
**“A LONGITUDINAL STUDY OF HIGH-RISK
PREGNANCY AND ITS OUTCOME AMONG
ANTENATAL WOMEN RESIDING IN AN
URBAN FIELD PRACTICE AREA”**

Submitted by

REG. NO. BD0121006

Dissertation

Submitted to

KAHER, Belagavi, Karnataka,

In partial fulfilment of the requirements for the degree of

M. D. (Doctor of Medicine)

In

COMMUNITY MEDICINE

**DEPARTMENT OF COMMUNITY MEDICINE,
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DECEMBER 2024 / JANUARY 2025

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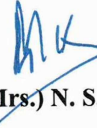


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LIST OF ABBREVIATIONS USED

S. No	abbreviations	Expansion of the abbreviations
1	ASHA	Accredited Social Health Activist
2	ANC	Ante Natal Care
3	BMI	Body Mass Index
4	BP	Blood Pressure
5	CPI	Consumer Price Index
6	GDM	Gestational diabetes mellitus
7	Hb	Haemoglobin
8	LBW	Low Birth Weight
9	LSCS	Lower segment caesarean section
10	MMR	Maternal Mortality Ratio
11	NFHS	National Family Health Survey
12	PROM	Premature Rupture of Membrane
13	PPROM	Preterm Premature Rupture of Membrane
14	PIH	Pregnancy Induced Hypertension
15	PMSMA	Pradhan Mantri Surakshit Matritva Abhiyan

16	PHC	Primary Health Care
17	Rh	Rhesus
18	SDG	Sustainable Development Goal
19	SRS	Sample Registration system
20	SES	Socio Economic Status
21	SPSS	Statistical Package for the Social Sciences
22	USHA	Urban Social Health Activist
23	WHO	World Health Organization
24	\geq	More than or equal to
25	\leq	Less than or equal to

ABSTRACT

“A LONGITUDINAL STUDY OF HIGH-RISK PREGNANCY AND ITS OUTCOME AMONG ANTENATAL WOMEN RESIDING IN AN URBAN FIELD PRACTICE AREA”

Background: Majority of pregnancies end happily and healthily, some pregnancies are complicated by issues pertaining to the mother's health, the health of the foetus, or pregnancy-specific issues. These complications can then impact the mother's health and the foetus's overall survival. High-risk pregnancies pose significant challenges to maternal and foetal health, necessitating a comprehensive understanding of the associated demographic, socio-economic, medical, and obstetric factors.

Hence, identification of type of highrisk pregnancy at earliest stage will be useful in directing the appropriate intervention measures for pregnant women for their better outcome. Most of the previous studies are either cross sectional or record based, hence the present study was undertaken as a longitudinal study to find out the outcome of high-risk pregnancy among antenatal women residing in urban field practice area of Belagavi

Objectives: To study the outcome of high-risk pregnancy and also to study risk factors associated with high risk pregnancy

Methodology: The present study was a longitudinal study conducted to study the outcome of high-risk pregnancies among the high-risk pregnant women residing in the two urban field practice area, Ashok Nagar and Rukmini Nagar which is under JNMC, Belagavi. A sample size of 130 was calculated. Data was collected regarding sociodemographic variables, pregnancy related variable, and high-risk factors by using a predesigned, pretested questionnaire. Studied the outcome of high-risk pregnancy was assessed according to PMSMA guidelines and the risk factors

associated with high risk pregnancy by using modified Coopland scoring system. Ethical clearance was obtained from institutional ethics committee. Collected data was entered using Microsoft Excel software and analysed in SPSS software.

Results: Mean age of the participant was 25.86 ± 3.9 years. Majority 83.1% were Muslims. 39.2% were belonged to class III SES. Among 130 study participants, 11(8.5%) had adverse maternal outcome and 119 (91.5%) did not have any adverse maternal outcome. Out of 138 neonates, including 8 twins, one (0.7%) was intrauterine death, while 131 (94.9%) were born alive, one (0.7%) was stillbirth, and 5 (3.7%) died during the neonatal period. In the present study of 130 pregnant women, adverse foetal outcomes occurred in 18 cases (13.8%), while 112 (86.2%) experienced no such adverse outcomes.

Age, tobacco use, and a family history of hypertension were significantly associated with high-risk pregnancy. Parity, previous child mortality, and conditions like pregnancy-induced hypertension, multiple pregnancies, and Rh-negative pregnancies were also significantly associated with high risk.

Conclusion: The present study revealed that adverse maternal outcomes were present in 8.5% of mothers. In case of foetal outcomes, 13.8% had adverse foetal outcomes whereas 86.2% had normal outcomes. In our study, factors significantly associated with high-risk pregnancy were sociodemographic variables like age, tobacco chewing habit and family history of hypertension. In pregnancy-related risk factors parity, previous child death was significantly associated with high-risk pregnancy. Risk factors like pregnancy-induced hypertension, multiple pregnancy and Rh-negative were also significantly associated with high-risk pregnancy

Keywords: High risk pregnancy, PMSMA, pregnancy outcome, longitudinal study

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INTRODUCTION

Women are the heart of the household, so their wellbeing is essential to the family's overall happiness. The wellbeing of women is fundamental to the wellbeing of society. Over the past ten years, medical professionals and public health specialists have given a great deal of emphasis on the health of women who are of reproductive age. Slogans such as "Pregnancy is Special, Let's keep it safe" have been widely disseminated globally.^[1] A woman's pregnancy is a wonderful time filled with excitement and high aspirations. Pregnancy and delivery have a profound effect on women and their families' financial, mental, emotional, and physical health. The health of the mother and additional variables such as race, ethnicity, age, and income have an impact on pregnancy-related health outcomes.^[2]

Even while the majority of pregnancies end happily and healthily, some pregnancies are complicated by issues pertaining to the mother's health, the health of the foetus, or pregnancy-specific issues.^[3] Anytime during a pregnancy or childbirth, complications can arise. These complications can then impact the mother's health and the foetus's overall survival.^[4] Approximately 15% of expectant mothers may experience potentially fatal problems that call for specialized treatment, with some needing extensive surgery to survive.^[1]

Pregnancy considered high-risk poses a higher danger to the mother and her foetus than a normal pregnancy, in which there is a greater chance of morbidity or death before or after delivery for the mother, foetus, or new born.^[5] A Pregnancy that is complicated by one or more variables that have a negative impact on the mother, the foetus, or both is considered high-risk.^[6]

The health of women during their pregnancies, deliveries, and postpartum periods is referred to as maternal health. To optimize the health and wellness of women and their infants, each phase should be made pleasurable. Despite significant advancements during the previous 20 years, 287000 women died during or after pregnancy and delivery in 2020. This is an excessively high number. In 2020, the worldwide “maternal mortality ratio (MMR)” stood at 223 for every 100,000 live births. Attaining a global MMR of less than 70 by 2030 will necessitate an annual reduction rate.^[7]

According to WHO, in 2020, approximately 800 women died every day from pregnancy and childbirth related avoidable causes; that equates to one woman dying every two minutes. By 2030, to achieve a reduction in the number of maternal deaths to <70 for every 100,000 live births, in alignment with Sustainable Development Goal (SDG) target 3.1. Maternal mortality ratios decreased by almost 34% globally between 2000 and 2020.^[8]

Maternal mortality rate of India has declined over the years to 103 in 2017-19 from 113 in 2016-18, 122 in 2015-17 with a target of less than 70 by 2030.^[9] The Sample Registration System shows that the MMR dropped from 113 deaths per 100,000 live births between 2016 and 2018 to 103 deaths per 100,000 live births between 2017 and 2019. Majority of maternal deaths occurred in the age group of 20–29 years.^[10]

MMR in Karnataka decreased by 14 points, from 83 for 100,000 live births in 2017–18 to 69 in 2018–20, indicating a considerable decline in the number of women dying after child birth. Karnataka is now among the 8 States in the nation to have substantially surpassed the target of SDG. The State’s MMR has decreased by 16.9 percentage.^[11]

Morbidities and death related to pregnancy are directly correlated with poor maternal health indicators.^[12] The most frequent direct causes of maternal injury and mortality worldwide include infections, high blood pressure, unsafe abortions, obstructed labour, and excessive blood loss. Indirect factors include heart disease, anaemia, and malaria.^[8] The main causes of maternal death in India were pregnancy-related hypertensive disorders (7.0%), severe haemorrhage (47.0%), other pregnancy-related complications (19.6%), infection or sepsis (12.0%), and abortions (5.0%). A comprehensive initiative on reproductive, maternity, new born, child, and adolescent health has been launched in India due to the country's high rates of maternal mortality. Its goal is to address the main causes of maternal fatalities.^[12] Therefore, all pregnancies must be assessed for high risk pregnancy through regular prenatal care from medical specialists.

In high-risk pregnancies, early identification and specialized intensive care can drastically alter the perinatal prognosis. Therefore, it is important to assess every pregnancy to see whether risk factors are present or will arise. Some of the factors that should be considered when assessing the risk for any pregnant woman are age, parity, social class, mothers with a history of chronic disease (diabetes, hypertension, heart disease, etc.) or woman who have a history of previous pregnancy problems (abortion and stillbirth), multiple pregnancies, gestational age under 18 or over 35 years, and pregnancy more than four times.^[6]

It is possible to reduce the occurrence of babies with low birth weight and rates of infant and maternal death by anticipating such situations in advance, planning beforehand, and reducing their severity. The Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), launched in 2016 by the Indian Ministry of Health and Family Welfare, intends to provide all pregnant women in the second or third trimester with

free and excellent prenatal care services at designated health care facilities, ninth of every month. It enhances pregnant women's access to prenatal care everywhere, including in isolated and rural places. By avoiding high risk pregnancy issues, it contributes to the safe birth and healthy life of every mother and child.^[13]

The most common natural pregnancy losses are stillbirth and miscarriage, which have an effect on the mother's physical and mental health. The causes of miscarriages are yet unknown, however factors such as uterine dysfunction, infections, hormone imbalances, comorbidities, advanced maternal age, and atypical parental genetic makeup are associated with a higher chance of pregnancy loss.^[14]

Identifying high-risk pregnancies, their causes, and their problems through high-quality prenatal care contributes to favourable outcomes for mothers, obstetricians, and new-borns. Furthermore, it is crucial to ensure that women identified as being at high risk receive ongoing monitoring through regular check-ups provided by healthcare professionals both at healthcare facilities and during home visits. This is essential for preventing the occurrence of any complications for the mother or the foetus. In addition to follow-up care, improving the outcome of pregnancy also necessitates adequate laboratory studies and referral services. The type of high-risk pregnancy that expectant moms experience has an impact on the outcome prediction. Therefore, identifying the type of high risk factor early in pregnancy can help to guide the right intervention strategies for expectant mothers.^[4] Most of the previous studies are either cross sectional or record based, hence the present study was undertaken as a longitudinal study to know the outcome of high-risk pregnancy among pregnant women residing urban field practice area, Belagavi.

OBJECTIVES

Primary Objective: To study the outcome of high-risk pregnancy.

