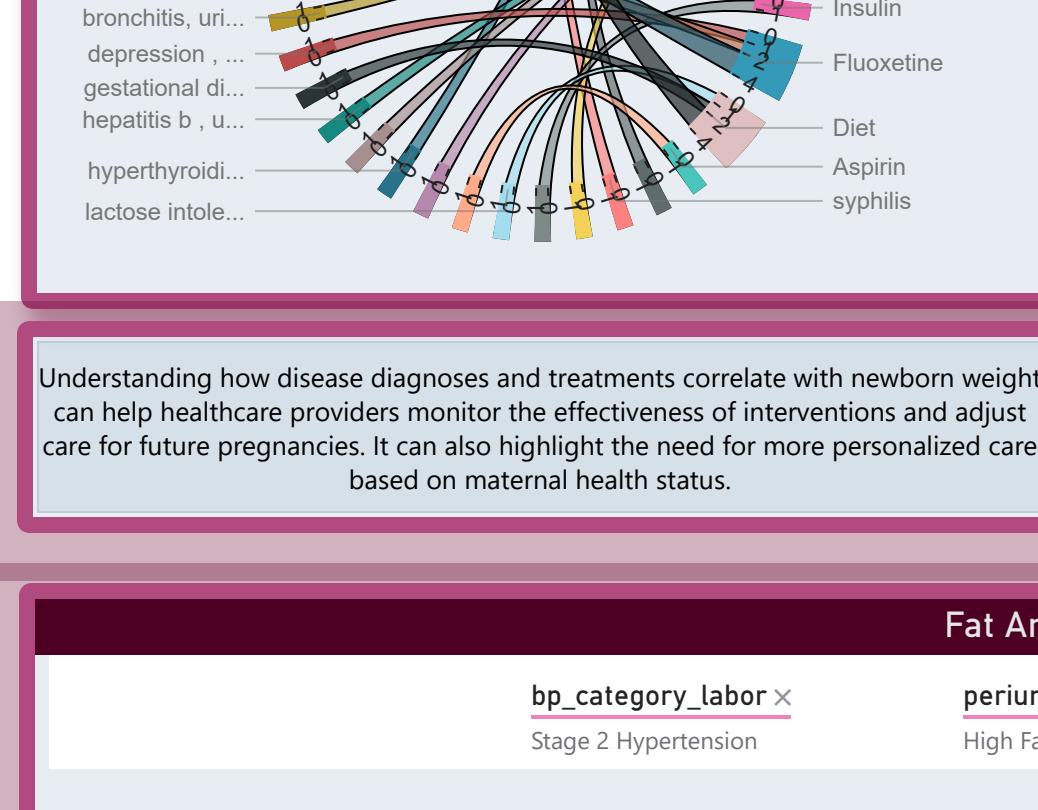
# LAB ANALYSIS



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**Figure 1.** The five clusters of the LCA model. The first cluster is represented by a dark blue bar, the second by a light blue bar, the third by a pink bar, the fourth by a light green bar, and the fifth by a dark green bar.

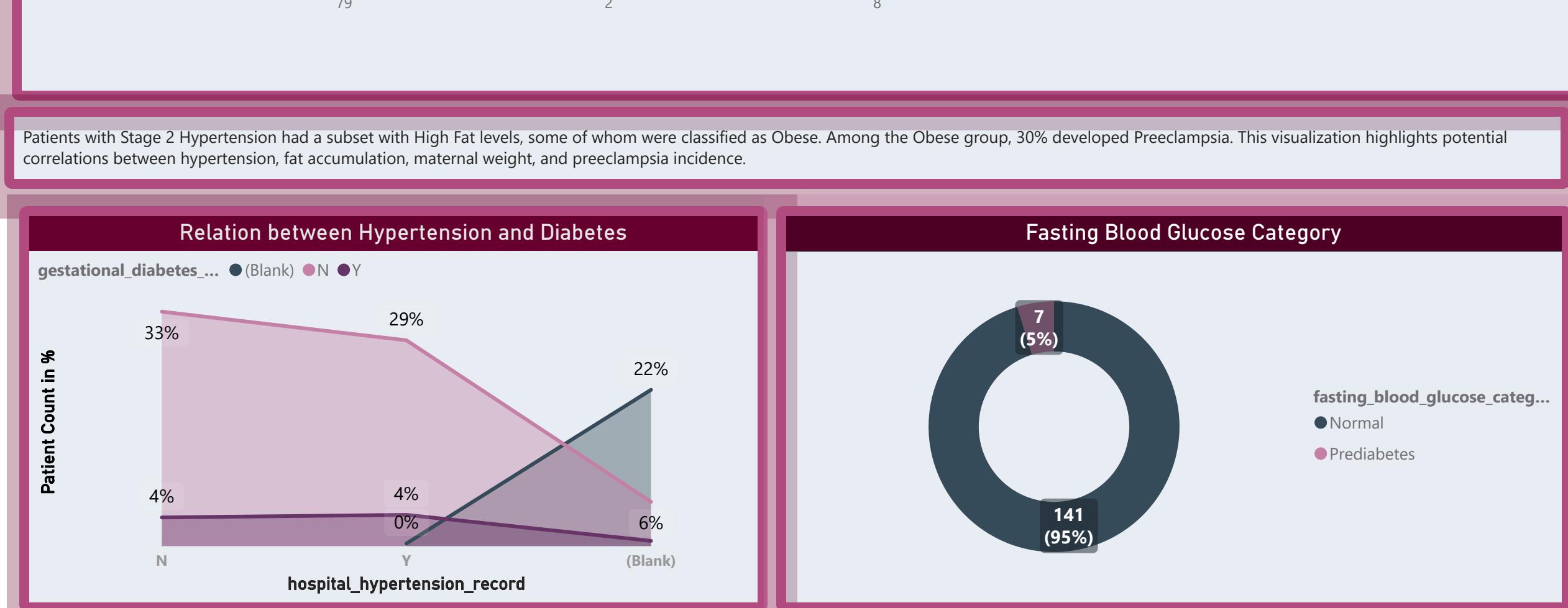


A treemap visualization showing the distribution of case IDs across different hypertension stages. The total count of case IDs is 272.

