# An Epidemiological Survey on the Assessment of Risk Factors during Pregnancy

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*Authors' contributions*

*This work was carried out in collaboration between all authors. Author PA wrote the protocol, and wrote the first draft of the manuscript. Authors PS designed the study, performed the statistical analysis and managed the literature searches, and author RK managed the analyses of the study. All authors read and approved the final manuscript.*

**Short Communication**

## ABSTRACT

Pregnancy is described as a condition or a state from the time of conception up to the time of delivery. The 'high-risk' pregnancy means a woman has one or more things that raise her-or her baby's chances for health problems or preterm (early) delivery. High blood pressure, obesity, diabetes, epilepsy, thyroid disease, smoking, alcohol, using illegal drugs, heart or blood disorder, poorly controlled asthma, malnutrition anemia, multiple pregnancy, pregnancy history and infection can increase the risk of pregnancy. This study was basically a descriptive type of epidemiological study

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based on the concept of active surveillance. The elements involved to study were risk factors involved during pregnancy like Pre-eclampsia, Gestational Diabetes, Thyroid, delivery related complications and weight gain during pregnancy. The data obtained was categorized and analyzed using graphical representations as charts, graphs and other means. The descriptive responses were analyzed individaually. Out of 100, 27 women were suffering from complications during late age pregnancy include Gestational Diabetes, Thyroid, complications due to High Blood Pressure, Cyst in Uterus, Bed Rest due to previous Miscarriage, Bleeding in Second Trimester, Acute Body Pain, Acute Rise in Blood pressure. Premature delivery was seen due to late age pregnancy. 16 out of 100 women had premature delivery i.e in 33 to 35 weeks of pregnancy or 7th and 8th month of pregnancy. In late age pregnancy, there were total 59 responses out of 100, 27(45.7%) women facing problems due to late age pregnancy like high BP, stillbirth, death of fetus in womb, thyroid, gestational diabetes and complications during delivery and 54.20% women were not having any problems. Women who suffered pregnancy induced hypertension, out of 57women 17(29.82%) were facing problems like depression, anxiety, miscarriage, weakness, vomiting, nausea. Out of 100 women, 9 women suffered from gestational diabetes and 10 women had prolonged diabetes. So from above results, it is considered that women who are 35 years and above are considered to be at "high risk" for pregnancy. Women who were aged 22-30 years didn't suffer from such diseases but gestational diabetes was observed in some cases. Women who were aged 28-35 years suffered miscarriage and abortion due to reasons unknown.

# 1. INTRODUCTION

"Some bodily and social characteristics of women, which have took place in previous pregnancies and certain health conditions of women may complicate the pregnancy. Pregnancy adverse outcomes are strongly influenced by either non-pathologic or pathologic pre-pregnancy risk factors at first antenatal visit booking. Factors that put mother, fetus, or neonate at increased risk of morbidity or mortality can belong to pre-pregnancy situations (pathologic or not) or pregnancy proceeding, including in the postpartum period". Duckitt and Harrington [1].

Barthélémy et al. [2] conducted "a study with women sample comprised 2,086. Primiparity (36.5%), single relationship status (26.4%), and maternal age ≥35 years (18.3%) were the most important non-pathologic risk factors, while arterial hypertension in family (34.3%), previous miscarriage (33.2%), overweight/obesity (21.9%), diabetes in family (21.1%), previous cesarean section (15.7%), previous postpartum hemorrhage (13.1%), low birth weight (10%), previous macrosomia (10%), and previous premature rupture of membranes (6.2%) predominated among pathologic risk factors. Major adverse outcomes recurred in some women, with recurrence rates of 21/37 (57%), 111/208 (53%), 74/208 (36%), 191/598 (32%), 132/466 (28%), 24/130 (18%), and 4/65 (6%) for prematurity, low birth weight, macrosomia, preeclampsia/eclampsia, cesarean section,

premature rupture of membranes, and stillbirth, respectively. Outcomes that were significantly influenced by non-pathologic risk factors were also significantly influenced by pathologic risk factors".

Haas et al. [3] found that "health status and risky behaviors prior to conception accounted for 40% of the variability in risk of preterm delivery".

Hedderson et al. [4] concluded that "having raised blood pressure before pregnancy increases the risk of hypertensive disorder during pregnancy. The accurate assessment of pre-pregnancy risk factors, antenatal care remains one of four pillars of safe motherhood, the three others being family planning, clean/safe delivery, and essential obstetric care. Bergsjø P. [5].

Mgaya et al, [6] "in Tanzania, reported that grand multiparity was independently associated with an increased prevalence of malpresentation, fetal and neonatal distress, and placenta previa". In a rural area in Zimbabwe, Majoko et al. [7] also reported "primiparity to be a risk factor for LBW, cesarean section, and hypertensive disorders, whereas grand multiparity and young age were risk factors for hypertensive disorders and LBW, respectively".

Periyasamy K. [8] conducted "a study and revealed that the prevalence of high-risk pregnancies among Indian women was 49.4%, with 33% of women having a single high-risk, and

16.4% having multiple high-risk pregnancies. Notably, pregnant women from Meghalaya and Manipur states had 67.8% and 66.7% with one or more high-risk factors, respectively. About 31.1% of women had short birth spacing, and 19.5% of women had adverse birth outcomes during the last birth. Logistic regression analysis showed that women with no education (adjusted odds ratio (AOR) = 2.02; 95% confidence interval (CI) = 1.84-2.22) and the poorest wealth quintile (AOR = 1.33; 95% CI = 1.04-1.29) had significantly higher odds of having HRP than those with higher education and the highest wealth quintile, respectively".

"A systematic review showed that women who had previous caesarean deliveries within a shorter duration from the last birth were at increased risk of uterine rupture, blood transfusions, and maternal morbidity". Ye L et al. [9].

According to the India – Sample Registration System (SRS) [10] "the maternal mortality ratio (MMR) has declined from 113 deaths per 100 000 live births between 2016 and 2018 to 103 deaths per 100 000 live births between 2017 and 2019, and the majority of maternal deaths occurred in the age range of 20-29 years"

Oyerinde K. [11] believed "in the strategy of aiming at exclusion of poorly predictive risk factors from routine surveillance so that one can concentrate on key factors known to cause or precipitate death from hemorrhage, hypertensive disorders, infection, and disordered growth etc".

"Women who were from the Christianity had a greater risk of high-risk than women of other religions. While ST women had a lower likelihood of high-risk and multiple high-risk than the higher-caste women, Women in southern states were more likely to experience high-risk and multiple-high-risk than those in northern states, and it could be due to the higher frequency of women with obesity, comorbidities, short birth spacing and more in caesarean section delivery"-Kutchi et al. [12].

 "Pregnancy-related complications also known as Comorbidities were attributed to the greatest risk of maternal deaths. Empowered Action Group (EAG) States in India such as Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand were reported to have higher rates of maternal deaths, and complications during pregnancy were also higher in these states".

Howrood et al. (2020). Also, factors like maternal age, short-birth spacing, less weeks of gestation, and higher birth orders were the other high-risk factors, which are responsible for weight of the newborn. Global Burden of Disease Study 1990–2017.

## 2. METHODOLOGY

This study was basically a descriptive type of epidemiological study based on the concept of active surveillance. The elements involved to study were risk factors involved during pregnancy like Pre-eclampsia, Gestational Diabetes, Thyroid, delivery related complications and weight gain during pregnancy.

The data was collected by sharing the questionnaire as "Microsoft Forms" to 100 women and the data was collected over a span of 1 month from different regions of Haryana and Punjab. The data obtained was categorized and analyzed using graphical representations as charts, graphs and other means. The descriptive responses were analyzed individaually.

## 3. RESULTS AND DISCUSSION

### 3.1 Lifestyle

Lifestyle includes 76 out of 100 women were sedentary worker 20 out of them were moderate worker and 4 out of them were heavy worker. "A study on 430 women with planned pregnancy in Belgium reported that 83% of the participants had at least one change in their lifestyle behaviors in preparation for pregnancy. The modifications included behaviors such as smoking, alcohol consumption, caffeine consumption, nutritional status, weight control, and folic acid multivitamin supplements intake" Goossens et al. [13]. "A similar study on 283 pregnant women in the Netherlands has showed that actively preparing for pregnancy is associated with choosing a healthier lifestyle by women during the preconception period" Poels et al. [14].

### 3.2 Age of Marriage

This bar graph is showing that out of 100 women 53 women were married between the age of 18-22, 33 women were married between the age of 23-27,13 women were married between the age of 28-31 and 1 woman was married in the age of 32 years. The Table 1, shown below depicts the age of !st marriage in India as suggested by Singh et. al. [15].

### 3.3 Age of 1st Pregnancy

This graph is showing that 7 women were got pregnant between the age of 15-20 years, 8 women were got pregnant between the age of 21-23 years, 52 women were got pregnant between the age of 24-28 years, 27 were got pregnant between the age of 29-31 years and 5 women got pregnant after 31 years of age.