Secondary Objective: To study risk factors associated with high risk pregnancy.

REVIEW OF LITERATURE

A longitudinal follow-up study was undertaken with 112 high-risk antenatal mothers from a primary healthcare centre in Andhra Pradesh, spanning from April 2021 to February 2022. Study revealed that anaemia prevalence among “high-risk” pregnant women was 82%. Among these women, 31% were categorized as having intermediate risk, 73% belonged to the upper middle class, and 57% underwent normal delivery. A small proportion (2.5%) underwent medical termination of pregnancy (MTP), while 39% experienced mild anaemia, 23% had moderate anaemia, and 20% had severe anaemia.^[15]

A longitudinal investigation conducted in Belagavi, Karnataka on 147 pregnant women who were attending health camps on PMSMA day during 2016-2017. Out of 147 participants, 40.4% exhibited low-risk scores, high-risk scores were seen in around 45.9%, and severe risk score were seen in around 13.7% according to the modified Coopland’s high risk pregnancy scoring system. Approximately among pregnancies with high risk 29.5% ended up in adverse foetal outcomes. Notably, when Coopland’s score increased within the “high risk” group, the likelihood of positive foetal outcomes diminished significantly, indicating a notable association. The study cohort comprised women aged 16 - 45 years, with the majority (60.5%) falling within the 20 - 25 years age bracket. Additionally, 21.1% were aged between 26 - 29 years, 11.6% were over 30 years old, and 6.8% were 19 years or younger. In terms of pregnancy outcomes, there were 145 new-borns (including 3 abortions and 2 sets of twins), with 77 (53.1%) being male and 68 females (46.9%). Among the deliveries, 95 (65.1%) were through normal vaginal delivery, while 51 (34.9%) were by Caesarean section. The majority of mothers (63.7%) opted delivery at private hospitals, whereas Government hospitals opted by only 35.6% and home delivery opted by one woman

(0.7%). When comparing outcomes, 70.5% of the pregnancies with high risks resulted in favourable foetal outcomes, while 43 (29.5%) had unfavourable outcomes.^[13]

A prospective study conducted in Kerala, involving 300 high-risk pregnant women, during 2019-2020 revealed the following risk distribution: 14.66% as high risk, 19.66% as moderate risk, and 65.66% as low risk. Incidence of preterm births was 27.27% among the high risk group, 16.94% in the moderate risk group, and 12.18% among the low risk group; however, these differences were not statistically significant. The study recorded 4 perinatal deaths, with 1 occurring in the moderate-risk group and 3 in the high-risk group. Among these deaths, 2 were cases of intrauterine foetal death and 2 were early neonatal deaths due to complications arising from prematurity. With a statistically significant p-value of less than 0.0001, operational delivery was necessary in 65.90% of instances in the 'high risk' group compared to 25.36% in the 'low risk' group. Furthermore, a p-value of 0.024 indicated a substantial requirement for surgical delivery in the moderate-risk group.^[16]

In a similar longitudinal study conducted in Telangana in 2018, Researchers looked through the medical records of 569 pregnant women who went to a rural health center connected to a tertiary care institute. The study revealed that over half of the expectant mothers (51%) were aged between 20 and 25 years, while approximately 9% were adolescents. Additionally, 64% of the pregnant mother were experiencing multigravida pregnancies, and 60% were multiparous. Based on the kind and style of delivery, obstetric outcomes were assessed; most (79%) of the cases were term births. Spontaneous vaginal delivery was the most common mode (69%), followed by LSCS (29%). Neonatal outcomes were evaluated concerning the child's status and birth weight. Among the obstetric outcomes, delivery method was

significantly linked to high-risk pregnancies, with preterm delivery being 35% more prevalent among high risk pregnancies in comparison with normal ones. Additionally, 5% of high-risk pregnancies led to low-birth weight babies, while around 5% ended in abortions and only 2% in stillbirths, with a statistically significant p-value of 0.004. Post-term delivery was similarly linked to high-risk pregnancies. Regarding neonatal outcomes, 'High risk' pregnancies were associated with a higher prevalence of low birth weight new born than normal pregnancies.^[1]

In a retrospective cohort study spanning from 2013 to 2018 and conducted among pregnant women in Haiti, a total of 31,509 women and 24,983 deliveries were analysed. Among these, 204 maternal deaths (0.6% of women giving birth), equivalent to a MMR of 648 per 100,000 women giving birth, were recorded. Additionally, 1,962 stillbirths (7.9% of deliveries) and 11,008 low birthweight neonates (44.1% of deliveries) were identified. Among all admissions, 10,991 (34.9%) were women diagnosed with (pre-)eclampsia. The study found that the risk of maternal death was significantly elevated with caesarean section among pregnant women with complication and those with (pre-)eclampsia. However, it minimizes the likelihood of still birth in these same populations. Furthermore, not attending antenatal care was associated with a significantly higher risk of stillbirth and low birthweight among women with complicated pregnancies.^[17]

A cohort study conducted in Nepal among 700 women during 2020 revealed that, the percentages of low, high, and extremely high risk were 67.3%, 20%, and 12.7%, respectively. The rates of LSCS were notably higher in the extremely 'high risk' group (89.9%) and high-risk group (77.9%) compared to the low-risk group (51%). Extremely high risk and 'high risk' pregnancies were associated with increased maternal complications, greater total blood loss, and longer durations of

hospital stays. Compared to low risk pregnancies (15%), LBW new-borns were more common in extremely high-risk pregnancies (60%). Furthermore, 32% of infant born to extremely risk group required admission to a NICU, which was significantly elevated than those born to low risk and high-risk category. There was also increased perinatal mortality rates among extremely 'high risk' category.^[18]

A cross sectional study done in Nashik, India among 9307 pregnant women during 2017-2018 found that prevalence of adverse maternal outcome was 4.1% Abortions were 1.7% still birth and preterm birth in 4.1%, low birth weight occurred in 13.2%. Risk factors associated with abortion were pre-existing illness, heavy work etc. Consanguinity, tobacco consumption during pregnancy and pre-existing illness was identified as a contributing factor for still birth.^[19]

A longitudinal study conducted in Chennai from 2011 to 2012 revealed that among 99 high-risk antenatal cases, 46.4% were primigravidae, 53.6% were multigravida, and 83.8% belonged to a low socioeconomic status. Around 62.9% of patients hailed from rural backgrounds, with 67.3% falling within the age range of 15-25 years compared to other age groups. The most prevalent associated medical disorder was anaemia, affecting 61.6% of the study group. Within this group, 48.5% had mild anaemia, 8.1% had moderate anaemia, and 5.1% had severe anaemia. It was noted that LSCS (Lower Segment Caesarean Section) was significantly more common among multiparas than primiparas. Out of 82 LSCS cases, 51% underwent emergency procedures. Maternal morbidity post-delivery occurred in 21 cases, presenting as puerperal pyrexia, urinary tract infections, wound sepsis, postpartum haemorrhage, and deep vein thrombosis. Additionally, 69 babies weighed more than 2.5 kg at birth. The neonatal mortality rate stood at 10.1 for every 1000 live births, while the stillbirth rate was also 10.1 per 1000 live births.^[2]

In a cohort study conducted in Nepal, involving 346 pregnant women at gestational weeks 28–32, researchers discovered that 14.4% of participants experienced high-risk pregnancies. Utilizing a color-coded risk classification system, 7.5% were identified as red, 6.9% as yellow, 72.0% as green, and 13.6% as white. Notably, women with high-risk pregnancies were found to have a 4.2-fold increased likelihood of developing severe maternal morbidity during labour and delivery.^[20]

A study conducted in Saudi Arabia between 2016 and 2018 included 533 pregnant women. Among them, 298 (55.9%) were categorized as having low antenatal risk scores, 185 (34.7%) had moderate-risk scores, and 50 (9.4%) had high-risk scores. Analysis of maternal characteristics revealed that high-risk mothers tended to be older and had higher gravidity, parity, and abortion rates compared to those with pregnancies of low or moderate-risk. Neonates born to high-risk mothers were more frequently male and exhibited lower gestational ages and birth weights. Although there were no instances of maternal mortality, high-risk mothers underwent more LSCS and had longer hospital stays compared to those with low and moderate-risk groups. Additionally, there was a notable trend towards increased stillbirths. Neonatal outcomes demonstrated significantly elevated rates of neonatal mortality, admission to the NICU, occurrence of congenital anomalies, and longer hospital stays among neonates born to high-risk mothers.^[21]

A longitudinal study focusing on high-risk pregnancies and their outcomes was conducted at a rural primary health center in Puducherry in March 2018. The study spanned five years, from 2013 to 2017. Analysis of records revealed that out of 569 antenatal cases, 55.3% belonged to 20 to 25 age range, 81.4% hailed from families living below the poverty line. Most (74.3%) of them enrolled in the first trimester of their pregnancy. Among participants, 18.3% of pregnancies were high

risk. Maternal age was the main factor contributing to high-risk pregnancies; 6.2% of these pregnancies were due to younger (age <20 years) primigravidae or elderly (age >35 years) gravidae. Other contributing factors included hypertension disorders in pregnancy (3.1%), gestational diabetes mellitus (1.9%), severe anaemia (1.7%), previous history of LSCS (1.6%), twin or multiple pregnancies (1.4%), hypothyroidism (1.4%), Rh incompatibility (1.0%), and bad obstetric history (0.5%). The majority (81.9%) experienced term deliveries. Regarding the outcomes for the foetus and new born, vaginal births accounted for 73.9% of deliveries; LBW newborns made up for 10.4% of the total, while stillbirths accounted for 1.7%. Socioeconomic status, parity, and unfavourable outcomes like preterm birth, low birth weight, and post term birth were linked to high-risk pregnancies.^[4]

In a descriptive study focusing on high-risk mothers from both the five least and five best-performing PHCs in Bhavnagar district, conducted between March 2017 and August 2018, it was noted that among high-risk mothers in the least performing PHCs, the most prevalent risk factor was anaemia (66.7%), followed by poor obstetric history and multiparity (31.1% each). Similarly, in the best-performing PHCs, anaemia remained the predominant risk factor (44.4%), followed by previous caesarean section (33.3%). Furthermore, it was seen that 60% of high-risk mothers in the least performing PHCs and 44.4% in the best performing PHCs had multiple risk factors.^[22]

Among 105 pregnant women who visited ANC clinics in the Kinaye PHC of Belagavi district, Karnataka, during 2018, a cross sectional study found that 31.4% of the participants were high risk, 30.5% were moderate risk, 29.5% were low risk, and 8.6% were 'no risk'. One important factor that has been linked to high-risk pregnancies is maternal undernutrition. Of the 24 underweight participants, 58.33%

were classified as intermediate risk and 33.33% as high risk ($p < 0.05$). This indicates a statistically significant relationship between risk status and underweight BMI. Additionally, Risk status and hyperthyroidism were found to be statistically significantly correlated; all individuals with hyperthyroidism were categorized as high risk ($p < 0.05$). However, this finding should be regarded cautiously because there were only two participants with hyperthyroidism. There were no statistically significant correlations discovered between risk status and hypothyroidism, gestational diabetes mellitus, or the first trimester of pregnancy. Additionally, there was a statistically significant positive association discovered between the risk score and hyperthyroidism and a statistically significant negative correlation between the risk score and BMI. Nonetheless, no statistically significant associations were found between the risk score and the following conditions: hypothyroidism, gestational diabetes mellitus, or trimester.^[23]