Hypertension Stage	Count of case_id
Stage 1 Hypertension	50
Stage 2 Hypertension	222
(Blank)	23

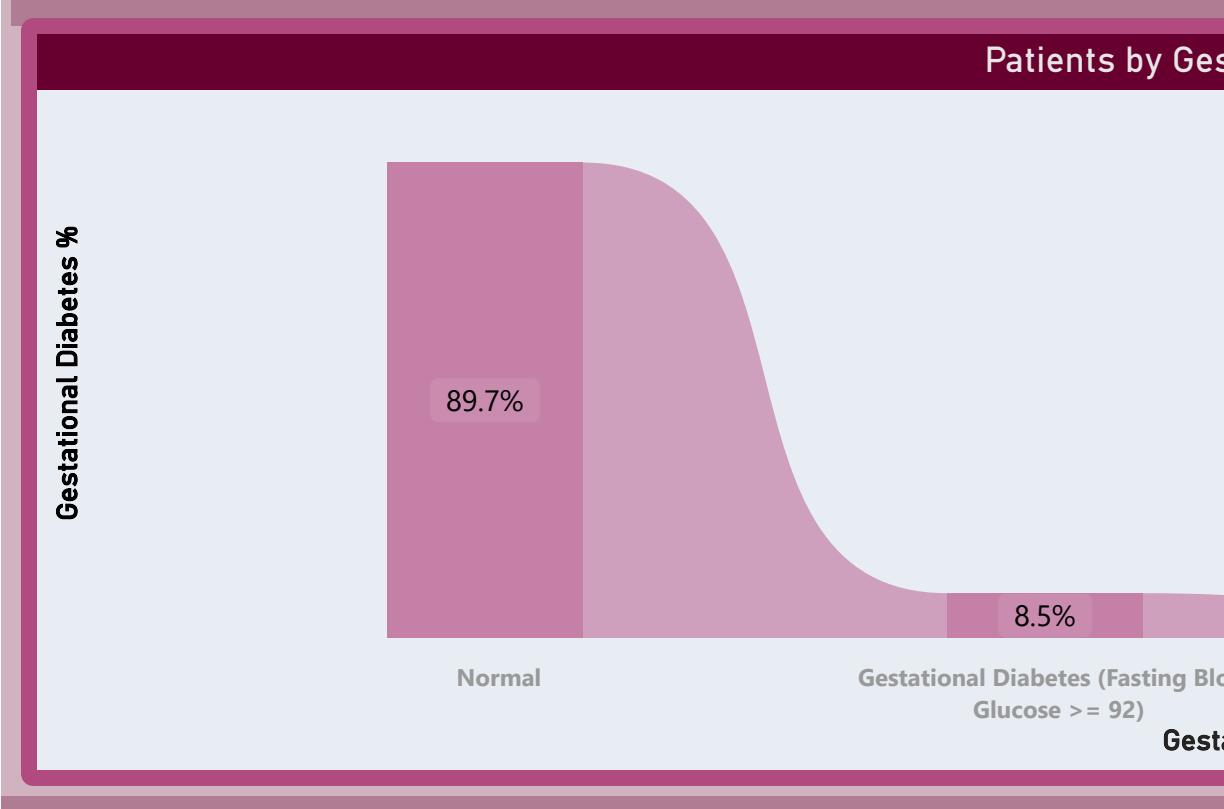


7

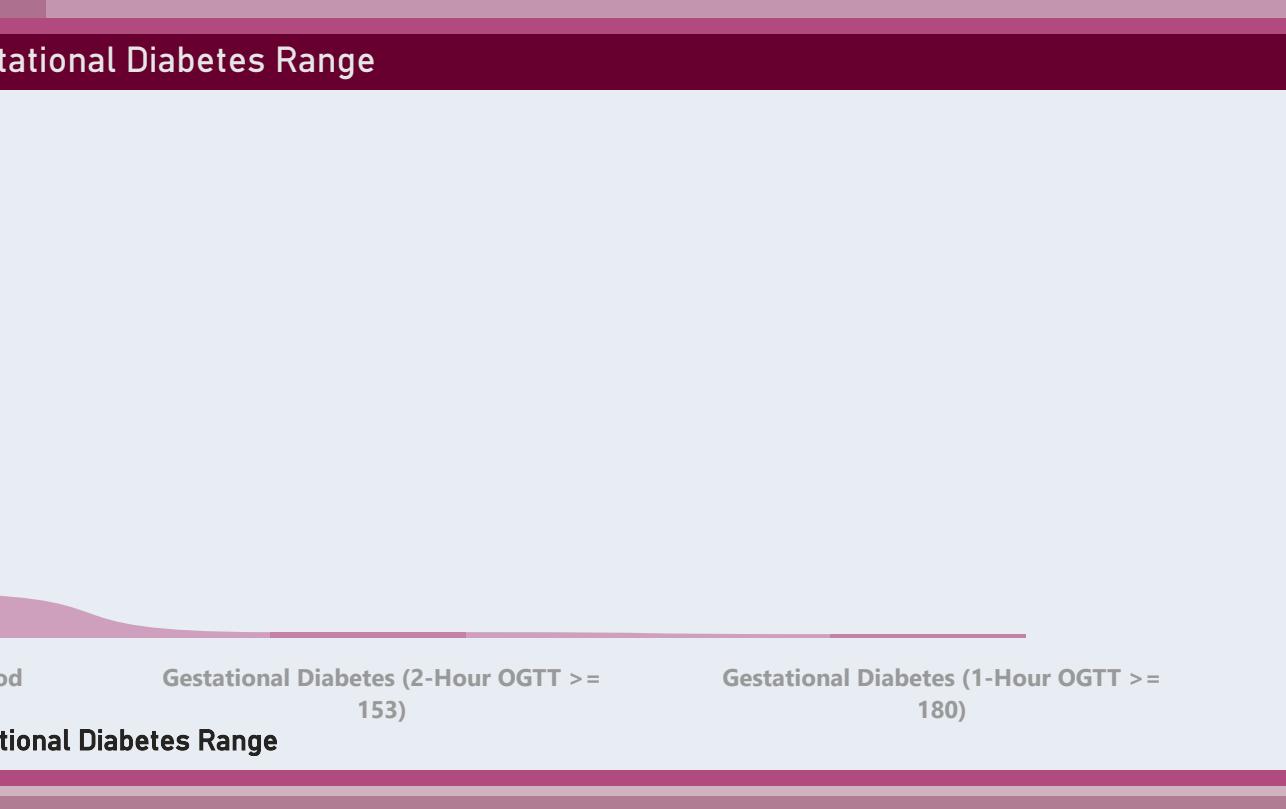


Among 9% of total diabetic patients ,half the percentage i.e around 4% had hypertension which implies a strong correlation between hypertension and diabetes.