Wubshet Debebe Negash and Desale Bihonegn Asmamaw in 2022 found in a survey that the overall median age at first birth was found to be 19 years (IQR: 16, 21 years). Rural residency (AHR = 1.02, 95%, CI 1.00,1.04), agricultural employee (AHR = 1.14, 95%, CI 1.13, 1.17), and nonagricultural employee (AHR = 1.06, 95%, CI 1.05, 1.08), marriage below 15 years (AHR = 5.47, 95%, CI 5.37, 5.57) and 15–17 years (AHR = 3.27, 95%, CI 3.22, 3.32), had sex below 15 years (AHR = = 1.57, 95%, CI 1.54, 1.61) and 15–17 years (AHR = 1.38, 95%, CI 1.38, 1.43), women who had unmet need for contraceptive (AHR = 1.39, 95%, CI 1.37, 1.42), and met need (AHR = 1.32, 95%, CI 1.30, 1.35), high spousal age gap (AHR = 1.17, 95%, CI 1.15, 1.19), not heard family planning message (AHR = 1.02, 95%, CI 1.01,1.04) were the higher hazard of early childbirth.
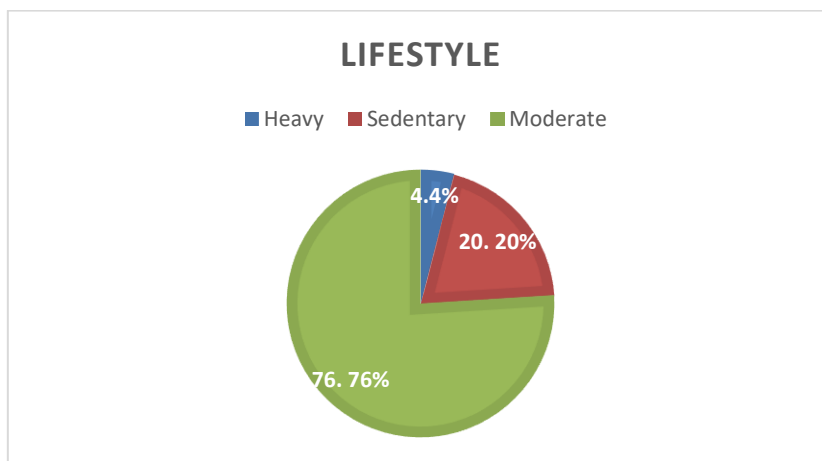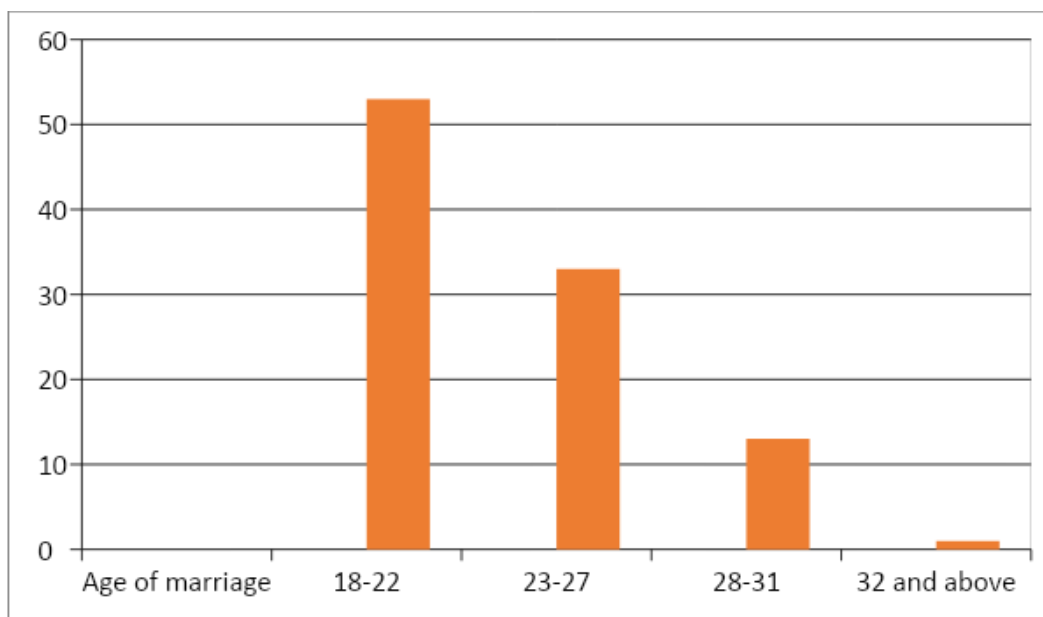


**Fig. 1. Pie chart showing lifestyle scenario**



**Fig. 2. Bar graph showing Age of marriage**

**Table 1. Distribution of age at first marriage by exact age in India over the period 1992–2021**

Percentage of women who married for the first time by specific exact age and the median age at first marriage by current age

| Current Age | NFHS-Rounds | Percentage married by exact age | | | | | | | | Number of Women | Median age at first Marriage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 25 | | |
| 15–19 | NFHS–I | 43.1 | na | na | na | na | Na | na | na | 9098 | a |
| | NFHS-II | 41.0 | na | na | na | na | Na | na | na | 8275 | a |
| | NFHS-III | 11.9 | na | na | na | na | Na | na | na | 7133 | a |
| | NFHS-IV | 2.6 | na | na | na | na | Na | na | na | 19,194 | a |
| | NFHS–V | 1.7 | na | na | na | na | Na | na | na | 15,897 | a |
| 20–24 | NFHS–I | 31.2 | 44.3 | 56.2 | 65.9 | 79.1 | 87.2 | na | na | 17,974 | 16.5 |
| | NFHS-II | 29.3 | 42.1 | 53.8 | 63.5 | 77.9 | 85.5 | na | na | 16,583 | 16.7 |
| | NFHS-III | 18.2 | 27.2 | 36.9 | 47.4 | 56.8 | 64.4 | na | na | 16,294 | 18.3 |
| | NFHS-IV | 6.5 | 10.9 | 17.5 | 26.6 | 37.4 | 47.7 | na | na | 78,800 | a |
| | NFHS–V | 4.8 | 8.7 | 14.7 | 23.2 | 33.4 | 43.0 | na | na | 71,356 | a |
| 25–29 | NFHS–I | 32.4 | 45.2 | 56.5 | 64.7 | 75.1 | 80.7 | 87.0 | 97.5 | 17,439 | 16.4 |
| | NFHS-II | 30.2 | 42.9 | 53.8 | 61.9 | 73.3 | 79.2 | 85.8 | 97.0 | 17,960 | 16.7 |
| | NFHS-III | 25.4 | 35.8 | 46.2 | 55.4 | 65.7 | 72.4 | 78.6 | 91.3 | 18,163 | 17.4 |
| | NFHS-IV | 12.1 | 18.5 | 26.4 | 35.8 | 45.6 | 54.5 | 62.7 | 83.8 | 100,084 | 19.5 |
| | NFHS–V | 8.9 | 14.4 | 22.1 | 32.0 | 42.7 | 52.5 | 61.1 | 82.7 | 1,02,068 | 19.7 |
| 30–34 | NFHS–I | 33.6 | 46.4 | 58.3 | 66.1 | 76.3 | 81.1 | 87.1 | 96.1 | 14,665 | 16.3 |
| | NFHS-II | 31.6 | 44.9 | 56.8 | 64.8 | 75.3 | 80.3 | 86.4 | 95.8 | 15,288 | 16.4 |
| | NFHS-III | 28.5 | 40.7 | 51.8 | 61.2 | 70.9 | 76.5 | 82.0 | 93.2 | 16,366 | 16.8 |
| | NFHS-IV | 16.4 | 24.4 | 33.5 | 43.6 | 53.0 | 61.4 | 68.4 | 85.7 | 88,867 | 18.7 |
| | NFHS–V | 13.5 | 20.9 | 29.6 | 39.3 | 49.1 | 57.8 | 65.9 | 86.1 | 94,719 | 19.1 |
| 35–39 | NFHS–I | 36.7 | 49.8 | 61.9 | 69.2 | 78.4 | 82.7 | 88.3 | 96.0 | 12,461 | 16.0 |
| | NFHS-II | 33.5 | 46.4 | 58.3 | 66.1 | 76.1 | 81.1 | 86.5 | 95.3 | 13,252 | 16.3 |
| | NFHS-III | 31.0 | 43.6 | 54.8 | 63.4 | 73.5 | 79.1 | 84.3 | 93.8 | 14,813 | 16.6 |
| | NFHS-IV | 17.8 | 26.1 | 35.0 | 45.1 | 54.6 | 62.8 | 69.6 | 85.6 | 82,729 | 18.5 |
| | NFHS–V | 15.8 | 24.4 | 34.2 | 44.9 | 55.0 | 63.3 | 70.4 | 87.5 | 92,831 | 18.5 |
| 40–44 | NFHS–I | 40.3 | 53.8 | 64.7 | 72.0 | 81.1 | 85.1 | 90.9 | 96.9 | 9755 | 15.7 |
| | NFHS-II | 36.3 | 49.1 | 60.1 | 68.0 | 77.9 | 82.8 | 88.5 | 96.2 | 10,646 | 16.1 |
| | NFHS-III | 32.4 | 44.4 | 55.6 | 64.6 | 74.1 | 79.8 | 85.5 | 94.6 | 12,222 | 16.5 |
| | NFHS-IV | 19.6 | 28.1 | 37.1 | 46.8 | 55.6 | 63.5 | 70.2 | 84.9 | 69,863 | 18.4 |
| | NFHS–V | 17.9 | 26.7 | 36.3 | 46.9 | 56.8 | 65.4 | 72.7 | 88.6 | 77,467 | 18.3 |
| 45–49 | NFHS–I | 44.1 | 56.7 | 67.4 | 73.8 | 82.6 | 86.5 | 91.7 | 97.4 | 8046 | 15.7 |
| | NFHS-II | 38.3 | 51.7 | 62.0 | 69.7 | 78.5 | 82.5 | 88.5 | 95.8 | 8272 | 15.9 |
| | NFHS-III | 33.0 | 44.7 | 55.4 | 64.2 | 73.3 | 79.1 | 85.1 | 94.5 | 9203 | 16.5 |
| | NFHS-IV | 18.0 | 26.3 | 34.7 | 43.7 | 52.7 | 60.6 | 67.1 | 82.4 | 65,737 | 18.7 |
| | NFHS–V | 17.3 | 26.2 | 35.7 | 46.0 | 56.0 | 64.4 | 71.2 | 87.6 | 80,331 | 18.4 |
| 15–49 | NFHS–I | 36.0 | na | na | na | na | Na | na | na | 89,437 | a |
| | NFHS-II | 33.2 | na | na | na | na | Na | na | na | 90,276 | a |
| | NFHS-III | 23.9 | na | na | na | na | Na | na | na | 94,194 | a |
| | NFHS-IV | 12.3 | na | na | na | na | Na | na | na | 505,274 | a |
| | NFHS–V | 10.6 | na | na | na | na | Na | na | na | 5,34,670 | a |
| 20–49 | NFHS–I | 35.2 | 48.1 | 59.7 | 67.7 | 78.2 | 83.6 | na | na | 80,340 | 16.2 |
| | NFHS-II | 32.4 | 45.4 | 56.7 | 65.0 | 76.2 | 81.8 | na | na | 82,001 | 16.4 |
| | NFHS-III | 26.9 | 37.9 | 48.6 | 57.9 | 67.7 | 74.0 | na | na | 87,061 | 17.2 |
| | NFHS-IV | 14.3 | 21.3 | 29.6 | 39.1 | 48.8 | 57.5 | na | na | 486,080 | 19.1 |
| | NFHS–V | 12.4 | 19.3 | 27.7 | 37.6 | 47.7 | 56.7 | na | na | 5,18,773 | 19.2 |
| 25–49 | NFHS–I | 36.3 | 49.2 | 60.7 | 68.2 | 77.9 | 82.6 | 88.5 | 96.7 | 62,366 | 16.1 |
| | NFHS-II | 33.2 | 46.2 | 57.5 | 65.4 | 75.7 | 80.8 | 86.8 | 96.1 | 65,418 | 16.3 |
| | NFHS-III | 29.4 | 41.1 | 52.0 | 61.1 | 70.9 | 76.8 | 82.5 | 93.2 | 70,767 | 16.8 |
| | NFHS-IV | 16.4 | 24.2 | 32.8 | 42.5 | 51.9 | 60.1 | 67.3 | 84.5 | 407,280 | 18.8 |
| | NFHS–V | 14.2 | 21.9 | 30.9 | 41.1 | 51.3 | 60.1 | 67.7 | 86.3 | 4,47,417 | 18.9 |