A prospective study conducted in Surat, comprising 100 high-risk and 100 low-risk caesarean cases, revealed that 42% and 30% of the study and control groups, respectively, experienced the birth of low-weight babies. In the high-risk group, neonatal mortality was recorded at 3%, while in the control group, it remained at 0%. Furthermore, 38% of infants in the study group and 17% in the control group exhibited mild to severe depression.^[24]

A study conducted at the Department of Obstetrics and Gynaecology in Jodhpur from January to June 2016 revealed that out of 10,172 delivered patients, 1,014 cases (9.96%) were referred. Among these cases, 9 maternal mortalities occurred, and 8 patients were transferred to other specialties for further management of respective complications. Additionally, 183 patients (18.04%) required admission to the ICU. The most prevalent cause of maternal morbidity was anaemia, affecting

188 cases (51.09%), followed by PPH in 67 cases (18.20%), and vaginal wall tear in 58 cases (15.77%).^[25]

A hospital-based cross-sectional study conducted in Ethiopia in 2016 revealed that approximately 77% of mothers experienced a normal maternal birth outcome and were discharged without complications. The most common complication, occurring in 11% of cases, was postpartum haemorrhage (PPH), while about 4.2% developed postpartum sepsis. Additionally, 7.5% sustained genital and urinary tract injuries. According to multivariate logistic regression analysis, attending antenatal care (ANC) during the index pregnancy was significantly associated with positive maternal birth outcomes. Adequate preparedness for childbirth and its complications, as well as the preference for healthcare facility for labour and delivery, were also linked to favourable maternal birth outcomes. Conversely, delivery modes other than spontaneous vaginal delivery were seen to be protective against adverse maternal birth outcomes.^[26]

A community-based descriptive study was conducted in a rural area of Nagpur, Maharashtra, during 2014-2015 to investigate the outcomes of pregnancy in cases deemed as high risk. Among the 214 pregnant women included in the study, who were at least 20 weeks into gestation, a prevalence of “high risk” pregnancy was noted at 33.64%. Among these, 142 (66.36%) had low-risk pregnancies, lacking known risk factors. The distribution of these risk factors included a history of caesarean section in 31 (14.49%) cases, malpresentation among 17 (7.94%), teenage pregnancy in 14 (6.54%), and various other factors like, oligohydramnios, height \leq 140cm, and weight \leq 40kg, each at 6 (2.80%) occurrence. There were 4 (1.87%) cases each of past incidents of stillbirth and related illnesses. Gestational diabetes, maternal age over 30 in primigravida, prolonged pregnancy, in two (0.93%) of the cases, there was an

occurrence of congenital abnormalities and a history of multiple abortions. One instance (0.47%) had a history of both severe anaemia and ectopic pregnancy. Babies weighing less than 2,500 grams at birth and caesarean sections were substantially linked to high-risk pregnancies. Additionally, caesarean section was strongly linked to previous caesarean delivery and maternal height ≤ 140 cms. Oligohydramnios and history of LSCS were strongly linked with pregnancy outcomes, particularly low birth weight.^[3]

A study carried out in rural Belagavi, involving 600 women attending antenatal clinics, during 2016 revealed that 30.7% of them were identified as 'high-risk' pregnancies. Among these, 59.8% had a history of adverse obstetric events, 4% experienced PIH, 5.5% were elderly gravida, 3.2% had Rh negative, and 22.3% had other risk factors. The study found significant associations between age at conception and the pregnant woman's parity and education status of pregnant women.^[6]

In a prospective cross-sectional study conducted in Puducherry involving 60 high-risk pregnancies, the findings indicated that a significant portion experienced anaemia (25, 35.21%), while PIH was present in 15 (25%) and gestational diabetes in 10 (14.8%) cases. Concerning perinatal outcomes, the majority of babies (44, 73.3%) had a birth weight more than 2.5kg. The study reported a neonatal mortality rate of only 1.7%. Regarding the relationship between high risk pregnancy and weight of baby at birth, the results showed no significant relationship. Notably, most mothers received adequate care, including treatment for pre-pregnancy anaemia. Initiating interventions aimed at educating mothers about the importance of antenatal check-ups and addressing maternal and foetal health can potentially reduce perinatal complications.^[5]

A prospective study done in central India over one-year period involved 415 randomly selected pregnant women. The findings revealed that 96 (59%) were categorized as High Risk, 191 (46%) as Low risk, and 128 (31%) as No risk. Among the High-risk group, 59 experienced perinatal deaths, resulting in a notably high perinatal mortality rate of 614 for every 1000 live births. Perinatal mortality rates were particularly elevated (38.4% and 33%) among mothers lacking formal education and those with a household monthly income below Rs. 500, respectively. This was attributed to increased risks of anaemia, inadequate maternal weight gain, intrauterine growth retardation, and preterm labour associated with lower socioeconomic status and educational levels. Observations revealed that 38.4% of perinatal mortality occurred among uneducated mothers, while 20.1% occurred among those with some level of education. Pregnancy-induced hypertension (PIH) emerged as a prevalent complication, affecting 16.6% of cases and contributing to 36.2% of perinatal mortality. PROM was another significant factor, accounting for 36.3% of perinatal deaths due to its association with increased rates of infections. Meconium presence was noted in 9.6% of cases, resulting in a mortality rate of 40%, primarily due to infections. The highest perinatal death rate (55.5%) was observed among foetuses weighing less than 1.5 kg, with a considerable rate (32.4%) between 1.5 to 2.5 kg. A higher incidence (28.9%) of LBW babies was evident among mothers with underlying risk factors. Similar trends were observed in cases of gestational age less than 34 weeks. Once neonatal complications like respiratory distress set in, the chances of survival significantly decreased, as evidenced by the high perinatal mortality rate (59%) in the study. Hypothermia emerged as a critical determinant of neonatal outcomes, with neonates exhibiting temperatures below 35.5°C experiencing a

mortality rate of 68%. Although major congenital anomalies were rare (constituting only 1.4%), they were universally fatal, resulting in 100% mortality.^[27]

A prospective analytical study conducted in Telangana from January to June 2016 involved 200 pregnant women, revealing a noteworthy association between poor perinatal outcomes and high-risk pregnancies as determined by a specific scoring system. Twenty percent of the cases fell into the high-risk category, with 32.5% of them experiencing maternal complications. The study identified a significant link between high risk scores and both birth asphyxia and perinatal mortality. Perinatal mortality was exclusively observed in the high-risk group, with four cases resulting in one intrauterine death, two stillbirths, and one early neonatal death, yielding a perinatal mortality rate of 100 per 1000 live births in this group. Perinatal complications were less prevalent, occurring in only 11.5% and 15.3% of the low and moderate-risk groups, respectively. The high-risk group exhibited a 30% occurrence of birth asphyxia. Women with a risk score of ≥ 6 faced significantly elevated risks of perinatal mortality ($p = 0.0003$) and birth asphyxia ($p = 0.0005$). Maternal complications were observed in 32.5% of high-risk cases.^[28]

A prospective descriptive study, carried out in Khammam from August 2007 to August 2009, examined 100 cases each of high-risk and low-risk caesarean deliveries, focusing on perinatal outcomes. According to the study, 28% of the low risk group and 40% of the high-risk group gave birth to low weight babies. In the high-risk group, 2% experienced neonatal mortality, whereas this rate was 0% in the low-risk group. Perinatal morbidity, including prematurity, intrauterine growth restriction, birth asphyxia and respiratory distress syndrome affected 42% of babies in the group at high risk and 12% in the group at low risk. Poor perinatal outcomes were reported in 7% of cases in both the study and control groups.^[29]

A descriptive study conducted at Kanchipuram, Tamil Nadu among 100 pregnant women published in 2016 found that 55% of pregnant women had low risk ,20% of pregnant mothers had moderate risk and 25% had high risk by using modified Hobel's high risk pregnancy risk assessment scale. There was a significant association between age, occupation, education and family income of antenatal mothers with the prevalence of high-risk pregnancy.^[30]

MATERIALS AND METHODS

Source of Data: 130 high-risk pregnant women who visited two UHCs' prenatal clinics provided data for the study.

Study Design: A Longitudinal study

Study Period: The research was carried out from October 1, 2022, to September 30, 2023, a duration of one year.

Study population: All high-risk antenatal mother attending Antenatal Clinics at two Urban Health Centers Ashok Nagar and Rukmini Nagar.

Sample Size: Total population of Rukmini Nagar- 64405

Birth rate- 18

Number of expected pregnancies = Population \times Birth rate/1000+10% of wastage

$$= 64405 \times 18/1000 + 116 = 1276$$

Out of these 15% are high risk = $15/100 \times 1276 = 190$

Expected High-risk ANC in a 1year period in Rukmini Nagar=190

For 6 months = $190/2 = 95$

Total population of Ashok Nagar- 24104

Birth rate- 16

Number of expected pregnancies = $24104 \times 16/1000 + 42 = 460$

Out of these 15% are high risk = $460 \times 15/100 = 69$

For 6 months = $69/2 = 35$

Total expected number of high-risk ANC = 35+95 =130 were covered in the current research.

Sampling technique: Universal sampling

Inclusion Criteria: All high-risk pregnant women who are residing in urban area Ashok Nagar and Rukmini Nagar who attended PMSMA camp or ANC clinics of UHCs

Exclusion Criteria: All normal pregnancies

Data collection procedure: High risk Expectant mothers who visited the PMSMA prenatal clinic at two UHCs were made aware of the study's purpose. PMSMA is the initiative which aims to ensure that comprehensive antenatal services are provided to pregnant women at designated health facilities by Obstetricians/ medical officers, and is conducted on ninth of every month.^[31]

After obtaining written informed consent, study participants were enrolled in the study irrespective of their gestational age, were interviewed and examined. A predesigned, pretested questionnaire was used for data collection. Data was collected regarding sociodemographic variables, educational status occupational status, income, obstetric history, and high-risk factors according to PMSMA guidelines. They also underwent a clinical examination, and anthropometry data, including weight, height, and other details, was gathered. Pregnant high-risk participants who attended the ANC clinic or PMSMA camp were monitored each month until birth. Follow-up was done every month from their date of enrollment till delivery.

The following were considered as high-risk ANCs according to PMSMA guidelines.