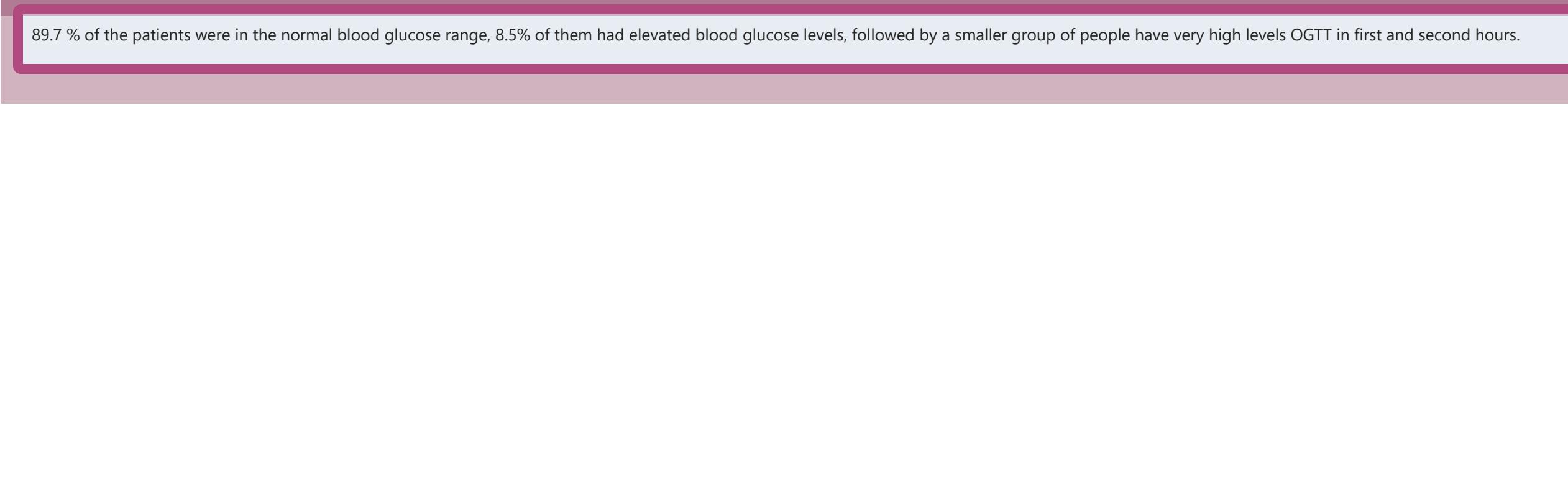
7(5%) Patients are found to be Pre Diabetic in this dataset.



89.7 % of the patients were in the normal blood glucose range, 8.5% of them had elevated bld