*Notes: na = Not applicable, a = Median is not calculated because less than 50 percent of women had a birth before reaching the beginning of the age group. Singh et al, [15]. From NFHS-1 to NFHS–V, there has been a considerable decline in women currently aged 15–19 years marrying at age 15. Similarly, there has been a considerable decline in the proportion of women aged 20–24 and 25–29 years during the survey marrying at younger ages. For instance, the percentage of married women in the age group 20–24 who got married at 15 years (young adolescents) of age declined by around one-sixth from 1992-93 to 2019-20. There has been an increase in the proportion marrying at higher ages across the survey rounds. Primarily during 1992–93, approximately 66% of women were married before 18 years while during 2019–21 it reduced to 23.2% among women aged 20–24 years. The same declining pattern of marriage was also observed for respondents married by the age of 21 years. Still, during 2019–21 around 32%, 39.3%, 44.9%, 46.9%, and 46.0% of women were married before 18 years among women with current ages 25–29 years, 30–34 years, 35–39years, 40–44 years, and 45–49 years respectively. During the last three decades, there has been a significant increase in the median age at marriage. For women in the age group 20–49 years, the median age of marriage improved from 16.2 years in 1992–93 to 19.2 years in the year 2019–21. Similar patterns were observed in the median age at marriage for women aged 25–49 years*
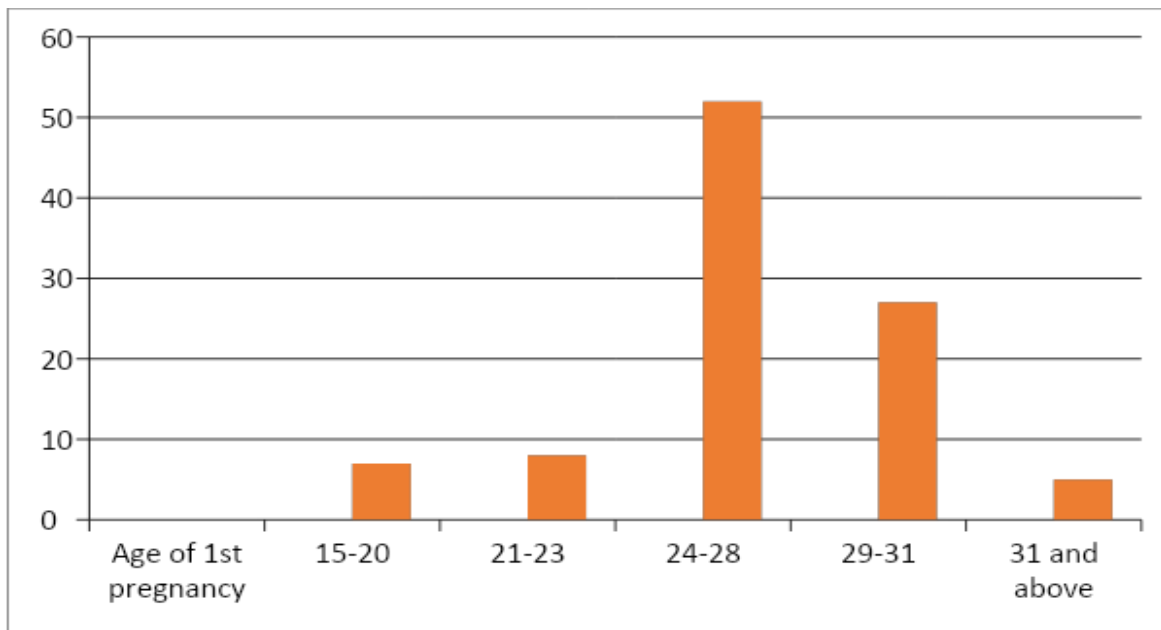
**Fig. 3. Bar graph showing Age of 1st pregnancy**

**Table 2. Age of 2nd Pregnancy**

| | |
|---|---|
| 24-27 | 14 |
| 28-32 | 19 |
| 32-34 | 5 |
| 35 and above | 9 |
| No Respondants | 28 |

### 3.4 Type of Delivery

The study done in a survey by Nivedita et al. [16] revealed that "the C-section deliveries are higher in the southern states than in the other parts of India. Literacy plays a vital role in C-section deliveries. The probabilities of C-section deliveries are more in 30–40 and 40 + years. The women belonging to the median wealth index category were more likely (OR–CI, 1.62 [1.55–1.66]) to undergo the C-section followed by the women from wealthy households (OR–CI, 1.46 [1.41–1.52])".

This result shows 60 out of 100 women had normal delivery and 40 out of them had c-section delivery.

### 3.5 Women Suffering from PCOD

This graph depicts 83 out of 100 women had not suffered from PCOD before pregnancy and 11 out of 100 women had suffered and 8 out of 100 with no response.

Stein-Leventhal syndrome, often known as polycystic ovarian syndrome (PCOS), is a syndrome that affects women's reproductive health. PCOS is one of the most common endocrine and metabolic disorders in women of reproductive age. The etiology of PCOS remains unknown mainly, and the estimation of PCOS burden in a specific geographical location will impact disease control strategies. Only those published Indian studies that reported the prevalence of PCOS from 2010 to 2021 and had at least one of the following diagnostic PCOS criteria were included in the systematic review: the National Institutes of Health (NIH), Rotterdam's criteria, or/and Androgen Excess Society (AES). MetaXL version 5.3 software was used for data analysis by Bharali M. et al. [17].

They found that the risk of bias was assessed using modified Joanna Briggs Institute criteria for cross-sectional studies. Out of 17132 articles, 11 articles were selected for systematic review and meta-analysis. The pooled prevalence of PCOS was 11.33(7.69-15.59) using the random effect. The proportion of Hirsute using the Ferriman-Gallwey score was highly variable, ranging from 1.6% to 37.9% (n=6). The prevalence rate of PCOS is high among Indian women. The pooled prevalence of PCOS was close to 10% using Rotterdam's criteria and AES criteria, while it was 5.8% using NIH criteria. The study's overall finding emphasizes the need for more acceptable and uniform diagnostic criteria for screening PCOS. At the same time, policy-makers should consider giving more importance to PCOS in their effort to control non-communicable diseases.
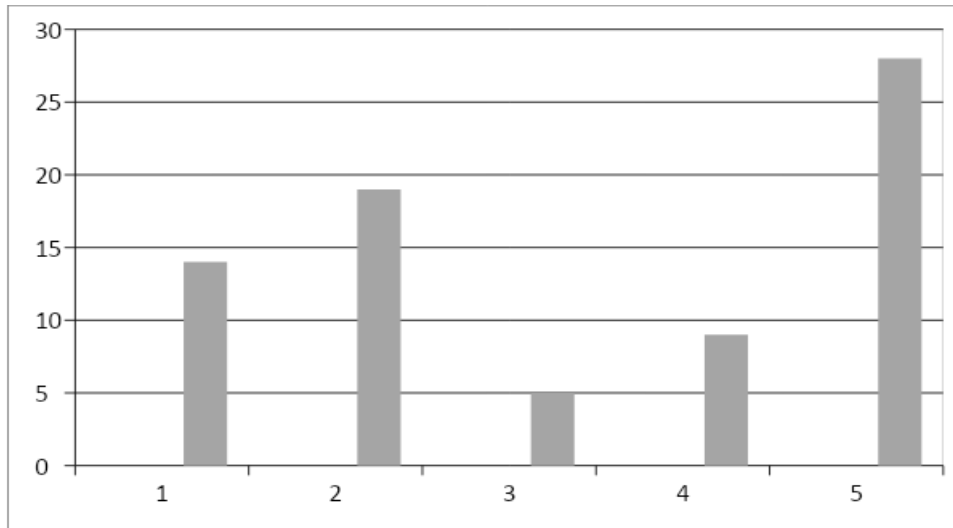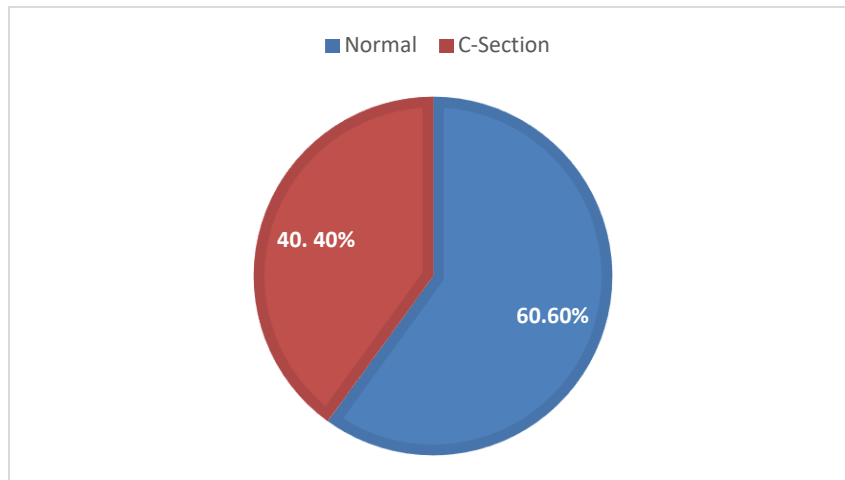
**Fig. 4. Bar graph showing age of 2nd pregnancy**