“Haemoglobin level less than 7 g/dl - Severe anaemia, pregnant women with syphilis or HIV positive, hypothyroidism (TSH normal levels in the first, second, and third trimesters are 0.1–2.5 mIU/L, 0.2–3 mIU/L, and 0.3–3 mIU/L), PIH / preeclampsia/ preeclampsia toxemia, GDM(glucose challenge test \geq 140 mg/dl), twin or multiple pregnancy, mal presentation, previous lower segment caesarean sections, Ages <20 years old for younger primi or >35 years old for elderly gravida, Bad obstetric history including stillbirth, preterm birth, congenital anomaly, abortion and obstructed labour, etc, Rh negative, low lying Placenta/ placenta previa, pregnant women with any other systemic illness”^[4,32]

Modified Coopland high risk scoring system was used to identify risk factors related with high risk pregnancy. By summing the values of all high-risk factors included in the scoring system, high risk pregnancy was categorized based on severity.^[33,34] Among predictor variables were reproductive history such as age, number of pregnancies (parity), and history of poor obstetric outcomes, along with the mother's medical and surgical conditions, and any complications during the current pregnancy etc. Each high-risk factor was assigned a numerical value based on its severity. The total score, which was the sum of these values, classified the pregnancy risk as follows: "low risk" for scores of 0 to 3, "moderate risk" for scores of 4 to 6, and "high risk" for scores of 7 or more.^[33] The pregnancy outcome was evaluated on the 8th day after delivery, and information regarding maternal complications and perinatal morbidity and mortality was recorded. The outcome was assessed as an adverse maternal outcome^[26] and adverse foetal outcome.^[13]

Parameter		Score	
Risk factor	Age	<18	2
		18-35	0
		>35	2
	Parity	0	1
		1-4	0
		>5	2
Medical/Surgical conditions	Chronic Hypertension		2
	Pregestational Diabetes Mellitus		2
	Chronic Renal Disease		2
	Heart Disease (NYHA- III or IV)		3
	Heart Disease (I or II- NYHA)		1
	Past surgery- gynaecological		2
	Other significant medical illnesses- TB, Asthma, Epilepsy, Autoimmune disease		1-3 based on severity
Past obstetric history	History of infertility		1
	History of 2 or more first trimester abortions		1
	History of second trimester abortions		2
	Previous child birth weight <2.5 kg or >4 kg		1
	Past LSCS		1
	PPH history or Manual removal of placenta		1
	Prior still birth or New born demise		3
	Difficult labour/ Prolonged		2
	Preeclampsia/ Gestational hypertension		2
	Eclampsia		3

	Gestational diabetes	2	
Present pregnancy conditions	Bleeding before 20 weeks of gestation	1	
	Bleeding after 20 weeks of gestation	3	
	Anaemia	Hb 6.-10 g%	1
		Hb <6.g%	2
	Rh isoimmunisation	3	
	Malpresentation at term	3	
	Multiple pregnancy	3	
	Hypertension	2	
	Eclampsia	3	
	Gestational diabetes	2	
	Placenta praevia	2	
	PROM	2	
	PPROM	3	
	Polyhydramnios (amniotic fluid index >24)	2	
	Oligohydramnios (amniotic fluid index <5)	2	
	IUGR (foetal weight <10 th centile for gestational age)	3	
	Abnormal Doppler	3	
	Modified Coopland's score		
Total score	"Low risk"	0-3	
	"Moderate risk"	4-6	
	"High risk"	>7	

Statistical analysis

Data was coded and then entered into an Excel sheet. The data was analysed using SPSS version 22.0, a statistical package for social sciences. The means and standard deviations of numerical variables were examined. Categorical data regarding socio-demographic factors and prevalence of various high-risk factors. Data was analyzed using percentages and chi-square test. Factors affecting the outcome of high-risk pregnancy were also studied. A pilot study was done before the start of the study to see the feasibility of the questionnaire. Less than 0.05 was regarded as a significant probability value (p-value).

Ethical clearance

The Jawaharlal Nehru Medical College, Belagavi Institutional Review Board granted ethical clearance. Informed consent was taken from all the participants.

Definition of variables

1. Age

Age was calculated to the closest finished year, as per information given by the study subjects

2. Education status

- a. Illiterate – Never attended school
- b. Primary school – Having studied up to 7th standard
- c. High school – Having studied at least until 8th standard but not beyond 10th standard

d. PUC – Having studied at least until 10th standard but not beyond 12th standard

e. Graduation – Having studied beyond 12th standard

3. Occupation ^[35]

- Housewife – A woman who takes care of the household day to day duties.
- Agriculturist – A person who works in the farm/field.
- Employee – A person who employed for wages or salary
- Laborer – A person doing unskilled work for wages
- Self-employed – A person who is working on freelance or the owner of a business rather than for an employer

4. Type of Family ^[36]

Nuclear family- Household, where married couple along with their dependent children live in the same house.

Joint family- Household, where a large number of married couples live together with their kids in the same home. Males are blood relatives and females of the family are related by either marriage or blood relation

5. Socio-Economic Status

For the year 2022, data on per capita income (in Rupees per month) was gathered, and the Modified B. G. Prasad's categorization was used to classify socioeconomic category. ^[37] The B.G. Prasad's scale was first introduced in the year 1961. It was calculated by considering the base Consumer Price Index (CPI) as 100

for the year 1960. It was later modified by introducing the Linking Factors 4.63, 4.93, 2.88 for the year 1982, 2001 and 2016 respectively as given by the Labor Bureau.

Consumer Price Index (IW) for January 2022 was 125.1

$$\begin{aligned} \text{Multiplication factor} &= \text{Current CPI (125.1)/Base index value in 2016 (100)} \\ &= 1.251 \end{aligned}$$

The new income value is calculated using the following equation:

$$\text{New income value} = \text{Multiplication factor (MF)} \times \text{Old income value} \times 4.63 \times 4.93 \times 2.88.$$

Upon substituting the values in the equation, the updated ranges for January 2022 were calculated as shown below.

Per capita income was classified using Modified B G Prasad's classification.

Socio Economic Classes	Original B.G Prasad's classification (1961)	Revised BG prasad's classification for January 2022
I	100 and above	8220 and above
II	50-99	4110-8219
III	30-49	2465-4109
IV	15-29	1230-2464
V	Below 15	Below 1230

Values mentioned as per capita income/month in INR, rounded off to nearest ₹10/

6. Anaemia: ^[38]

When a person's haemoglobin (Hb) level falls below the lower bound of the normal range for their age and sex, they are said to have anaemia.

Grading of anaemia in pregnancy according to WHO criteria

Haemoglobin (g%)	Anaemia
>11.0	No anaemia
10.0-10.9	Mild anaemia
7.0-9.9	Moderate anaemia
<7.0	Severe anaemia

7. Height ^[39]

The participant was instructed to stand upright, without shoes, with their arms falling down by their sides, their back, buttocks, and heels all contacting the wall. From the head to the heel, the height was measured. The corresponding reading was determined to the closest cm using a measuring tape.

8. Weight ^[39]

A standard portable adult weighing machine was used to measure body weight, with no shoes and with the least amount of clothing, to the nearest 0.1 kg. This machine was standardized on a regular basis during the study. Every session began with the scale reset to zero, and the weight was recorded in kilo

9. BMI

Body Mass Index (BMI in Kg/m²)

Body mass index was computed as follows:

BMI = Weight (Kg) / Height (Meter²)

BMI is classified for Asians as:^[40]

BMI	Status
<18.5	Underweight
18.5 to 22.9	Normal
23 to 24.9	Overweight
≥25	Obese

10. Blood pressure measurement:

During the investigation, every study participant had their blood pressure taken with a mercury sphygmomanometer. Standard protocols were followed, with the first approach being palpatory and the second being auscultatory. After the participant had rested in a sat position for at least five minutes, both blood pressure readings were taken. Every subject's left arm was used to take their blood pressure using a cuff that was the proper size and level with the heart. The participant's blood pressure was determined by averaging two measurements of the systolic and diastolic pressures. A third reading was taken, and the average of the three measurements was used when the two values were different by more than 10 mm Hg. Subjects categorized according to blood pressure levels, were divided into

“Normotensives” or “Hypertensives” according to their blood pressure readings.

Hypertensives: Blood pressure with a diastolic of 90 mm Hg and a systolic of 140 mm Hg or higher.

Normotensives: Systolic blood pressure less than 140 mm Hg and Diastolic blood pressure less than 90 mm Hg.

RESULTS

I. SOCIO-DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

Table 1. Distribution of participants according to their age (n=130)

Age in group	Frequency	Percentage
15-19	2	1.6
20-24	53	40.8
25-29	52	40
30-34	18	13.8
>35	5	3.8
Total	130	100

Mean age of the study participants was 25.86 years, with a standard deviation of 3.9 years. In our study, out of 130 pregnant women, there were 2 (1.6%) in the 15–19 age group, 53 (40.8%) in the 20–24 age group, and 52 (40%) in the 25–29 age group. 18(13.8%) were in the age group 30-34 and 5(3.8%) were older than 35 years.

Graph 1: Distribution of participants according to age (n=130)

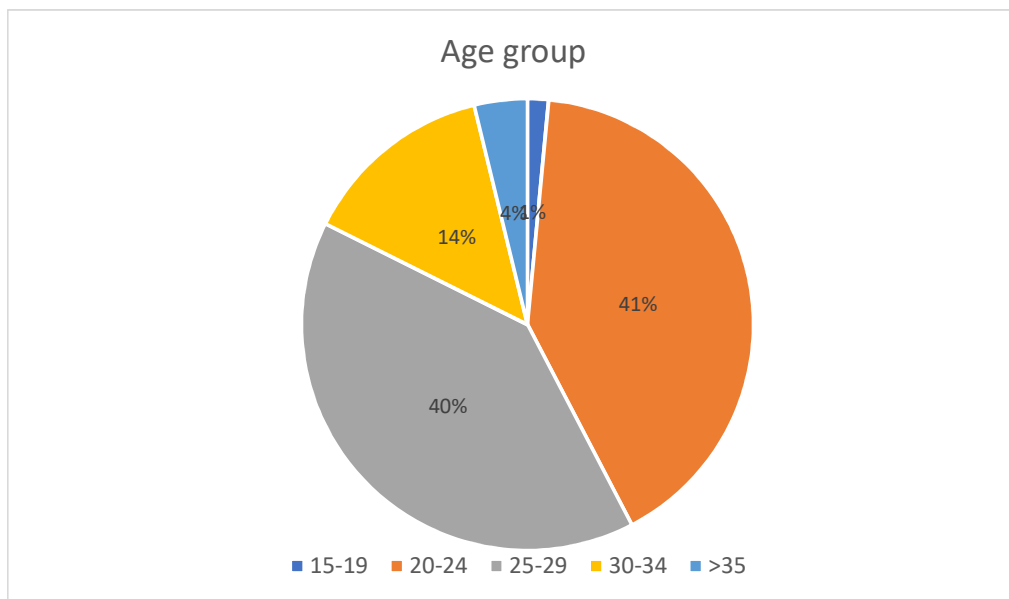


Table 2. Distribution of participants according to their religion (n=130).

Religion	Frequency	Percentage
Hindu	20	15.4
Muslim	108	83.1
Others*	2	1.5
Total	130	100

*Others includes Christian, Jain etc

In the present study, majority of study participants, 108 (83.1%) were Muslims, while 20 (15.4%) were Hindus, and 2 (1.5%) belonged to other religions like Christian, Jain.