se levels, followed by a smaller group of people have very hi



# Pregnancy Health Factors and Complications

% Cesarean\_Delivery

22

% Vaginal\_Delivery

53

Low Birth Weight %

6

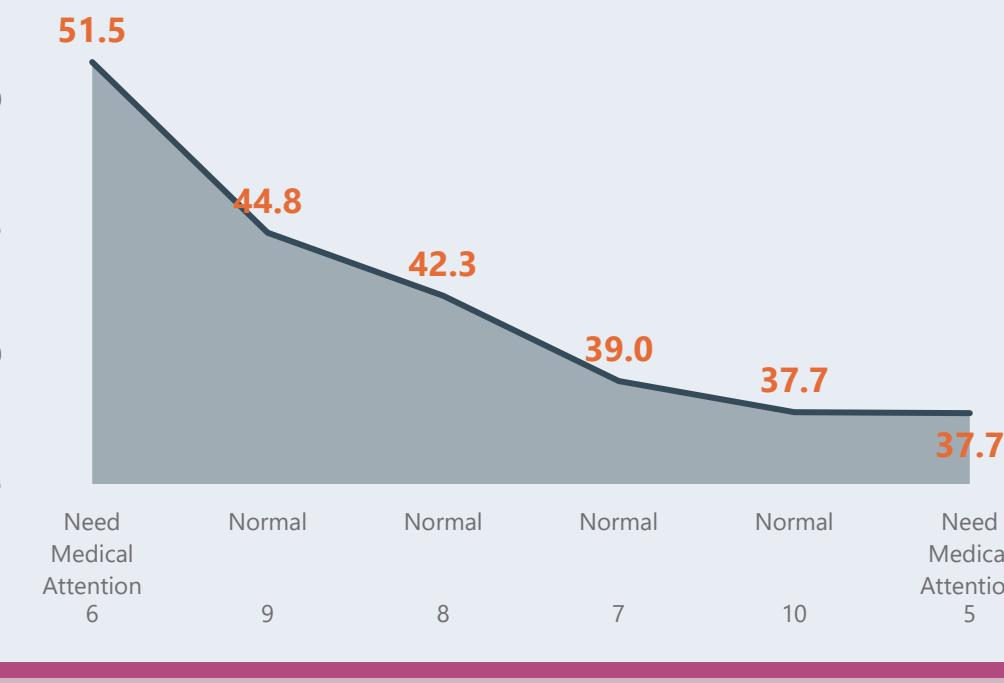
Normal Birth Weight %

89

Macrosomia %

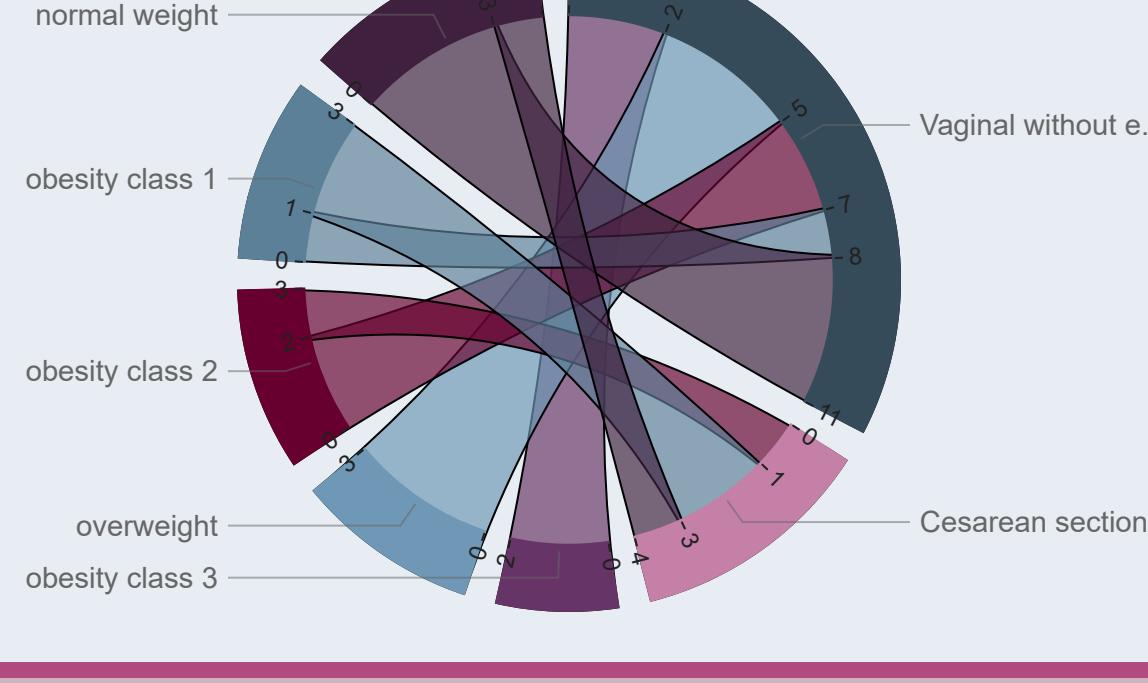
4

## Association Between Perumbilical Visceral Fat and Apgar Score at 1 Minute



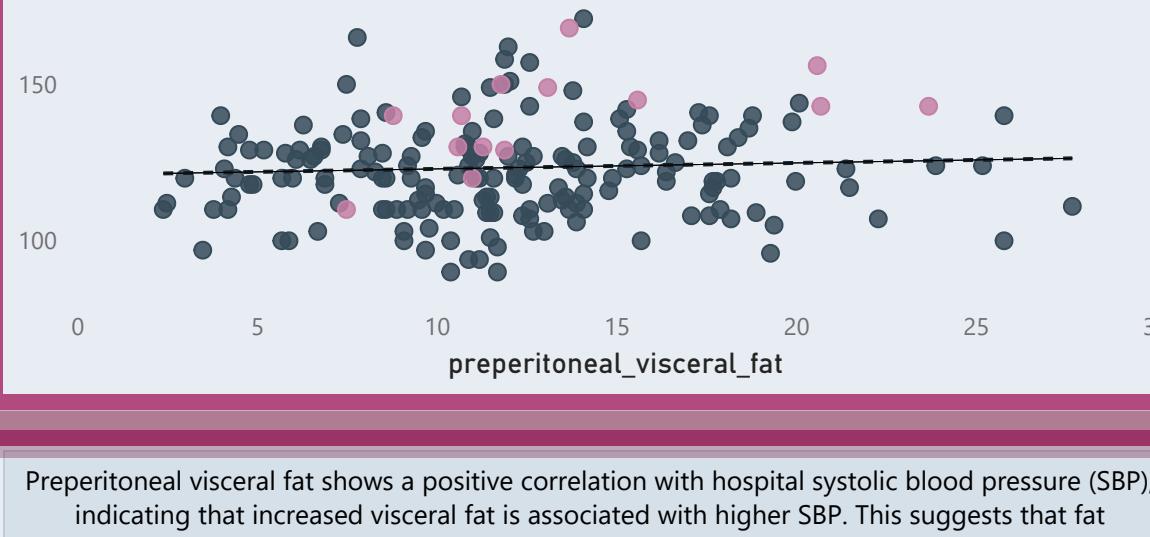
Extreme levels (above 51 and below 6) of visceral fat are linked to lower Apgar scores, emphasizing the importance of monitoring fat levels during pregnancy.

## Preeclampsia vs BMI vs Delivery mode



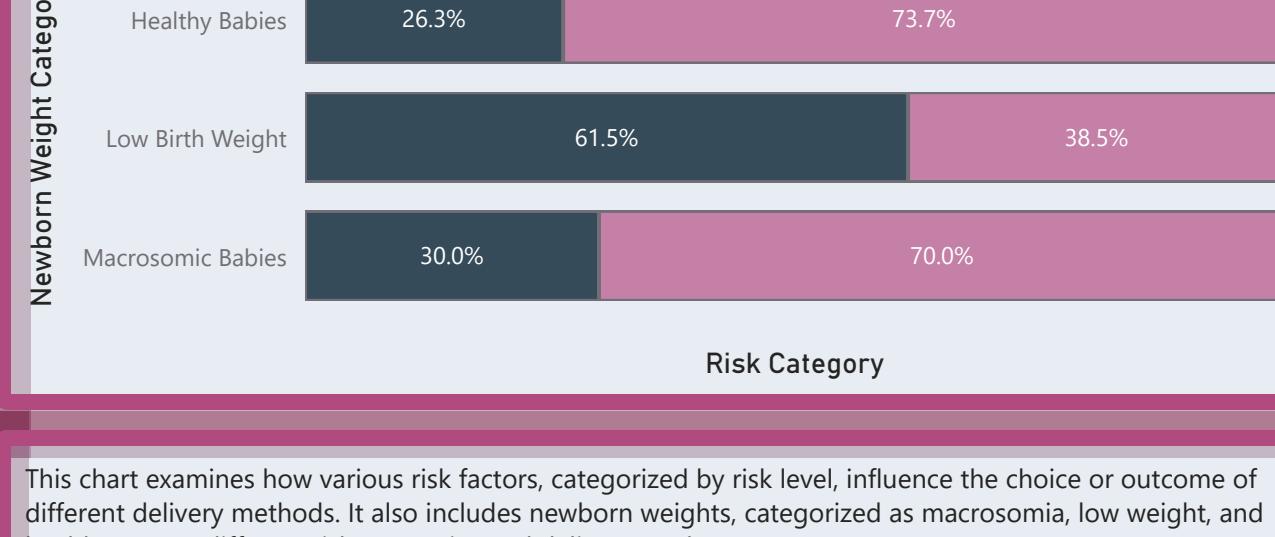
Coming to this chord chart- A majority of preeclampsia patients fall into the overweight or obese category, reinforcing the link between excess body weight and preeclampsia risk. Also vaginal births show a higher prevalence of preeclampsia compared to cesarean deliveries

## Preperitoneal\_Visceral\_fat VS Hospital SBP



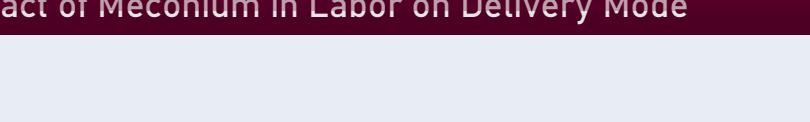
Preperitoneal visceral fat shows a positive correlation with hospital systolic blood pressure (SBP), indicating that increased visceral fat is associated with higher SBP. This suggests that fat distribution, rather than total visceral fat volume, plays a more significant role in predicting SBP in preeclampsia.