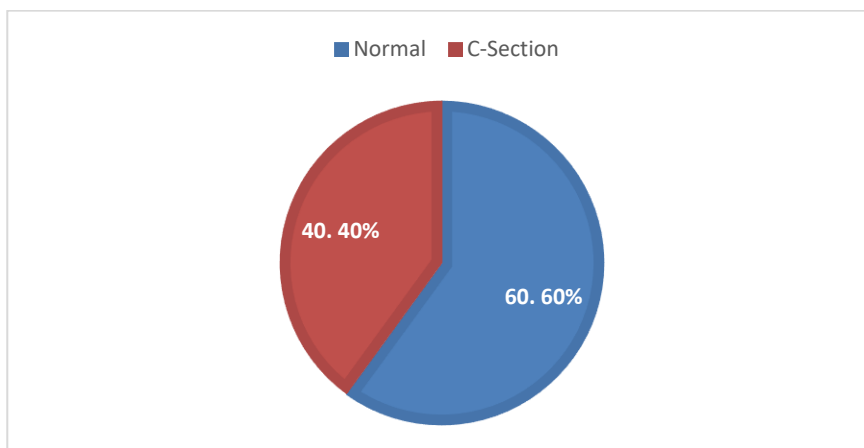**Fig. 5. Pie chart showing type of delivery in 1st pregnancy**



**Fig. 6. Type of delivery in 2nd pregnancy**
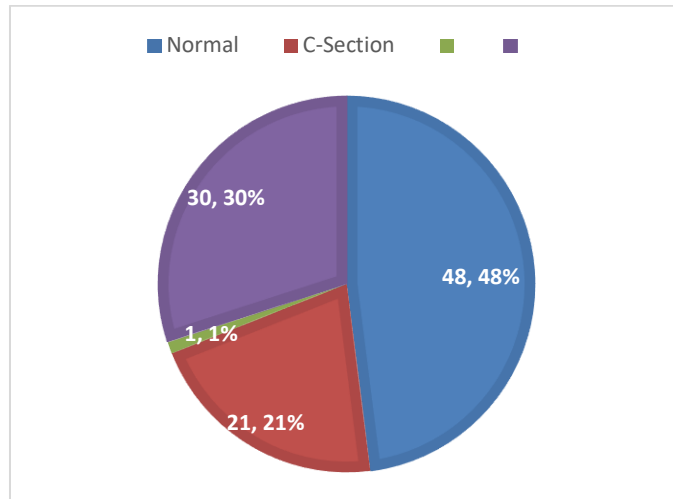*Nromal 60%*
*C-section 40%*

**Fig. 7. Pie chart showing suffered from PCOD before pregnancy**
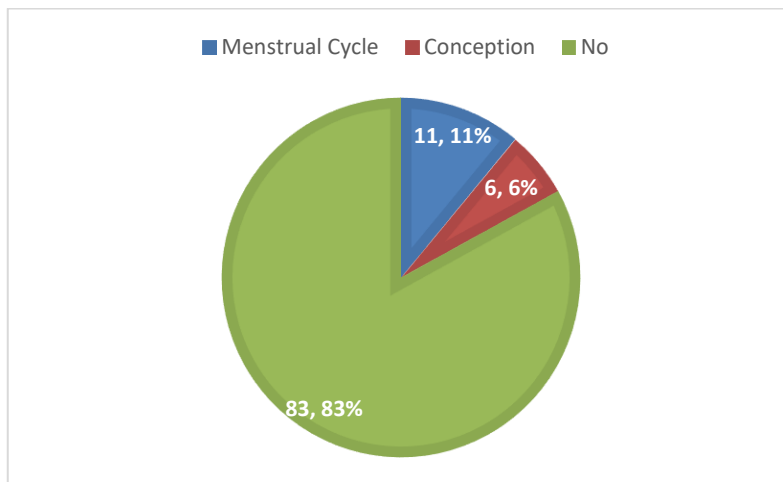


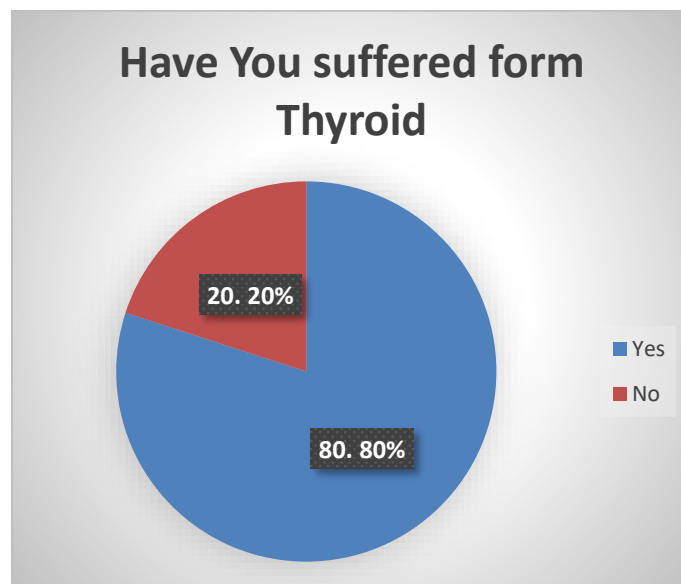**Fig. 8. Have you suffered form PCOD before pregnancy**



**Fig. 9. Pie chart showing suffering form thyroid**

**Women Suffering from Thyroid:** Women with polycystic ovary syndrome (PCOS) are more prone to autoimmune thyroiditis, and both disorders lead to subfertility and pregnancy-related complications. The aim of this study was to investigate whether mothers with and without PCOS and their offspring have comparable thyroid parameters at term and how thyroid parameters are associated with perinatal outcome in this population.

This pie chart depicts that 20 women out of 100 were suffering from thyroid and 80 women out of 100 didn't suffered from thyroid. Severe anemia, diabetes, and thyroid disorders contributed to 14.7% of high-risk pregnancies and 13.7% of high-risk pregnancies were multigravidas (four or more) in a study by Bharti *et al.*, [18].

**Table 3. Common symptoms during pregnancy**

| | |
|---|---|
| Cold | 2 |
| Cough | 1 |
| Fever | 1 |
| Headache | 11 |
| Weakness | 36 |
| Nausea | 51 |
| Vomiting | 52 |
| Others | 08 |
| Morning sickness | 52 |
| Missed period cycle | 35 |

Nissin et al. [19] report "real-world evidence from patient-reported outcomes that exceeds previous works: 1,549,186 tracked symptoms from 183,732 users of a smartphone pregnancy app symptom tracker are analyzed. The majority of users track symptoms on a single day. These data are generalizable to those users who use the tracker for at least 5 months. Week-by-week symptom report data are presented for each symptom. There are few or conflicting reports in the literature on the course of diarrhea, fatigue, headache, heartburn, and sleep problems. A peak in fatigue in the first trimester, a peak in headache reports around gestation week 15, and a steady increase in the reports of sleeping difficulty throughout pregnancy are found".

Dehingia et al. [20] found "in a survey that around one-fifth of the total women (16.9%) reported that their previous pregnancy was unintended. Logistic regression analyses revealed that unintended pregnancy was significantly associated with maternal complications- pre-eclampsia (AOR:2.06; 95% CI:1.57–2.72), postpartum hemorrhage (AOR:1.46; 95% CI: 1.01–2.13) and postpartum pre-eclampsia (AOR:2.34; 95% CI:1.47–3.72). Results from the Mantel Haenszel test indicated that both ANC and CHW home visit in pregnancy significantly affect the association between unintended pregnancy and postpartum hemorrhage ($p < 0.001$)".