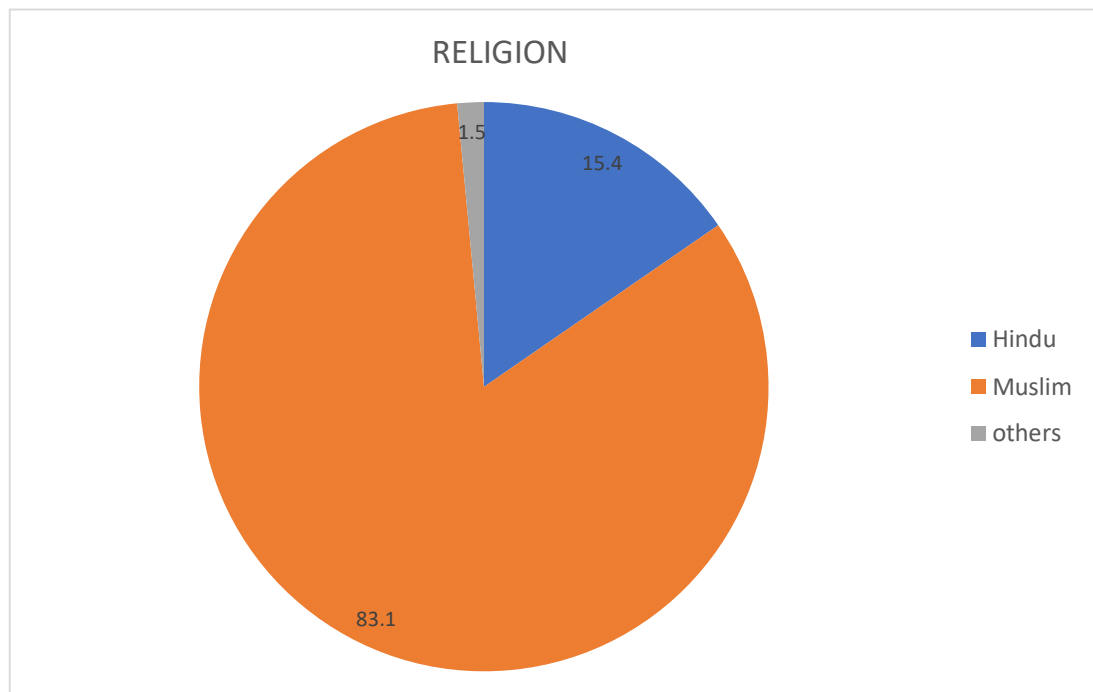
Graph 2. Distribution of participants according to religion (n=130).

Table 3. Distribution of participants as per their literacy status. (n=130).

Education of wife	Frequency	Percentage
Illiterate	5	3.8
Primary	21	16.2
Secondary	68	52.3
Higher Secondary	15	11.5
Graduate/pg.	21	16.2
Total	130	100

In the present study, 5 participants (3.8%) were illiterate, 21 (16.2%) had completed primary education, 68 (52.3%) had completed secondary education, 15 (11.5%) had completed higher secondary education, and 21 (16.2%) were graduates.

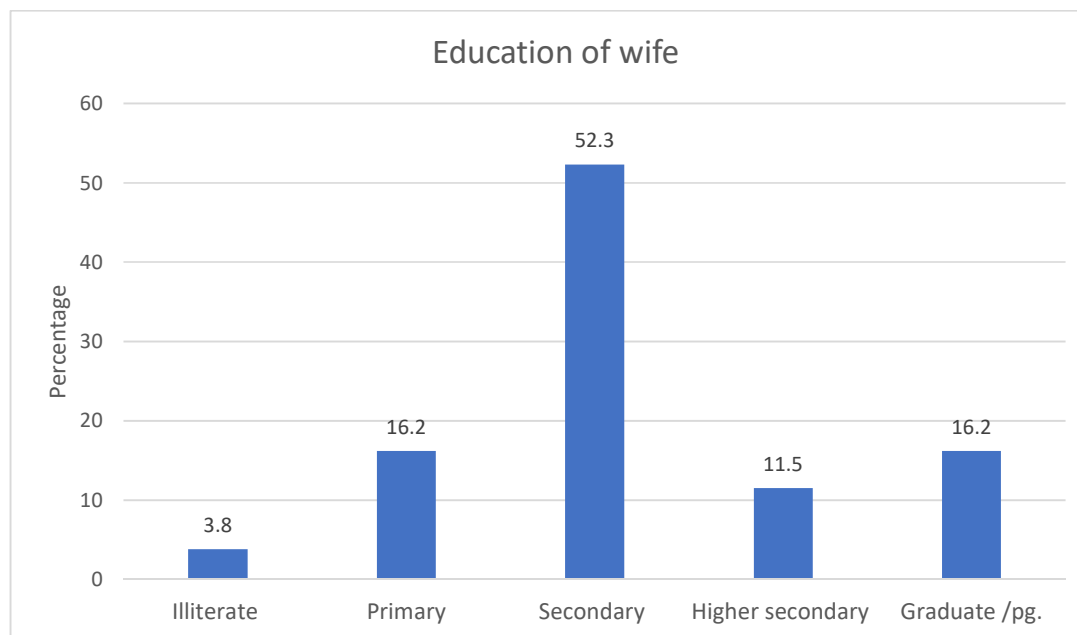
Graph 3. Distribution of participants as per their literacy status (n=130)

Table 4. Distribution of participants according to their occupation(n=130)

Wife occupation	Frequency	Percentage
House wife	123	94.6
Employee*	4	3.1
Labourer	1	0.8
Self employed	2	1.5
Total	130	100

*Employee – Includes professional, technical, managerial, clericals, sales

In this study, 123 participants (94.6%) were housewives, 4 (3.1%) were employees, 1 (0.8%) was a labourer, and 2 (1.5%) were self-employed.

Graph 4. Distribution of participants according to their occupation(n=130)

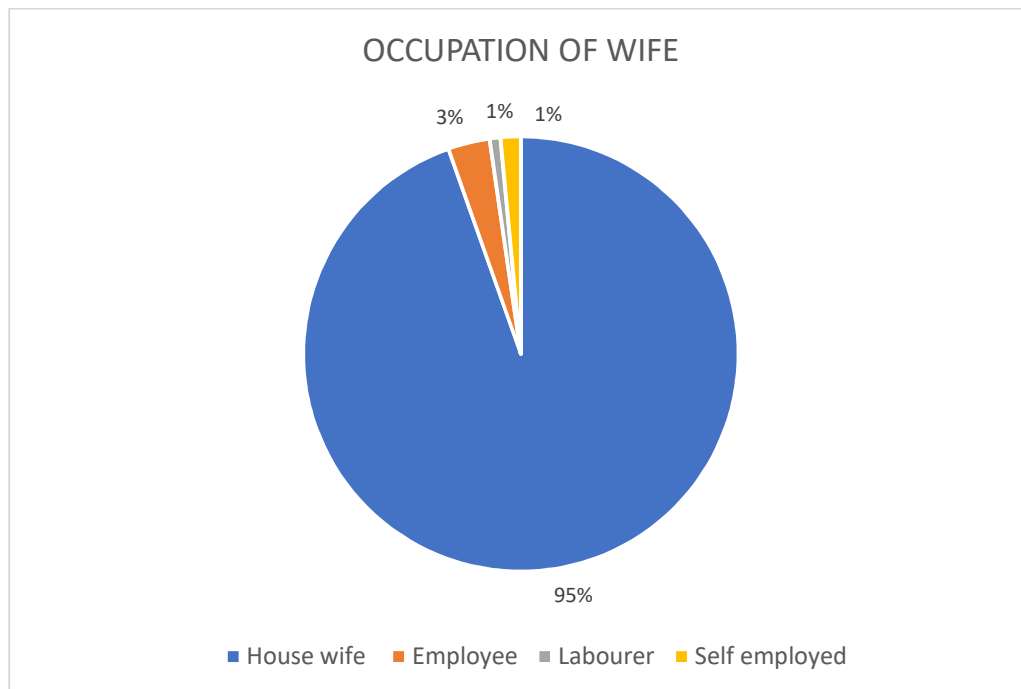


Table 5. Distribution of participants according to education of the Husband (n=130)

Education of husband	Frequency	Percentage
Illiterate	2	1.5
Primary	26	20
Secondary	70	53.8
Higher Secondary	7	5.4
Graduate/pg.	25	19.3
Total	130	100

Out of 130 participants, 2 (1.5%) were illiterate, 26 (20%) had completed primary education, 70 (53.8%) had completed secondary education, 7 (5.4%) had completed higher secondary education, and 25 (19.3%) were graduates.

Graph 5. Distribution of participants according to education of Husband (n=130)

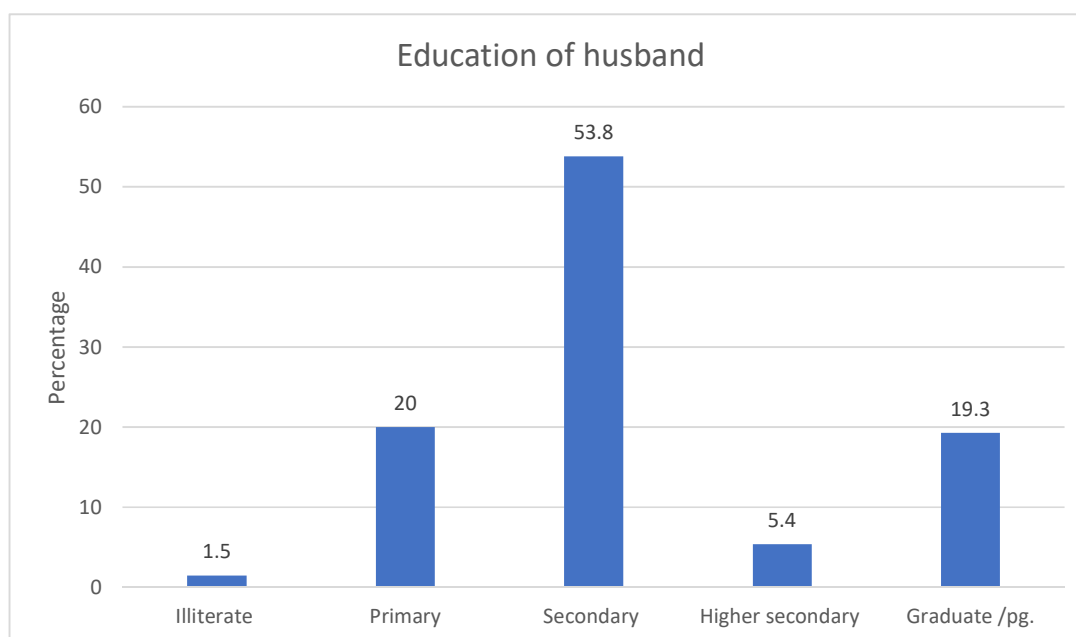


Table 6. Distribution of participants according to occupation of Husband. (n=130)

Occupation	Frequency	Percentage
Farmer	1	0.8
Employee*	38	29.2
Labourer	65	50
Self-employed	26	20
Total	130	100

*Employee – professional, technical, managerial, clericals, sales

Out of 130 participants, 1 (0.8%) was a farmer, 38 (29.2%) were employees, 65 (50%) were laborers, and 26 (20%) were self-employed.