## Risk Factors & Baby Outcome

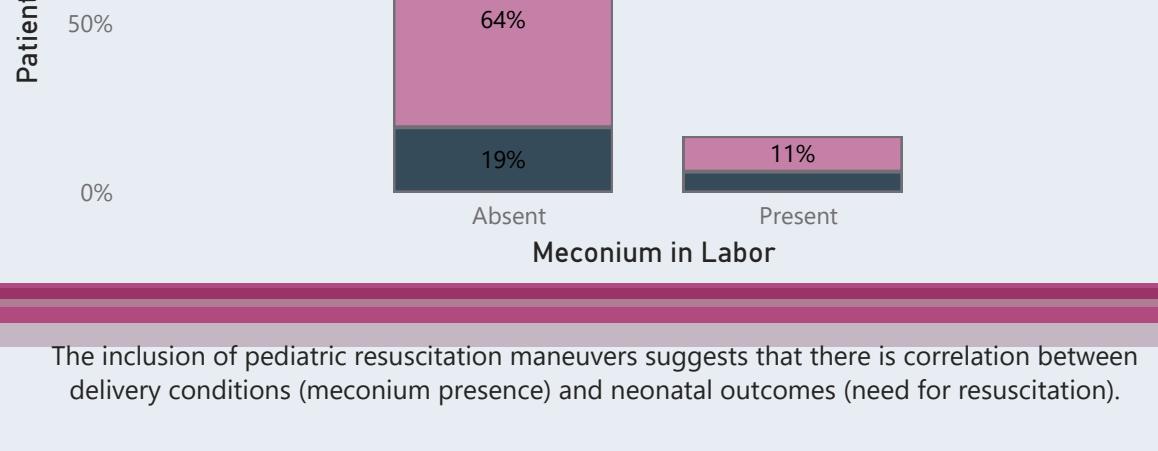


This chart examines how various risk factors, categorized by risk level, influence the choice or outcome of different delivery methods. It also includes newborn weights, categorized as macrosomia, low weight, and healthy, across different risk categories and delivery modes.

## Pediatric Resuscitation Maneuvers

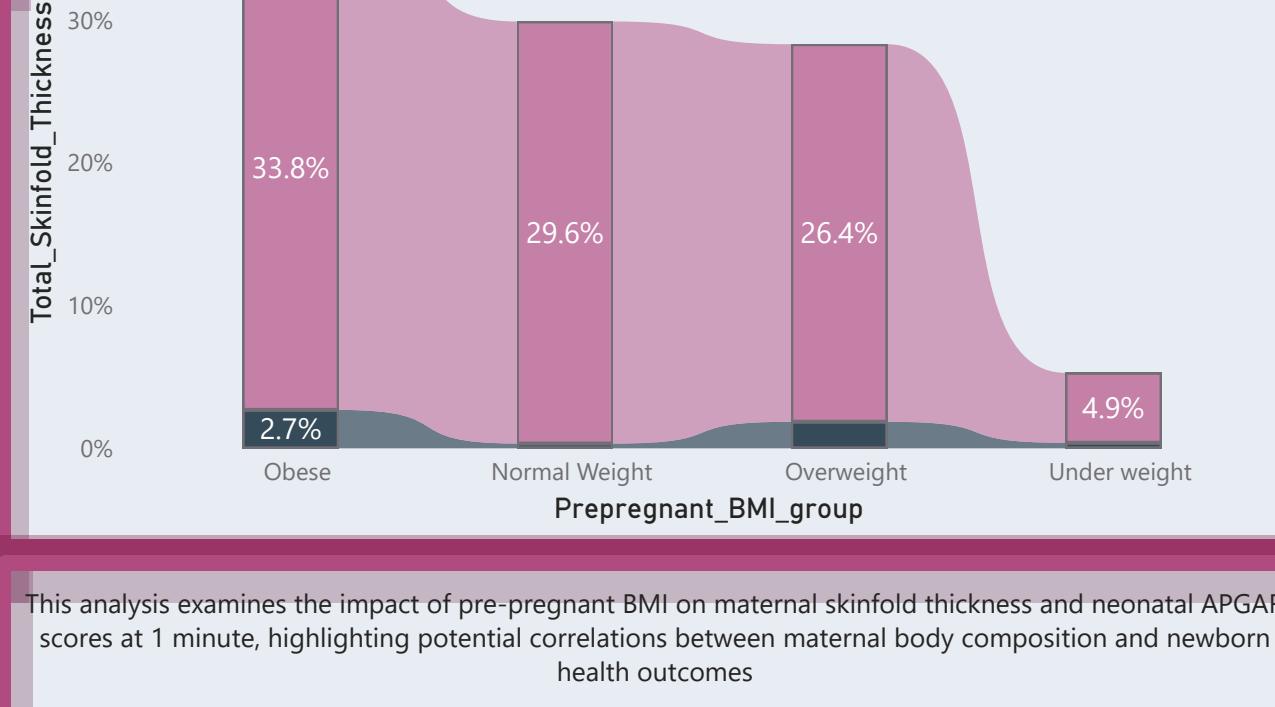


## Impact of Meconium in Labor on Delivery Mode



The inclusion of pediatric resuscitation maneuvers suggests that there is correlation between delivery conditions (meconium presence) and neonatal outcomes (need for resuscitation).

## Impact of Pre-Pregnant BMI On Skinfold Thickness & Neonatal APGAR(1 Min)



This analysis examines the impact of pre-pregnant BMI on maternal skinfold thickness and neonatal APGAR scores at 1 minute, highlighting potential correlations between maternal body composition and newborn health outcomes.

## Comparison of Preeclampsia and Gestational Diabetes Incidence



This chart highlights the incidence of Gestational Diabetes and Preeclampsia. Gestational Diabetes had the highest count, with 23 cases. It was significantly higher than Preeclampsia, which had 13 cases, and Preeclampsia & Gestational Diabetes combined, which had just 2 cases. This chart provides insight into the more frequent risk factor during pregnancy, helping prioritize healthcare interventions.