Swaminathan *et. al.* [21] Found that "of the 31 746 pregnant women with complete data in the study, the mean (SD) age was 24.3 (4.7) years, and the mean (SD) gestational age was 5.1 (2.3) months. The weighted age-adjusted prevalence of gestational diabetes was 1.3% (95% CI, 1.1%-1.5%). The prevalence of gestational diabetes increased with age, from 1.0% (95% CI, 0.5%-1.5%) at age 15 to 19 years to 2.4% (95% CI, 1.0%-3.8%) at age 35 years or older. The age-adjusted prevalence of gestational diabetes was higher among women with a body mass index of 27.5 or greater (1.8%; 95% CI, 1.0%-2.5%) compared with women with a body mass index of less than 18.5 (0.8%; 95% CI, 0.5%-1.1%), among women in the highest wealth quartile (1.7%; 95% CI, 1.1%-2.5%) compared with those in the lowest (0.9%; 95% CI, 0.7%-1.2%), and women in the south (eg, Kerala: 4.5%; 95% CI, 2.4%-6.7%; Telangana: 5.4%; 95% CI, 0.0%-11.0%) compared with the northeast (eg, Assam: 0.23%; 95% CI, 0.0%-0.48%; Mizoram: 0.16%; 95% CI, 0.0%-0.49%)".

Out of 100, only 8 women suffered covid-19 during pregnancy, while 5 women suffered covid-19 at the time of delivery. Rest remained unaffected.

"There were exceedingly rare cases of COVID-19 transmission to the fetus, and newborns can pick up COVID-19 when exposed. Vaccines were proved to be safe for pregnant women and help prevent both mother and the fetus from getting COVID-19 and were also highly effective to prevent COVID-19 infection, critical sickness, and fatalities in general. There are specific guidelines for labor and delivery during the COVID-19 pandemic which are to be imposed and followed to achieve safer and healthier childbirth. In this article, the overall influence of COVID-19 in pregnancy, its pathophysiology, effects on placenta and neonates, maternal and perinatal features and outcomes, the role of vaccination, available treatment options, and the guidelines to be followed during the pandemic are discussed based on the available scientific evidence". Choudhary et al. [22].

### 3.6 Mental Health During Pregnancy

"Research has indicated that India has a high burden of mental health disorders. According to the India State-Level Disease Burden Initiative, in 2017, approximately, 197.3 million Indians suffered from mental illnesses, meaning every seventh Indian was affected by mental illnesses of varying severity. The study also estimated the percentage prevalence of depressive and anxiety disorders to be higher in Indian women (3.9%) than men (2.7%)". Sagar et al. [23].
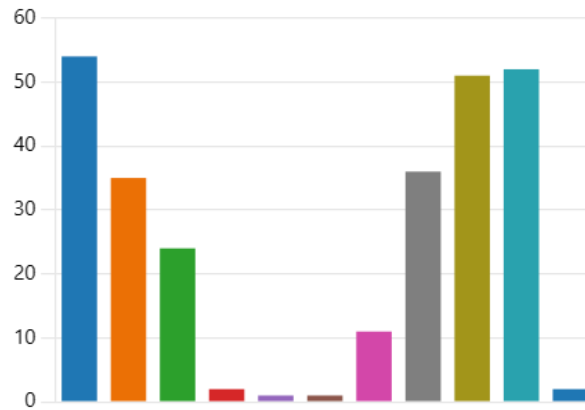


**Fig. 10. Complications faced during pregnancy**

**What were the complications suffered during period cycle?**
    Disturbed cycle 11(16%)
    Irregular periods 36(54%)
   Pain during menses 20(36%)



**Fig. 11. Pie chart showing Diabetes during pregnancy**

**Did you have diabetes during pregnancy?**
**Prolonged**              **10(53%)**
**Gestational Diabetes     9(47%)**

    **Did you suffer from Covid-19?**
    **During pregnancy**                                                      **8**
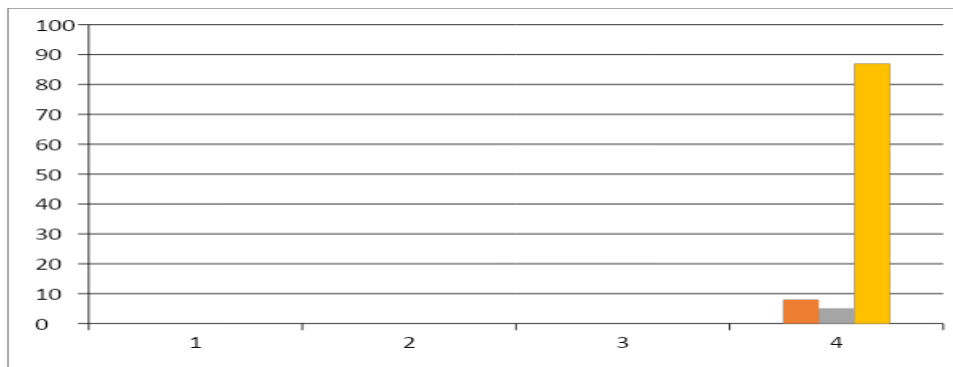    **At the time of delivery**                                               **5**

**Fig. 12. Women who Suffered from COVID-19 During Pregnancy**


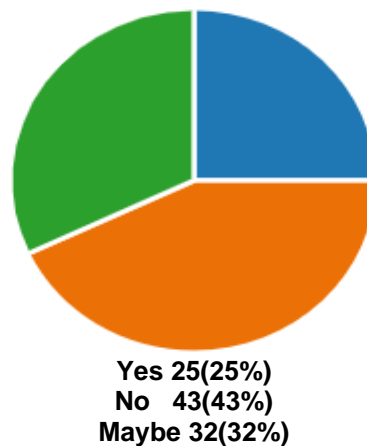
**Yes 25(25%)**
**No   43(43%)**
**Maybe 32(32%)**

**Fig. 13. Pie chart showing affect in mental health**

"For 2021–2022, India's Ministry of Finance allotted to the Ministry of Health and Family Welfare Rs. 712,690 million, about 3% of India's Gross Domestic Product [15]. Of this, the government dedicated a total of Rs. 5970 million to mental health care and only Rs. 400 million to NMHP". Mantri Ji, [24].

**Table 4. What were the issues?**

| | |
|---|---|
| Mood swings | 63 |
| Irritation | 35 |
| Stress | 32 |
| Anxiety | 28 |
| Fatigue | 48 |
| Relation with family members | 14 |
| Others | 5 |

In 2005, researchers estimated prevalence of antenatal and postnatal depressive disorders in high-income countries, to be 11% and 15%, respectively Gavin et al. 2005. Some studies in low-and middle-income countries (LMICs) have reported estimated prevalence to be even higher,

15.6% antenatally and 19.8% postnatally. Despite such high prevalence, maternal mental health problems remain "under-recognized and under-treated" Gelaye et al. [25]. "In India, recent studies estimated the prevalence of perinatal depression to be between 14 and 24%" Seshu et al. [26] Researchers estimated in 2020 the magnitude of other pregnancy-related disorders such as pregnancy-related stress and anxiety to be 30.9% Aneja et al. [27] and 23% Jyothi et al. [28] respectively.

## 3.7 Cravings During Pregnancy

"The most common food craving was fruit, seen in 31.1% vs 13.6%, $p$-value < 0.00001. In the group of women with craving, 64.6% reported that they craved the food item prior to becoming pregnant, 76.0% could not wait until another day to satisfy their food craving, and 41.7% reported there was something they liked as much. Only 2.9% of women in our cohort had pica vs 9.0%, $p$-value 0.00001. The cohorts differed in fruit craving, (31.1% vs 13.6%), meat, poultry, fish, dry beans,

eggs, and nuts (21.0% vs 5.0%), milk, yogurt, and cheese, (17.0% vs 2.2%) and vegetable, (14.1% vs 6.9%), all with *p*-value < 0.00001. They did not differ in the category of bread, cereal, rice, and pasta, 17.9% vs 22.3, *p*-value 0.06." Jonathan *et al.* [29].

**Table 5. How did you deal with negative mental health during pregnancy?**

| | |
|---|---|
| Going park and relaxing | 10 |
| Watching television | 12 |
| Doing walk | 20 |
| Yoga | 13 |
| Meditation | 21 |
| Satisfying cravings | 16 |

Food craving during the third trimester of pregnancy has remained constant for almost 60 years, although the items craved have changed. Pica was less common in our modern cohort of women.

## 3.8 What were the Cravings you Had in your Pregnancy?

This graph depicts various types of cravings were there from which 100 women gone through.

## 3.9 Complications at the Time of Delivery

"Giving birth should be a time for celebration; however, for an estimated 358,000 women worldwide, pregnancy and childbirth end in death and mourning" [30]. "Beyond these maternal deaths are numerous episodes of acute maternal complication: by some estimates, 9-10% of pregnant women or about 14 million women per year suffer from acute maternal complications" [31]. "Estimate of the World Health Organization (WHO), United Nations Children's Fund, and United Nations Population Fund (approximately 15% of expected births suffering from obstetric complications) is more than double this figure: approximately 20 million women suffer from an obstetric complication" [32]. The consequences of birth and acute maternal complications, including death and disabilities, make up the largest burden of disease affecting women in developing countries United Nations Children's Fund [33].

## 3.10 What were the Complications in your Delivery?

This graph represents multiple types of complications from which 10 women suffered at the time of delivery.

## 3.11 Abortions

Despite the legalisation of abortion in India, morbidity and mortality continue to remain a serious problem for a majority of women undergoing abortions. A lack of reliable information, wide regional and rural-urban differences and a thin research base all make it difficult for policy-makers, administrators and women's health advocates to develop strategic interventions.

### 3.11.1 Any abortion?

This pie chart shows 80 out of 100 women had suffered from abortion and 20 women had not suffered from abortion.