Graph 6. Distribution of participants according to occupation of Husband. (n=130).

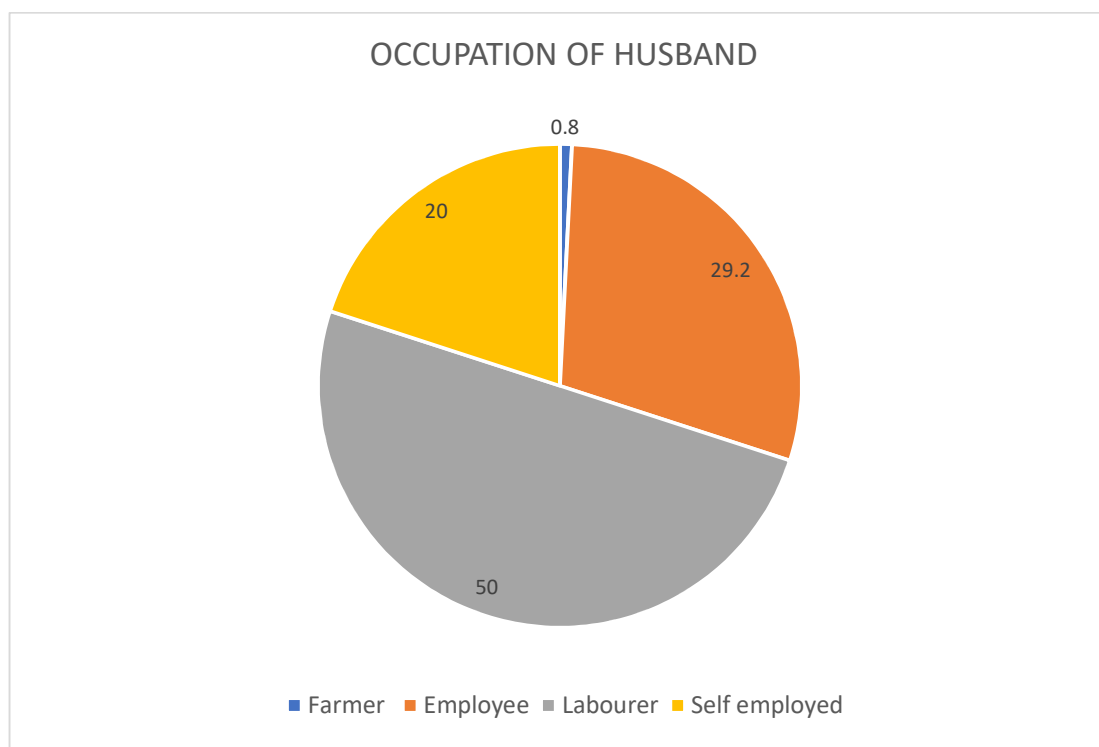


Table 7. Distribution of participants according to type of family (n=130).

Type of family	Frequency	Percentage
Joint	99	76.2
Nuclear	31	23.8
Total	130	100

Among the 130 study participants, 31 (23.8%) belonged to nuclear families, while 99 (76.2%) belonged to joint families.

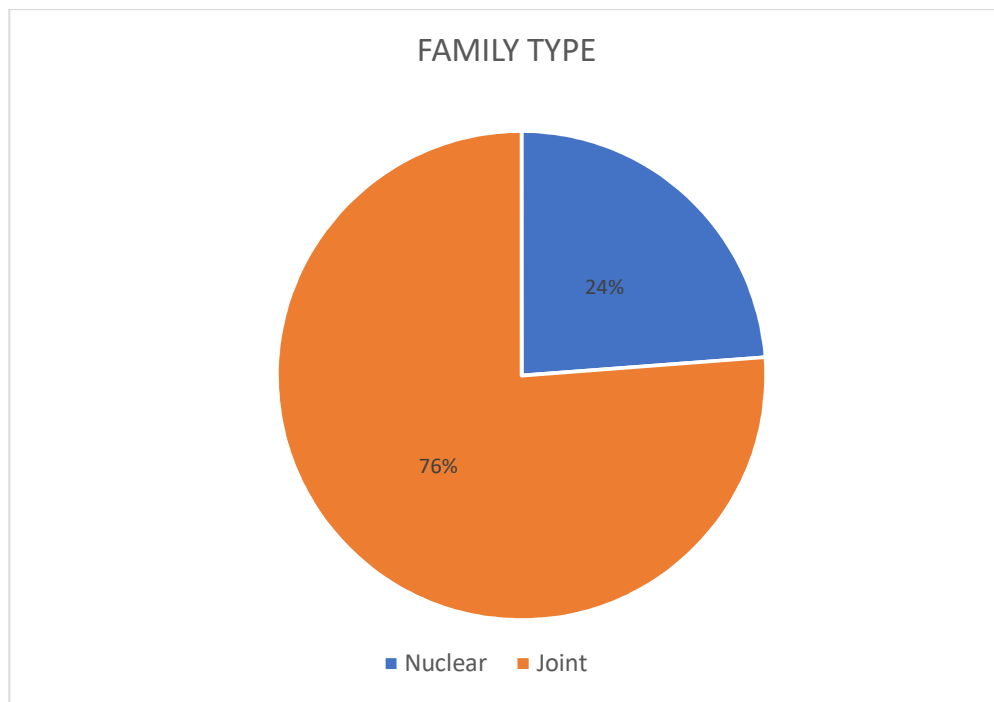
Graph 7. Distribution of participants according to type of family (n=130).

Table 8. Distribution of participants according to the Socio-Economic Status (n=130).

(According to modified B.G. Prasad classification, 2022)

SES	Frequency	Percentage
Class I	8	6.2
Class II	19	14.6
Class III	51	39.2
Class IV	38	29.2
Class V	14	10.8
Total	130	100

Based on the Modified B. G. Prasad's Classification of socioeconomic status, Class I comprised 8 individuals (6.2%), Class II comprised 19 (14.6%), Class III comprised 51 (39.2%), Class IV comprised 38 (29.2%), and Class V comprised 14 persons (10.8%).

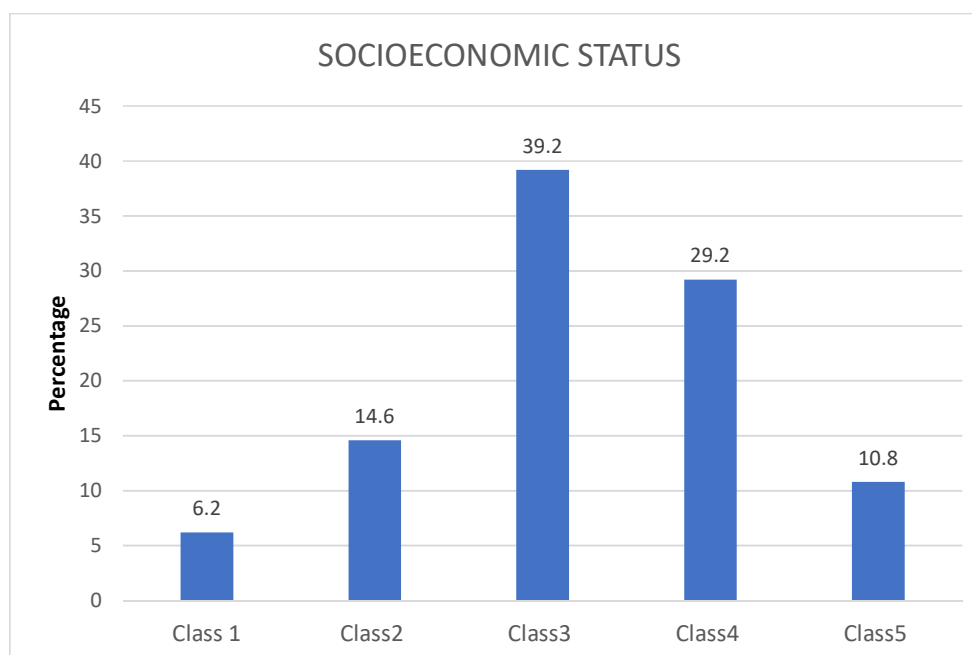
Graph 8. Distribution of participants according to the Socio-Economic Status (n=130).

Table 9. Distribution of participants according to time of registration of pregnancy(n=130)

Time of registration	Frequency	Percentage
1 st trimester	50	38.3
2 nd trimester	76	58.6
3 rd trimester	4	3.1
Total	130	100

Among the 130 study participants, 50 (38.3%) were registered in the first trimester, 76 (58.6%) were registered in the second trimester, and 4 (3.1%) were registered in the third trimester.

Graph 9. Distribution of study participants according to time of registration of pregnancy (n=130)

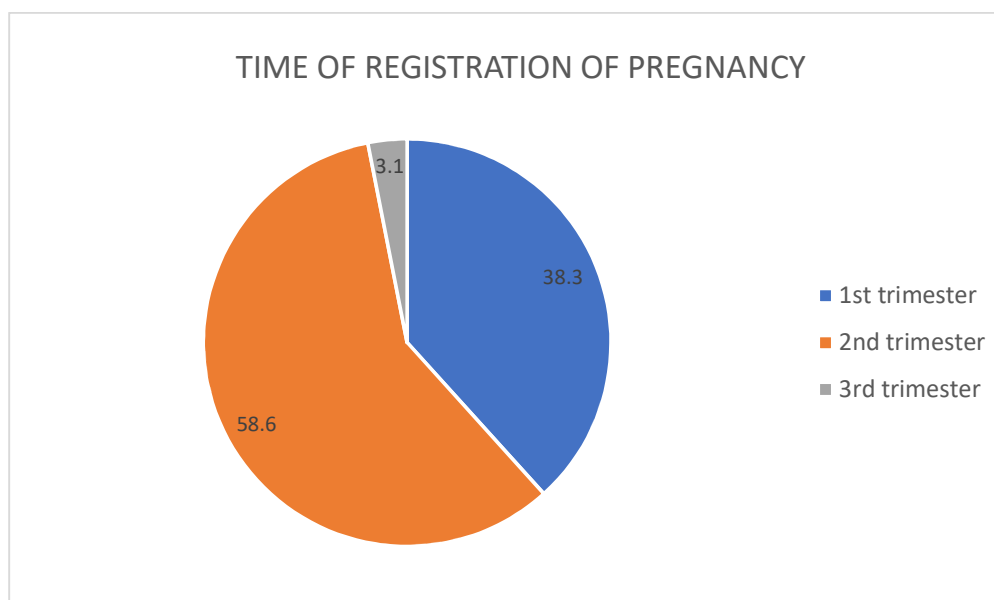


Table 10. Distribution of participants according to habits, medical history and family history (n=130)

	Frequency	Percentage
a. Distribution of participants according to Tobacco chewing habit		
Yes	7	5.4
No	123	94.6
Total	130	100
b. Distribution of participants according to past history of medical illness		
Nil	123	94.6
Thyroid	6	4.6
Hypertension	1	0.8
Total	130	100
c. Distribution of participants according to family history		
Nil	99	76.2
Diabetes mellitus	19	14.6
Hypertension	5	3.8
Diabetes and Hypertension	7	5.4
Total	130	100

- a. Among the 130 study participants, 7 (5.4%) had history of chewing tobacco, while 123 (94.6%) did not.