# FETAL OUTCOMES

Meconium %

13

Intubation %

2

Newborn Airway Aspiration %

13

Resuscitation Maneuvers %

14

Avg. NewBorn Weight

3.25Kg

% Max of patient count on weight fetal percentile

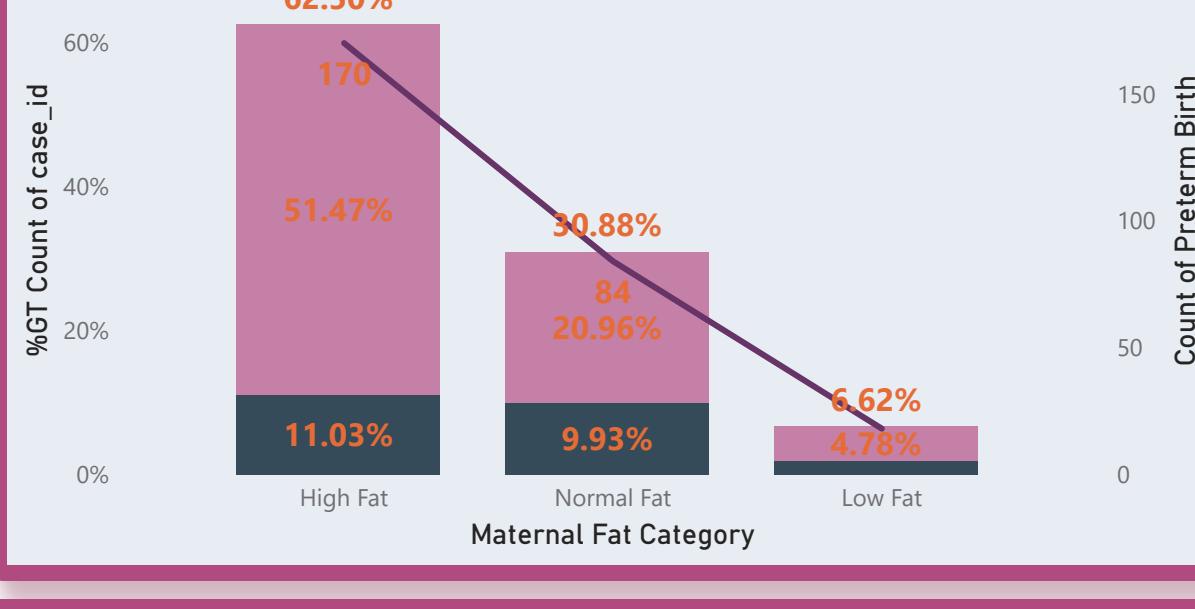
62.42

Hypertension Patients

12.9%

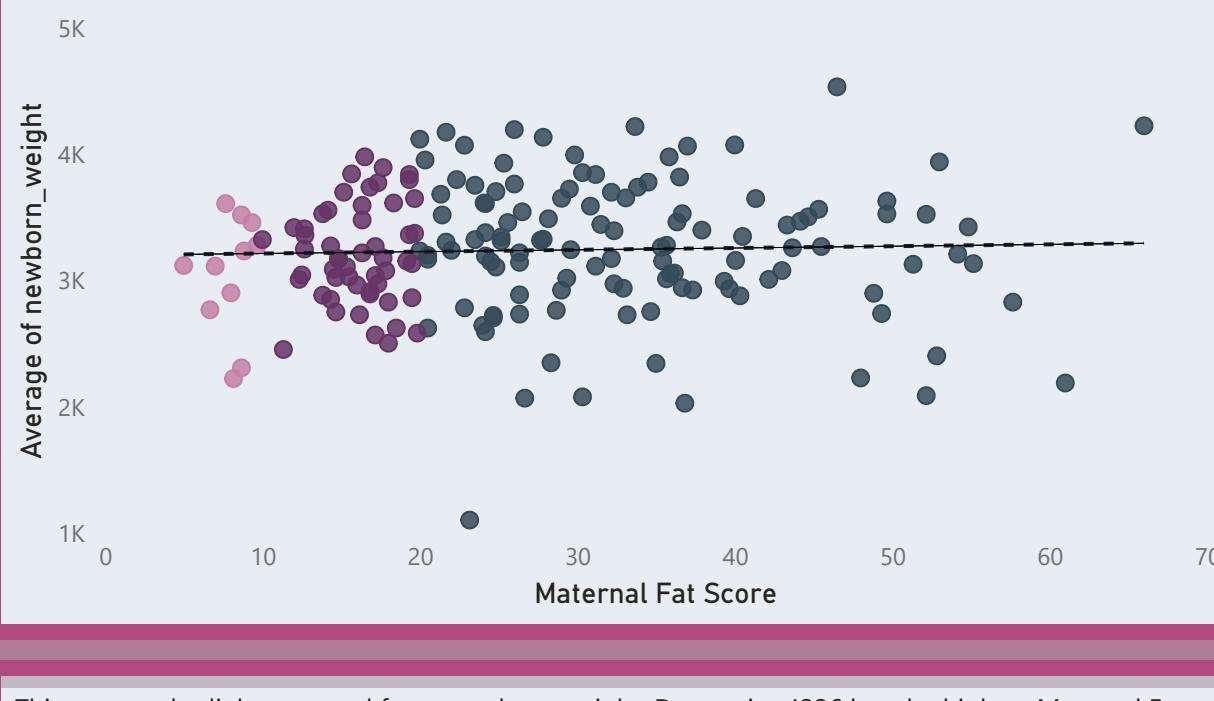
## Maternal Fat Distribution and Its Influence on Neonatal Health

Low\_APGAR ● Low APGAR ● Normal APGAR ● Count of T6\_Preterm\_Birth



This chart examines maternal fat levels' impact on neonatal health. Normal fat levels correlate with the highest births. Higher maternal fat increases the risk of low APGAR scores (51.47% in high-fat cases) and preterm births. It also links to higher rates of gestational diabetes and C-sections, highlighting the need for maternal health monitoring to improve neonatal outcomes.