## 3.12 Miscarriage During Pregnancy

Pregnancy outcome is an important health indicator of the quality of maternal health. Adverse pregnancy outcomes is a major public health problem, which can lead to poor maternal and neonatal outcomes. This study investigates the trends in pregnancy outcomes prevalent during 2015–2021 in Indian women.

### 3.12.1 Any miscarriage?

This pie chart depicts that 13 out of 100 women were suffered from miscarriage and 87 women did not.

"Livebirth decreased by 1.3 points (90.2% vs. 88.9%), and nearly half of the Indian states/UTs (n = 17/36) had lower than the national average of livebirth (88.9%) reported during 2019-21. A higher proportion of pregnancy loss was noted, particularly miscarriages increased in both urban (6.4% vs. 8.5%) and rural areas (5.3% vs. 6.9%), and stillbirth increased by 28.6% (0.7% vs. 0.9%). The number of abortions decreased (3.4% vs. 2.9%) among Indian women. Nearly half of the abortions were due to unplanned pregnancies (47.6%) and more than one-fourth (26.9%) of abortions were performed by self. Abortions among adolescent women in Telangana was eleven times higher during 2019-21 as compared to 2015-16 (8.0% vs. 0.7%)". Kappusamy [34].

## 3.13 Pre-Mature Delivery

In the 21st century, India is still struggling to reduce the burden of malnutrition and child mortality, which is much higher than the neighbouring countries such as Nepal and Shri Lanka. Preterm birth (PTB) and low birth weight

(LBW) predispose early-age growth faltering and premature mortality among children below the age of five. Thus, highlighting the determinants of LBW and PTB is necessary to achieve sustainable development goals.

### 3.13.1 In how many weeks your baby was born?

According to Jana A. [35] "there were cross-state disparities in the prevalence of PTB and LBW. In India, an estimated 12% and 18% of children were LBW and PTB, respectively, in 2019–21. Maternal obstetric and anthropometric factors such as lack of antenatal care, previous caesarean delivery, and short-stature mothers were associated positively with adverse birth outcomes such as LBW and PTB. However, a few correlates were

found to be differently associated with PTB and LBW. Mothers belonging to richer wealth status had higher chances of having a preterm birth (OR = 1.16, 95% CI: 1.11–1.20) in comparison to poor mothers. In contrast, the odds of having LBW infants were found to be increased with the decreasing level of the mother's education and wealth quintile".

### 3.14 Baby Birth Weight

Low birth weight (LBW) is an important public health indicator extensively linked to infant and child mortality, especially in lower-middle-income countries (LMICs). Globally, 15.5% of all infants are born with LBW while 95% of these occur in LMICs. This study aims to examine the prevalence and determinants of LBW in India.
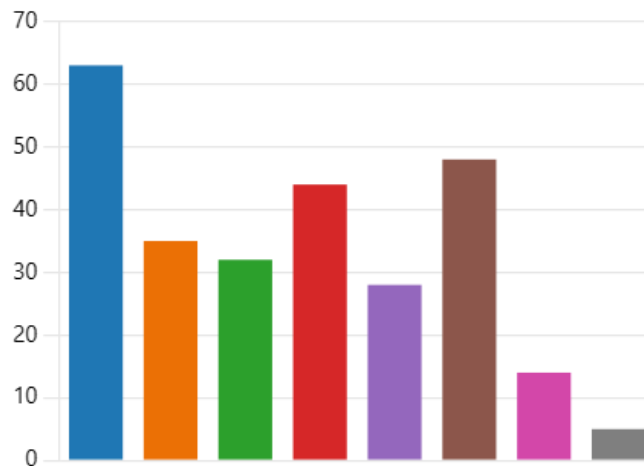


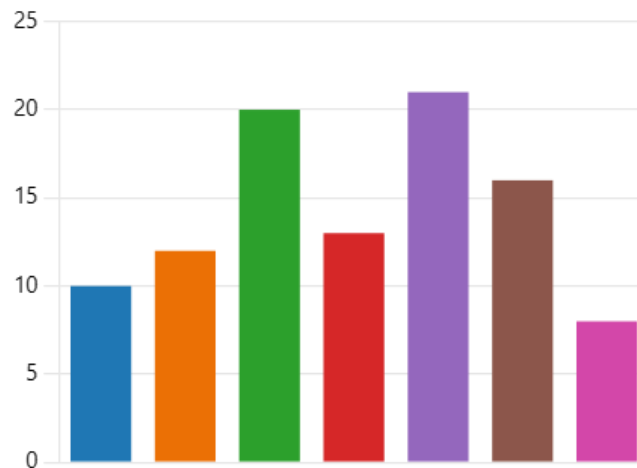**Fig. 14. Bar graph showing related issues**



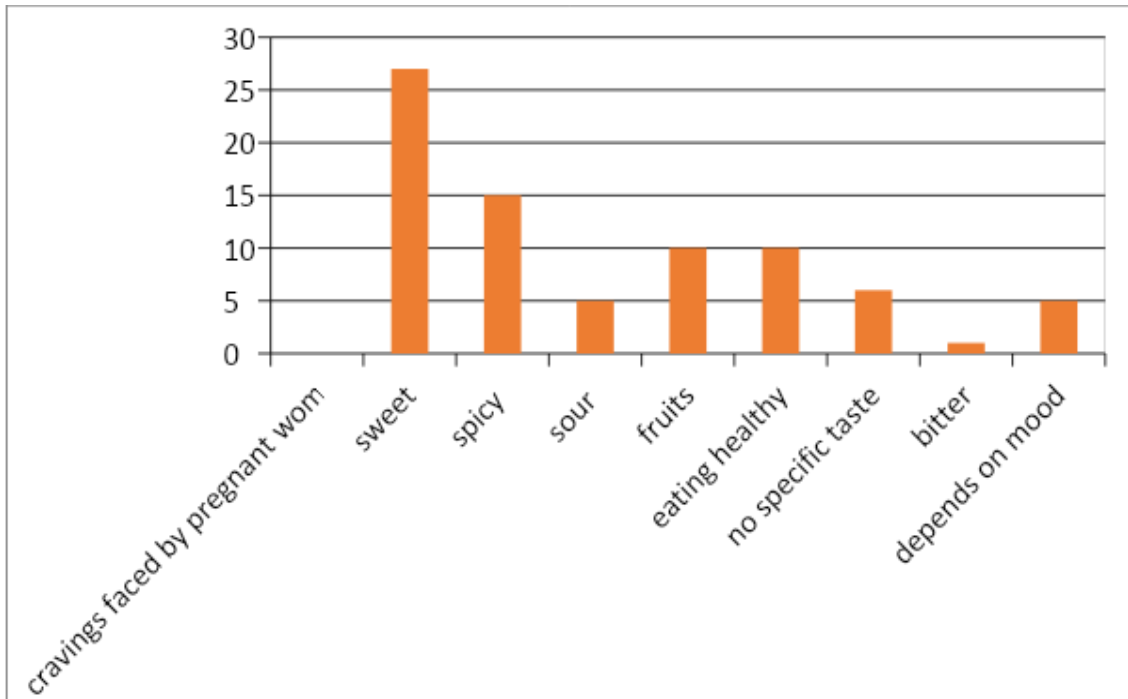**Fig. 15. Bar graph showing mental health during pregnancy**