- b. Regarding past history of medical illness, 123 participants (94.6%) had no history of medical illness, 6 (4.6%) had history of thyroid abnormalities, and one participant had history of hypertension; none had a history of diabetes.

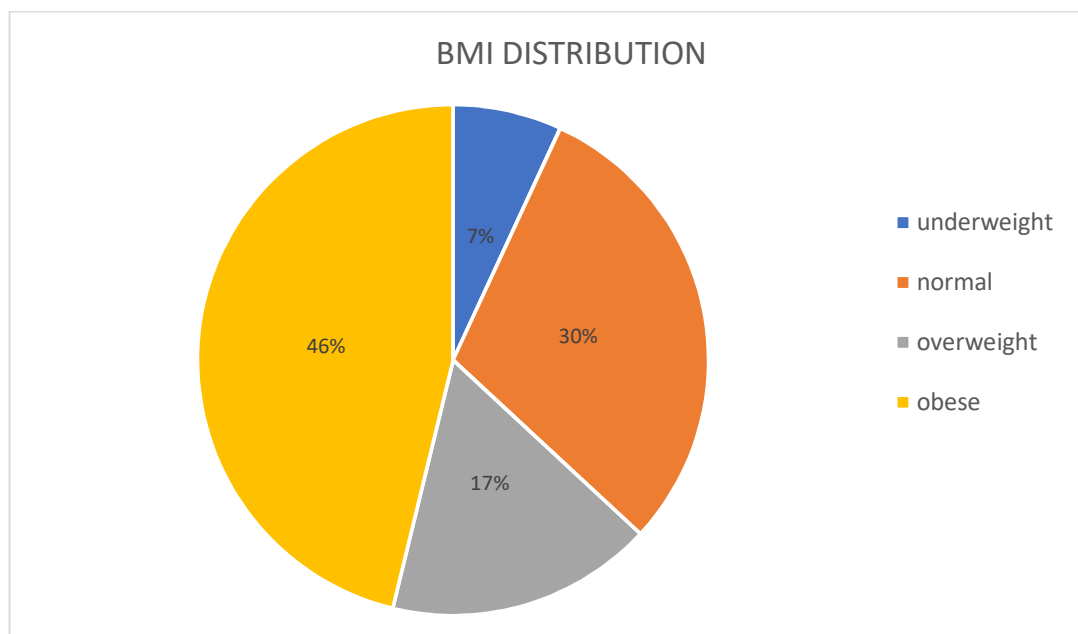
- c. In terms of family history, 99 participants (76.2%) had no relevant family history, 19 (14.6%) had a family history of diabetes, 5 (3.8%) had a family history of hypertension, and 7 (5.4%) had a family history of both diabetes and hypertension.

Table 11. Distribution of participants according to their BMI (n=130)

BMI	Frequency	Percentage
Underweight (<18.5)	9	6.9
Normal (18.5-22.9)	39	30
Overweight (23-24.9)	22	16.9
Obese (≥ 25)	60	46.2
Total	130	100

In this study, approximately 60 study participants (46.2%) had obesity (BMI ≥ 25), 39 (30%) participants had a normal BMI, 22 study participants (16.9%) were categorized as overweight, and only 9 study participants (6.9%) were classified as underweight.

Graph 11. Distribution of participants according to their BMI



Out of 130 study participants, physical examination finding showed that

- a) Mean height: 150.57 ± 6.43
- b) Mean weight: 58.31 ± 13.26
- c) Mean BP systole: 113.76 ± 14.77
- d) Mean BP diastole: 72.84 ± 9.88

Among 130 participant 23(17.7%) had pedal oedema, 107(82.3%) did not have any pedal oedema. 54(41.5%) had pallor whereas 76(58.5%) did not have any pallor.

II. OBSTETRIC VARIABLES OF STUDY PARTICIPANTS

Table 12. Distribution of study participants according to obstetric history (n=130)

VARIABLES	Frequency (n)	Percentage (%)
a. Age of marriage		
15-19	50	38.5
20-24	61	46.9
25-29	17	13.1
30-34	2	1.5
Total	130	100
b. Age at 1 st pregnancy		
15-19	29	22.3
20-24	75	57.7
25-29	22	16.9
30-34	3	2.3
>35	1	0.8
Total	130	100
c. Gravida		
Primigravida	23	17.7
Gravida2	44	33.8
Gravida 3	45	34.6
Gravida 4	12	9.3
Gravida 5	5	3.8
Gravida6	1	0.8
Total	130	100

d. History of abortion		
No abortion	82	63.1
Abortion 1	37	28.4
Abortion2	9	6.9
Abortion 3	1	0.8
Abortion 4	1	0.8
Total	130	100
e. Type of marriage		
Consanguineous marriage	28	21.5
Nonconsanguineous marriage	102	78.5
Total	130	100

- a. Among the 130 study participants, 50 (38.5%) were married between the age of 15 -19, 61(46.9%) between the age of 20 - 24, 17 (13.1%) between the age of 25- 29, and 2 (1.5%) between the age group of 30 - 34. Mean age at marriage was 20 ± 3.1 .
- b. Regarding age at 1st pregnancy, 29 participants (22.3%) conceived between the age of 15 - 19 years, 75 (57.7%) between the age group of 20 - 24, 22 (16.9%) between the age of 25-29, and 3 (2.3%) were between the age of 30 to 34. Only for 1 participant, age at 1st pregnancy was >35 years. Mean age of first pregnancy was 21.87 ± 3.46 .
- c. Regarding gravidity, out of 130 study participants, 23 participants (17.7%) were primigravida, 44 (33.8%) were gravida 2, 45 (34.6%) were gravida 3, 12 (9.3%) were gravida 4, 5 (3.8%) were gravida 5, and 1 (0.8%) was gravida 6.

- d. Regarding abortion history, out of 130 participants 83 (63.1%) had no history of abortion, 37(28.4%) had a abortion history, 9(6.9%) had a history of two abortions, and 2(1.6%) had a history of three or more abortions.

- e. Among 130 study participants, 28 (21.5%) had consanguineous marriage, while 102 (78.5%) had non-consanguineous marriage.

Table 13. Distribution of participants as per the number of risk factors (n=130)

	Frequency	Percentage
Single risk factors	85	65.4
Multiple risk factors	45	34.6

Among the 130 study participants, 85 (65.4%) had only one risk factor, while 45 (34.6%) had multiple risk factors.

Graph 13. Distribution of participants as per the number of risk factors present



Table 14. Distribution of participants according to severity of anaemia (n=130)

Anaemia (cut offs)	Frequency	Percentage
Normal (>11g/dl)	51	39.2
Mild (9-10.9g/dl)	55	42.3
Moderate (7-8.9g/dl)	17	13.1
Severe (<7g/dl)	7	5.4
Total	130	100

Among 130 study participants, 51(39.2%) were having normal Hb%, 55(42.3%) were having mild anaemia, 17(13.1%) had moderate anaemia and 7(5.45%) had severe anaemia.

	Normal (%)	Mild (%)	Moderate (%)	Severe (%)
1 st trimester	80	20	-	-
2 nd trimester	39	43.5	8.1	9.7
3 rd trimester	36.5	42.9	19	1.6

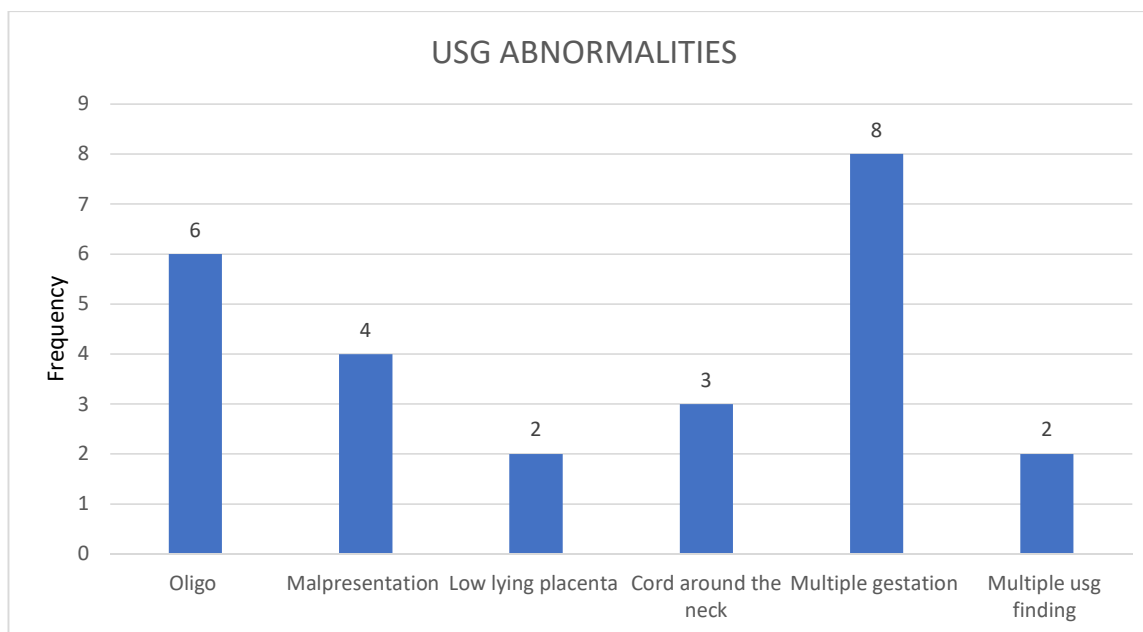
In the first trimester, 80% of enrolled pregnant women had normal haemoglobin levels, with 20% experiencing mild anaemia. For those enrolling in the second trimester, 39% had normal haemoglobin, 43.5% had mild anaemia, 8.1% had moderate anaemia, and 9.7% had severe anaemia. Among those enrolling in the third trimester, 36.5% had normal haemoglobin levels, 42.9% had mild anaemia, 19% had moderate anaemia, and 1.6% had severe anaemia.

Table15. Distribution of participants as per the USG abnormalities

USG abnormality	Frequency	Percentage
Oligo	6	4.6
Malpresentation	4	3.1
Low lying placenta	2	1.5
Cord around the neck	3	2.3
Multiple gestations	8	6.1
Multiple abnormalities in USG finding	2	1.6

Among the 130 high-risk pregnant women, 109 (83.8%) had normal ultrasonography (USG). Remaining participants had specific abnormalities: 6 (4.6%) had oligohydramnios, 4 (3.1%) had malpresentation, 2 (1.5%) had a low-lying placenta, 3 (2.3%) had the cord around the neck, 8 (6.1%) had multiple gestations and 2 (1.6%) had multiple USG abnormalities.