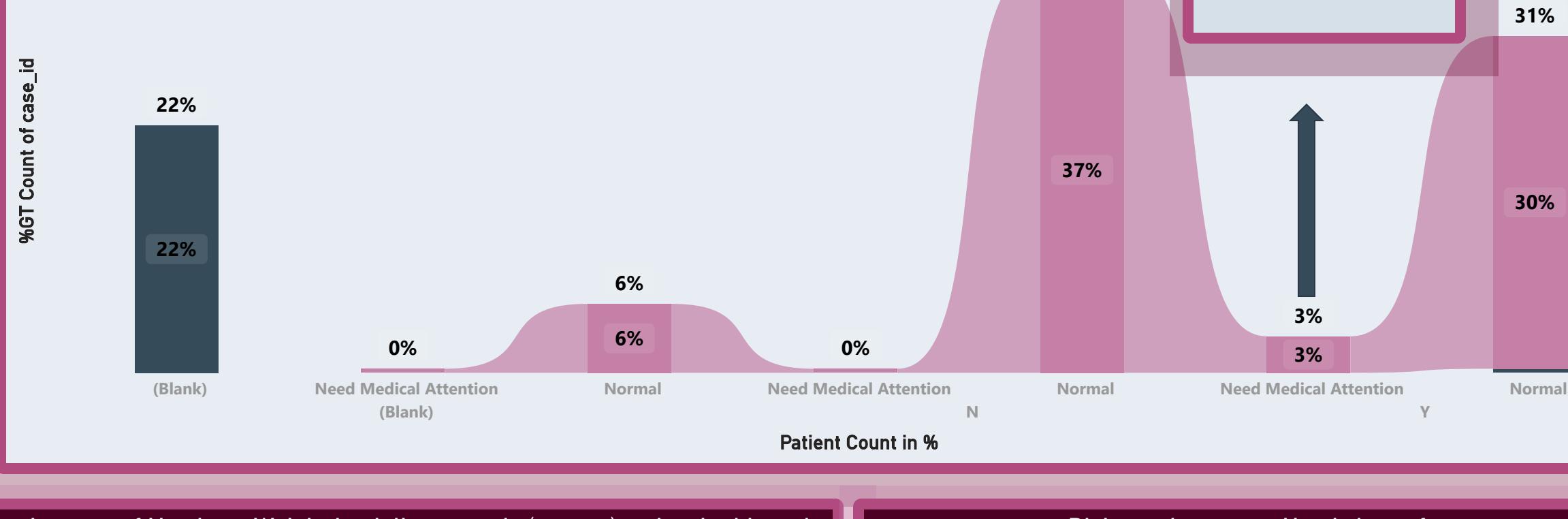
## Impact of Maternal Fat on Newborn Birth Weight (Average)



This scatter plot links maternal fat to newborn weight. Data point 4226 has the highest Maternal Fat Score (66), while 4534 has the highest Newborn Weight (4,534g), both in the High Fat category. Most newborns have a maternal fat score below 27.13 and weigh under 3,239.87g. The analysis suggests higher maternal fat may lead to larger babies, emphasizing its impact on birth weight.

## Apgar Score with hypertension impact on newborn

apgar\_5th\_min\_category ● (Blank) ● Normal



## Average of Newborn Weight by delivery mode (groups) and waist hip ratio category

waist\_hip\_ratio\_category ● High Risk ● Low Risk ● Moderate Risk

delivery\_mode (groups)

Cesarean

3.2K 3.6K 3.0K

# FETAL OUTCOMES



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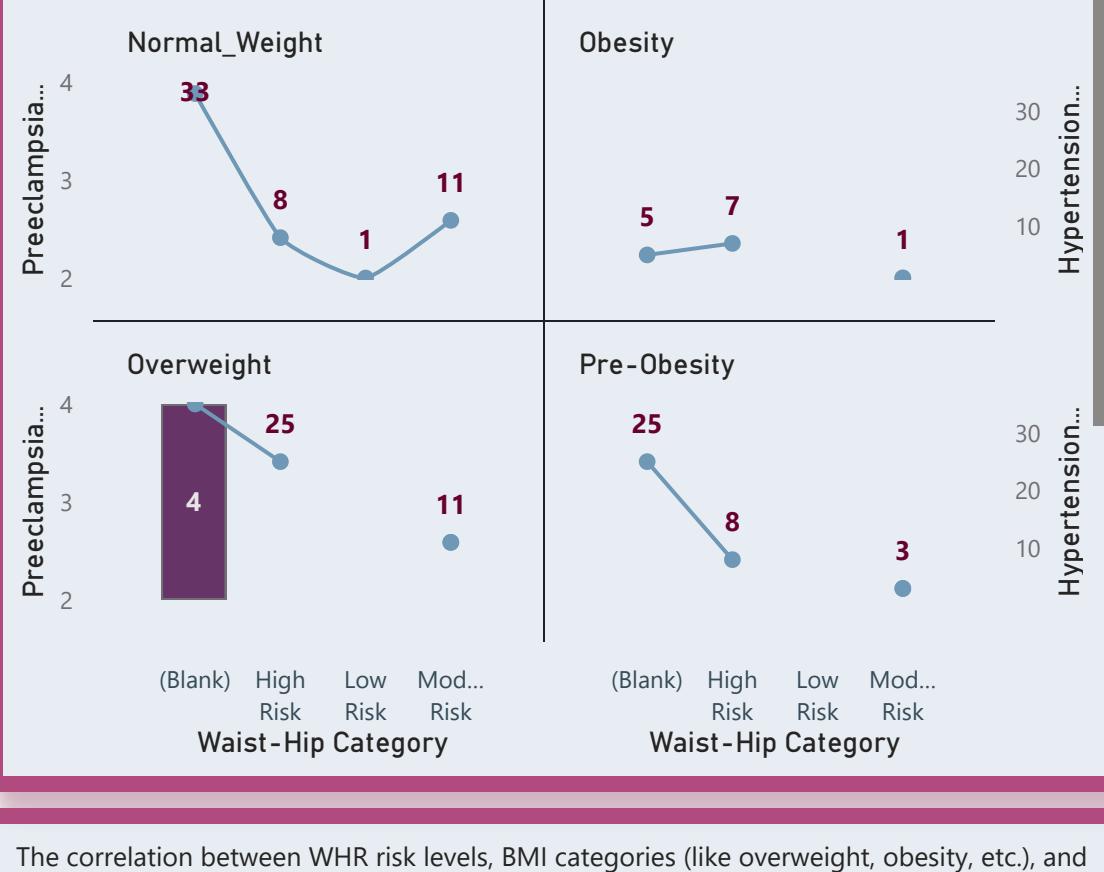
Higher preperitoneal visceral fat correlates with increased newborn weight, indicating maternal fat impact. Heavier newborns from mothers with abnormal visceral fat needed more medical attention due to low 1st-minute Apgar scores.