**Fig. 16. Bar graph showing cravings during pregnancy**

- ■ pain
- ■ bp
- ■ Bleeding
- ■ N/A
- ■ Breached position of baby
- ■ Diabeties
- ■ low fluid Amniotic
- ■ water bag brust
- ■ uterus tumor
- ■ Digestion
- ■ Hypertension
- ■ vomittingg
- ■ Anxity
- ■ Death of baby
- ■ Gastric
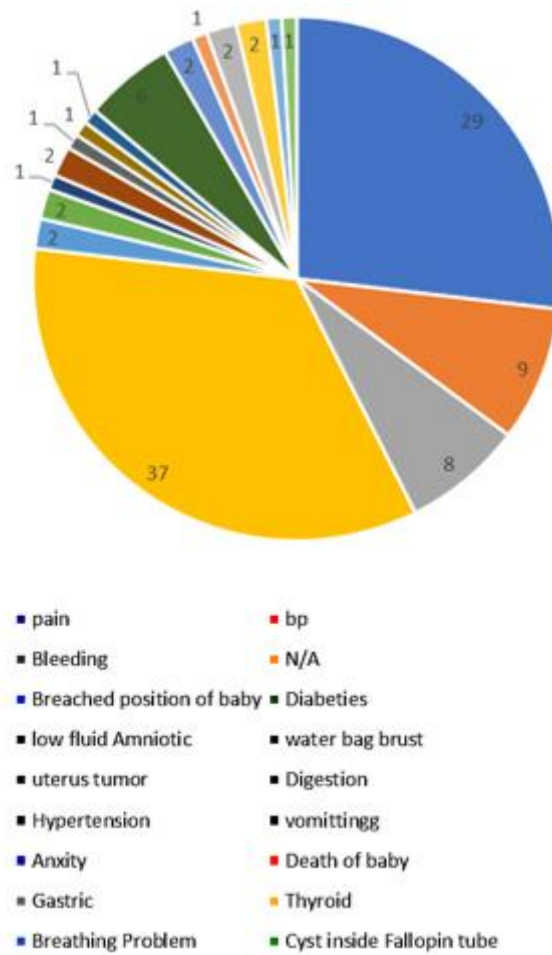- ■ Thyroid
- ■ Breathing Problem
- ■ Cyst inside Fallopin tube
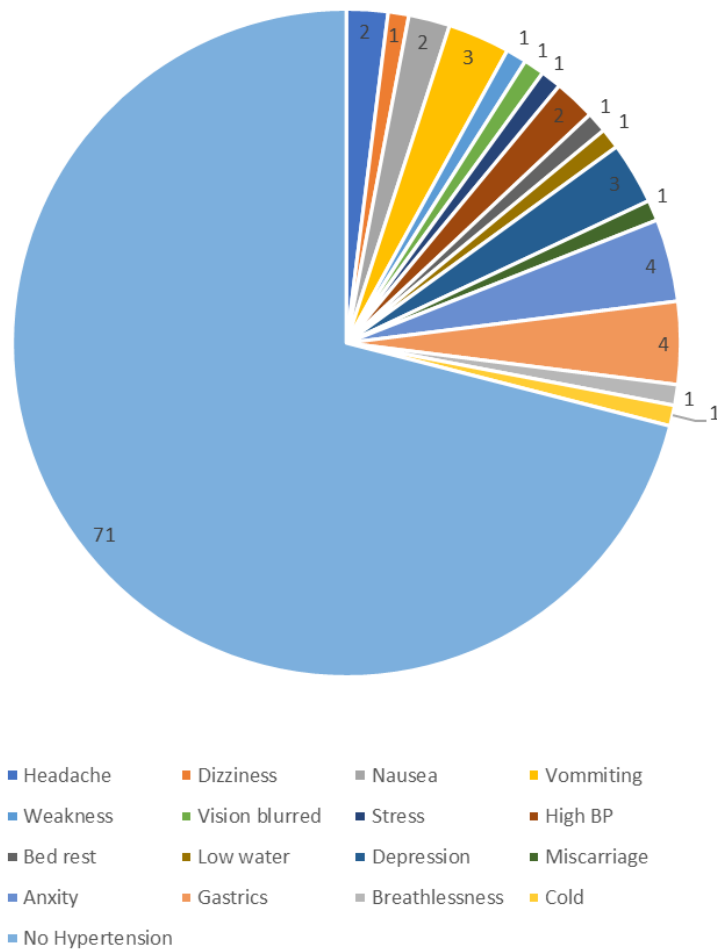
**Fig. 17. Pie chart showing complications in delivery**
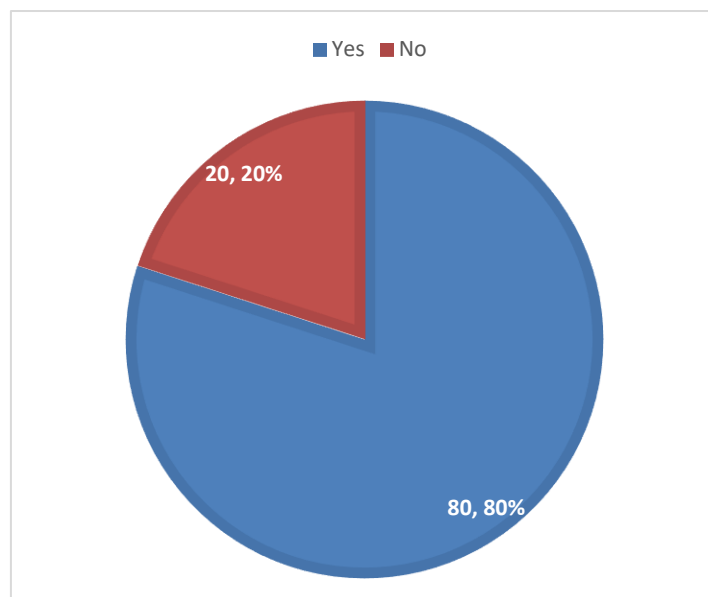


**Fig. 18. Pie chart showing abortion scenario**
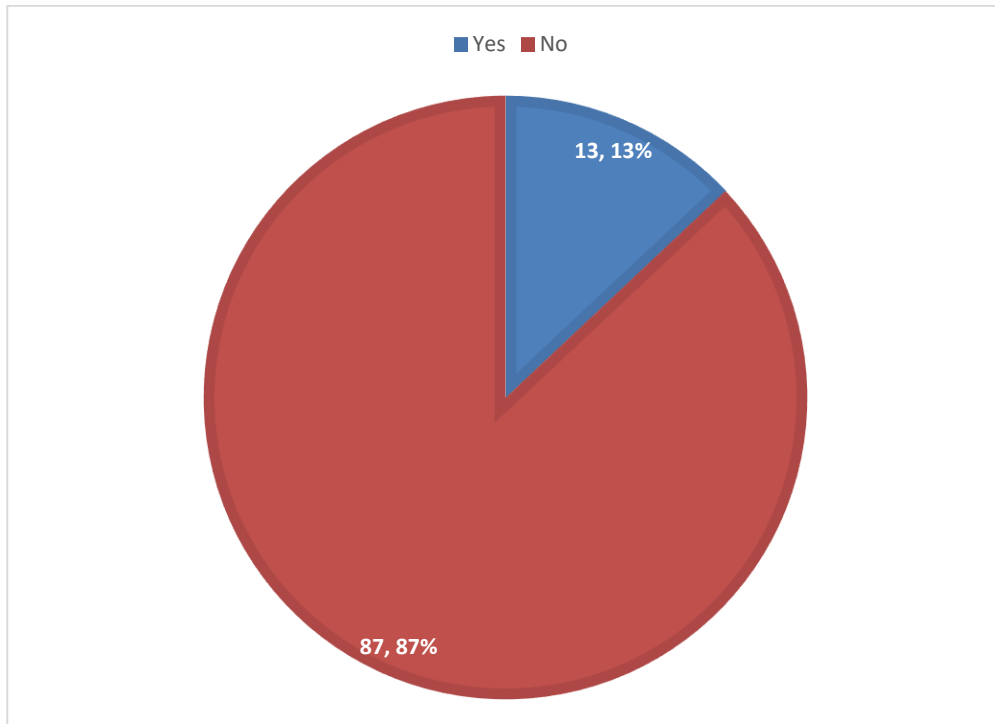
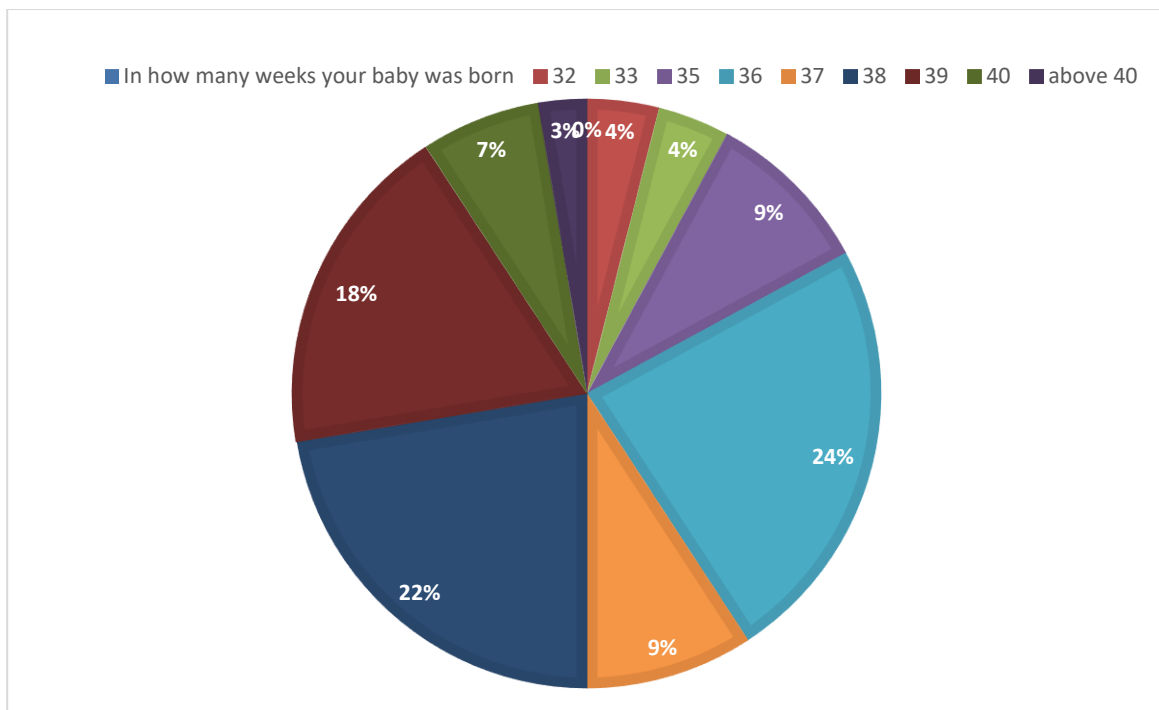**Fig. 19. Pie chart showing miscarriage scenario**



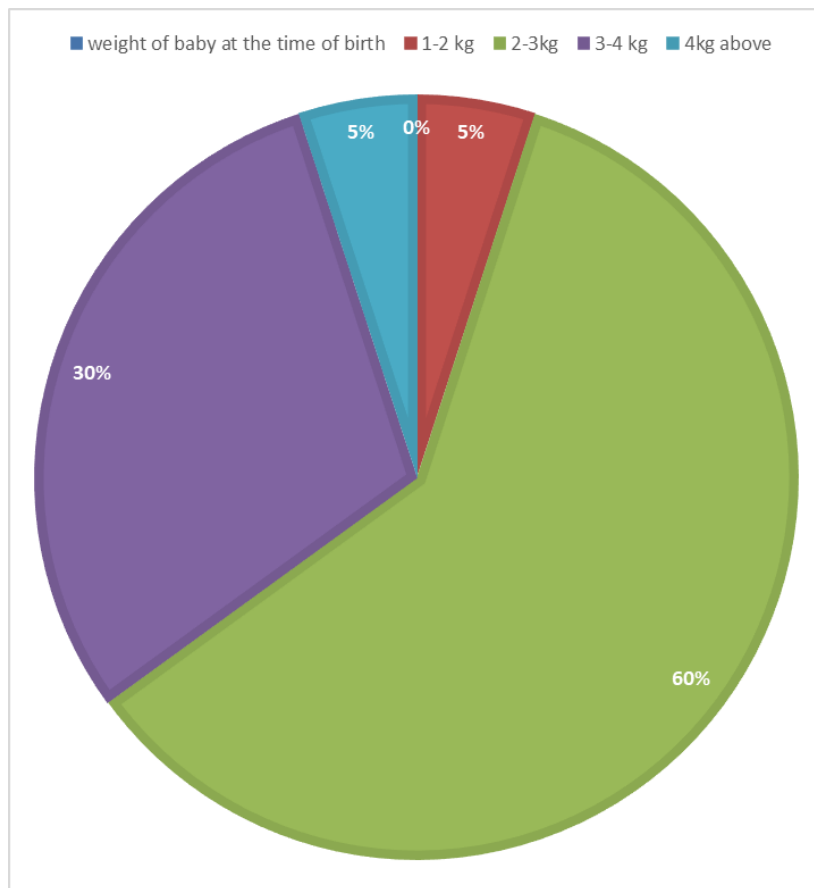**Fig. 20. Pie chart showing weeks of born of baby**

**Fig. 21.  Pie chart showing weight of baby at the time of birth**

### 3.14.1  What was the weight of your baby at the time of birth?

This pie chart represents that 5 babies were born in the category of 1-2kg birth weight, 60 babies were born in the category of 2-3kg birth weight 30 babies were born in the category of 3-4 kg birth weight and 5 babies were born under the category of above 4 kg birth weight.

"In a study conducted, a total of 175,240 mothers were included in the present study. The proportion of newborns with LBW was 17.29% (n=26366, 95% confidence interval [CI] 17.01, 17.57), of which 6% (n=1450, 95% CI 5.61, 6.41) had very low birth weight (less than 1500 g). An increase in the education level of women or wealth index also resulted in significantly reduced odds of LBW in the newborn. However, the number of antenatal care (ANC) visits lacked any statistically significant association with the odds of having a newborn with LBW". Girotra S et al. [36].

## 3.15 Mother's weight at the Time of Conception

GWG of Indian women is lower than the prescriptive standards of the Intergrowth charts. Dangat et al. [37]. They further found in a study that the median GWG was 1.68, 5.80, 7.06, and 11.56 kg at gestational ages 18, 26, 30, and 40 weeks, respectively. In our study, pregnant women gained less weight throughout pregnancy compared to Intergrowth-21st study, but more weight compared to the GARBH–Ini cohort centile curves in all the BMI categories. GWG in overweight/obese women (BMI ≥ 25) was significantly lower (<0.001) as compared to underweight (BMI < 18.5), or normal weight women (BMI ≥ 18.5 and <25). The median GWG at 40 weeks in underweight, normal and overweight/obese women was 13.18, 11.74, and 10.48 kg, respectively. Higher maternal BMI, older maternal age, higher parity and higher hemoglobin concentrations were associated with lower GWG, while taller maternal height was associated with greater GWG.
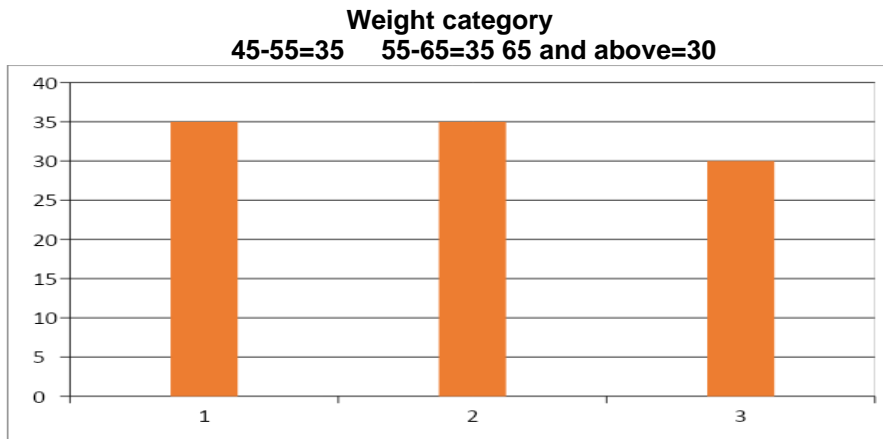
**Weight category**
**45-55=35    55-65=35 65 and above=30**



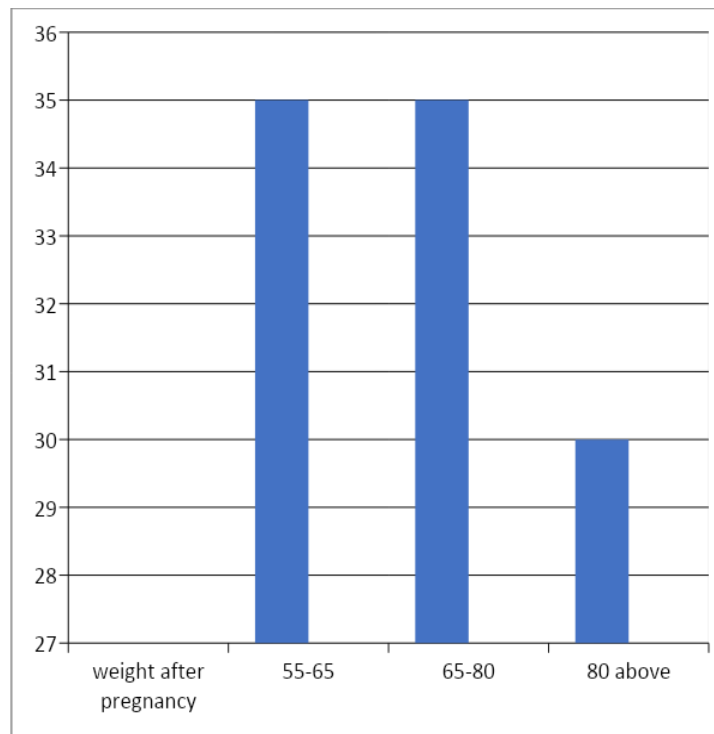**Fig. 22. Bar graph showing weight (in kg) before pregnancy**



**Fig. 23. Bar graph showing weight (in kg) after pregnancy**

### 3.15.1 What was your weight (in kg) before pregnancy?

Results showed that 35 women were between 45 to 55 kgs of weight, while 35 at 55-65 kg of weight and 30 women were above 65kgs at the time of conception.

## 3.16 Weight Gain During Pregnancy

### 3.16.1 What was your weight (in kg) after pregnancy?

Women gain little weight during pregnancy, but because of prepregnancy deficits, Indian women end pregnancy weighing less than African women do at the beginning. Deficits in maternal nutrition could help explain the Asian enigma, the puzzle of why Indian children are much smaller than their relative wealth predicts.

This graph represents that 35 out of 100 women gained weight between the range of 55-65kg and also 35 more women gained weight between the range of 65-80 kg weight and 30 women gained weight above 80 kg.

The latest Demographic and Health Survey (DHS), in 2005, showed that 35.5% of women

aged 15–49 y are underweight, suggesting that maternal health and nutrition are extremely also poor. India's high rate of underweight among women is worrisome in light of mounting evidence that nutrition during pregnancy is important not only for neonatal survival but also for birth weight Ludwig et al [38] which is associated with height and health in childhood and adulthood Adair LS, [39] as well cognition and productivity [40].

## 4. CONCLUSION

In this study on 100 different women, we found that, 27 women were suffering from complications during late age pregnancy include Gestational Diabetes, Thyroid, complications due to High Blood Pressure, Cyst in Uterus, Bed Rest due to previous Miscarriage, Bleeding in Second Trimester, Acute Body Pain, Acute Rise in Blood pressure. Premature delivery was seen due to late age pregnancy. 16 out of 100 women had premature delivery i.e in 33 to 35 weeks of pregnancy or 7th and 8th month of pregnancy. As per risks and complications, diets were also different like low sodium diet. Protein was also in moderate amount because of high blood pressure. This also included taking less amount of saturated fats like oil, butter, ghee and including anti-hypertensive drugs in diet is must. As pregnancy is a period in which a baby develops in a living state so more dietary requirement is there so in this study there were many types of diet recommended as high calorie diet, calcium rich diet, iron rich diet, healthy and nutritious diet with lots of antioxidants like fruits, vegetables and whole grains. Women were recommended some tablets like iron, calcium, folic acid in normal pregnancy and Thyroxine in case women had Thyroid. In late age pregnancy, there were total 59 responses out of 100, 27(45.7%) women facing problems due to late age pregnancy like high BP, stillbirth, death of fetus in womb, thyroid, gestational diabetes and complications during delivery and 54.20% women were not having any problems.

Women who suffered pregnancy induced hypertension, out of 57women 17(29.82%) were facing problems like depression, anxiety, miscarriage, weakness, vomiting, nausea. Out of 100 women, 9 women suffered from gestational diabetes and 10 women had prolonged diabetes. So from above results, it is considered that women who are 35 years and above are considered to be at "high risk" for pregnancy. Women who were aged 22-30 years didn't suffer from such diseases but gestational diabetes was observed in some cases. Women who were aged 28-35 years

suffered miscarriage and abortion due to unknown reason.

According to Stillbirth Collaborative Research Network Writing Group Association [41] long before admitting women for emergency situations during parturition, efforts should be directed to mitigation of pathologic risk factors that can be modified, conversely non-pathologic factors that cannot be mitigated. Reddy et al. [42]. said that these factors should not be ignored since they lead to more awareness so that adequate management can be planned [43-46].

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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