# FETAL OUTCOMES

Preeclampsia\_Percentage

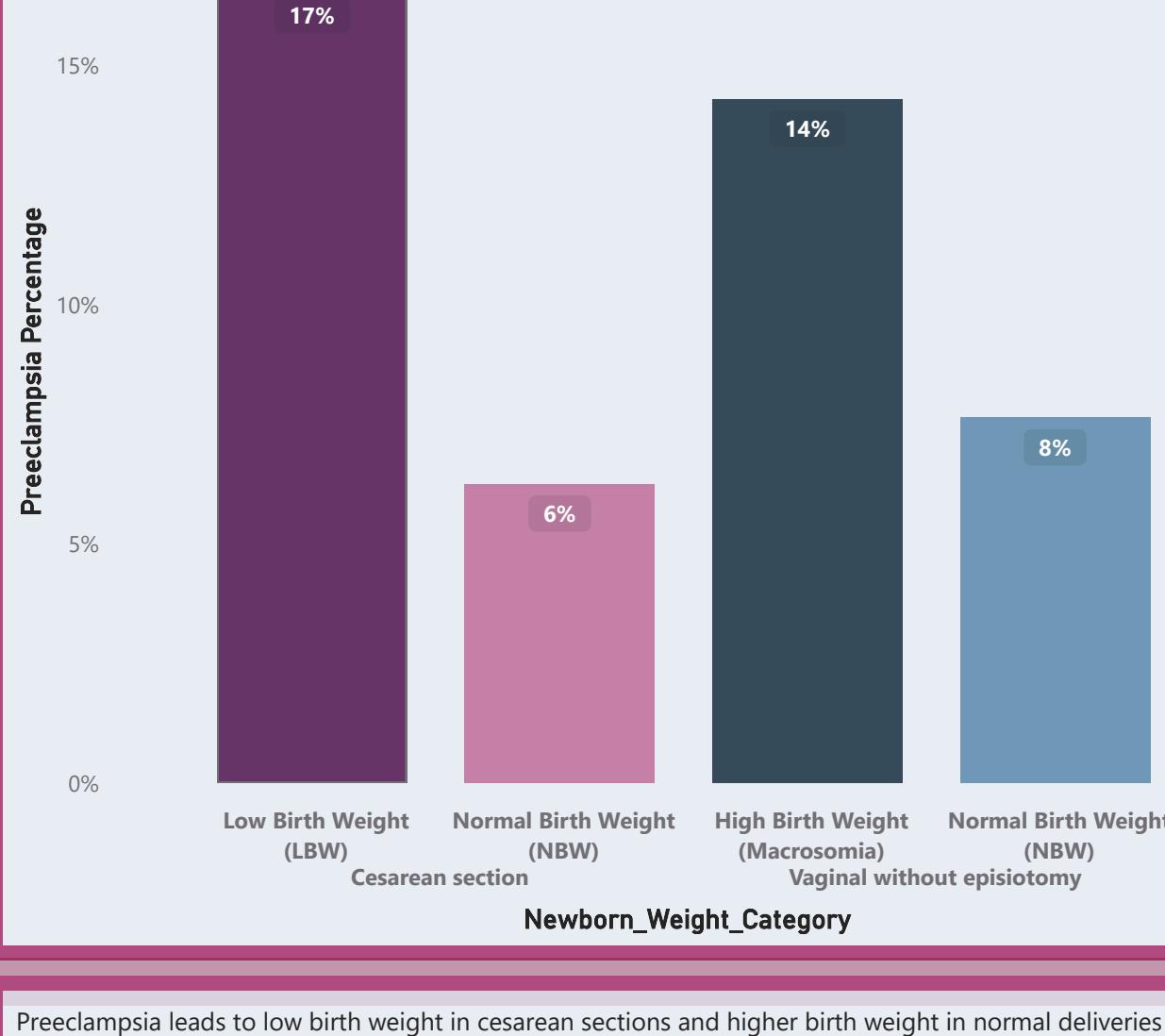
**5.5%**

Correlation Between Preeclampsia, WHR, BMI, and Hypertension



The correlation between WHR risk levels, BMI categories (like overweight, obesity, etc.), and high blood pressure can affect the number of preeclampsia cases.

Impact of Preeclampsia on Delivery Mode and Newborn Birth Weight



Preeclampsia leads to low birth weight in cesarean sections and higher birth weight in normal deliveries .It's important to carefully manage preeclampsia to reduce risk for both mother and baby ,especially in sever cases.

# PREDICTIVE ANALYSIS INCLUDING FAT - ECLAMPSIA



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37% of patients have an extremely low (0%) probability of developing eclampsia. The remaining 63% of patients have a higher probability (ranging from 0.05 to 0.50) of developing eclampsia, spread evenly across small bins. Predicting C-section.

**Accuracy 91%:** This suggests that the model is correctly predicting the outcome (eclampsia vs. non-eclampsia) about 91% of the time.

**ROC AUC:** An AUC of 0.95 suggests the model has a **strong ability to discriminate** between positive (eclampsia) and negative (non-eclampsia) cases, meaning it's very likely to catch eclampsia cases while not making many mistakes.

## PREDICTIVE ANALYSIS INCLUDING FAT - GDM



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The distribution plot shows that the model predominantly predicts low probabilities (0-0.2) for developing GDM, indicating it sees most cases as low risk. There are smaller peaks at higher probabilities (around 0.4 to 0.8), suggesting the model can identify some higher-risk cases.

**Accuracy (92%):** This high accuracy suggests that the model is making correct predictions most of the time.

**Low False Positives:** Since precision is 100%, there's a very low risk of falsely labeling someone as having GDM, which is important for avoiding unnecessary interventions or treatments.

**Strong Discrimination:** The ROC AUC of 0.92 indicates the model has good generalization ability and is capable of distinguishing GDM cases from non-GDM ones well.

# PREDICTIVE ANALYSIS INCLUDING FAT - CESAREAN DELIVERIES



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True Positives (TP)-11: 7 (The model correctly predicted "Cesarean" 7 times.)

True Negatives (TN)-00: 44 (The model correctly predicted "No Cesarean" 44 times.)

False Positives (FP)-01: 3 (The model incorrectly predicted "Cesarean" 3 times.)

False Negatives (FN)-10: 5 (The model incorrectly predicted "No Cesarean" 5 times.) - Incorrectly identified negative cases (positive cases classified as negative). Most Important

This Logistic Regression model Predicted delivery mode for participants with 86% accuracy and 70% Recall.

**Accuracy (86%):** The 86% accuracy means that, overall, the model is making correct predictions (both True Positives and True Negatives) 86% of the time.

A confusion matrix with a recall of 70% means that the model correctly identified 70% of the actual positive cases in the data, indicating that out of all the true positive instances, the model successfully predicted 70% of them, while missing 30% (false negatives).

Preeclampsia cases increase with the increase in the Prepregnant BMI. Obese women show high chances of having Preeclampsia.