Graph 15. Distribution of participants according to the USG abnormalities



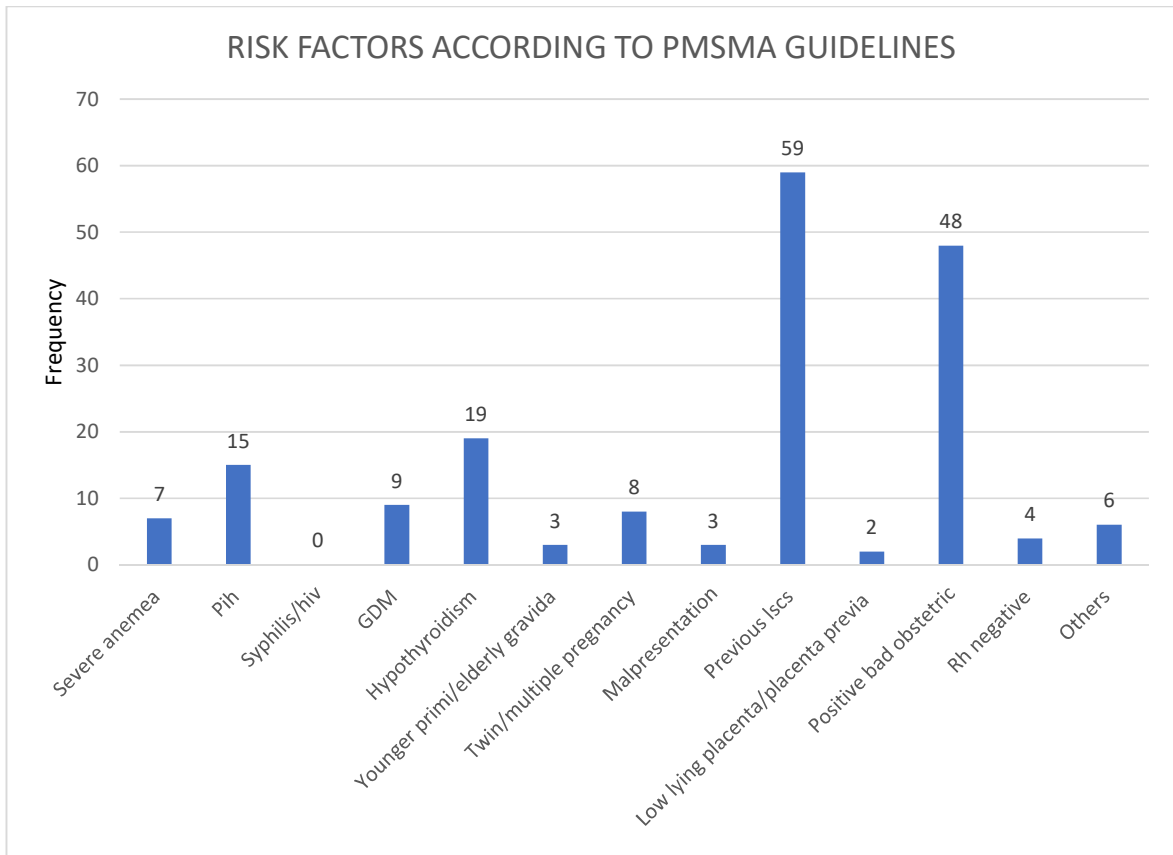
**Table 16. Distribution of participants according to the presence high risk factor
(According to PMSMA guidelines)**

High risk factor	Frequency	Percentage
1. Severe anaemia	7	5.4
2. PIH	15	11.5
3. Syphilis/HIV	-	-
4. GDM	9	6.9
5. Hypothyroidism	19	14.6
6. Younger primi/elderly gravida	3	2.3
7. Twin/multiple pregnancy	8	6.1
8. Malpresentation	3	2.3
9. Previous LSCS	59	46.1
10. Low lying placenta/placenta previa	2	1.5
11. Positive bad obstetric history (h/o stillbirth, abortion, congenital malformation, obstructed labour, premature birth)	48	36.1
12. Rh negative	4	3.07
13. Others -oligo, infertility treatment	6	4.6

Among the 130 high-risk pregnant women, the distribution of various complications was as follows: 7(5.4%) had severe anaemia, 15(11.5%) experienced pregnancy-induced hypertension, 9(6.9%) had hypothyroidism, 3(2.3%) were either younger primiparous or elderly multiparous, 8(6.1%) had twin or multiple pregnancies, 3(2.3%) presented with malpresentation, 59(46.1%) had a history of previous caesarean sections (LSCS), 2(1.5%) had a low-lying placenta or placenta previa,

48(36.15%) had a positive history of bad obstetrics, 4(3.07%) had Rh-negative pregnancies 4(4.6%) had a history of other high-risk factors such as oligomenorrhea or infertility treatment. None of the participants were positive for HIV, HBsAg and syphilis.

Graph 16: Distribution of study participants according to the presence high risk factor (According to PMSMA guidelines)



III. DISTRIBUTION OF OUTCOME VARIABLES

Table 17. Distribution of participants according to the variables related to delivery (n=129)

Place of delivery	Frequency	Percentage
Home	1	0.8
Gov. hospital	92	71.3
Private hospital	36	27.9
Total	129	100
Type of delivery		
Preterm	15	11.6
Term	111	86
Post term	3	2.4
Total	129	100
Mode of delivery		
Vaginal	45	34.9
LSCS	84	65.1
Total	129	100

n=130 As one pregnant woman died before delivery

Among the 129 study participants, one (0.8%) opted for home delivery, while 92 (71.3%) delivered in government hospital, and 36 (27.9%) delivered in private hospital.

Regarding time of delivery, 15 participants (11.6%) had preterm deliveries, 111 (86%) had term deliveries, and 3 (2.4%) had post-term deliveries.

Among high-risk pregnant women, 45 (34.9%) had vaginal deliveries, while 84 (65.1%) underwent caesarean section.

Table 18. Distribution of participants according to maternal outcomes (n=130)

Outcome	Frequency	Percentage
Normal	119	91.5
Morbidity	10	7.7
Mortality	1	0.8
Total	130	100
Adverse maternal outcome		
Present	11	8.5
Absent	119	91.5
Total	130	100

Among the 130 high-risk pregnant women, majority 119(91.5%) experienced no complications. However, 10 study study participants (7.7%) had various morbidities such as post-partum haemorrhage, wound infection, mastitis, etc. Tragically, one woman (0.8%) succumbed to diabetic ketoacidosis before delivery.

Among 130 study participants, 11(8.5%) had adverse maternal outcome and 119 (91.5%) did not have any adverse maternal outcome.

Table 19. Distribution of participants according to neonatal outcome

	Frequency	Percentage
Neonatal outcome		
IUD	1	0.7
Live birth	131	94.9
Still birth	1	0.7
Neonatal death	5	3.7
Total	138	100
Birth weight		
Normal	118	86.1
Lbw (<2.5kg)	19	13.9
Total	137	100
Adverse foetal outcome		
Yes	18	13.8
No	112	86.2
Total	130	100

*n≠130, as there were 8 twin deliveries in the present study and one pregnant woman expired before delivery.

Out of 138 neonates, including 8 twins, one (0.7%) was intrauterine death, while 131 (94.9%) were born alive, one (0.7%) was stillbirth, and 5 (3.7%) died during the neonatal period.

Among the 137 babies (excluding intrauterine death), 118 (86.1%) had normal birth weight, while 19 (13.9%) had low birth weight.

In the present study of 130 pregnant women, adverse foetal outcomes occurred in 18 cases (13.8%), while 112 (86.2%) experienced no such adverse outcomes.

Table 20. Distribution of high-risk pregnancies according to modified Coopland scoring (n=130)

Modified Coopland score	Frequency	Percentage
Low (0-3)	96	73.8
Moderate (4-6)	27	20.8
High (≥ 7)	7	5.4
Total	130	100

Among the 130 pregnant women, 96 (73.8%) had a low modified Coopland score, 27 (20.8%) had a moderate Coopland score, and 7 (5.4%) had a high Coopland score.

Graph 20: Distribution of high-risk pregnancies according to modified coopland scoring (n=130)

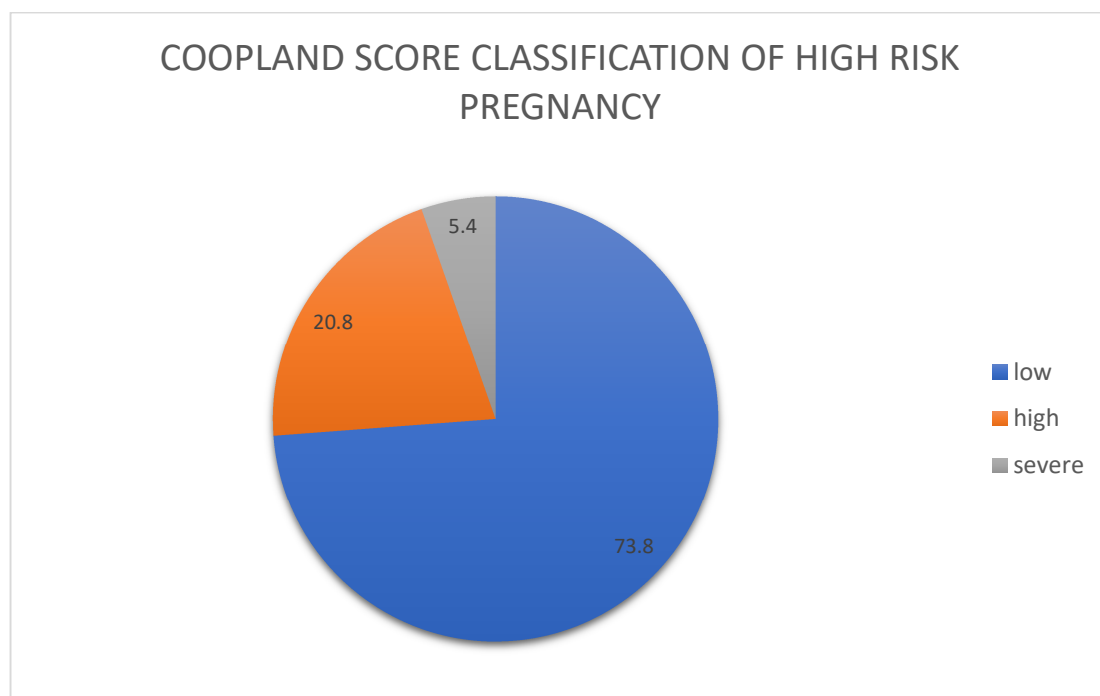


Table 21. Distribution of participants as per the time of enrolment in the study

(n=130)

Time of enrolment in study	Frequency	Percentage
1 st trimester	5	3.8
2 nd trimester	62	47.7
3 rd trimester	63	48.5
Total	130	100

Among the 130 study participants, 5 (3.8%) were enrolled in their first trimester, 62 (47.7%) were in their second trimester, and 63 (48.5%) were in their third trimester.

Graph 21. Distribution of participants as per the time of enrolment in the study

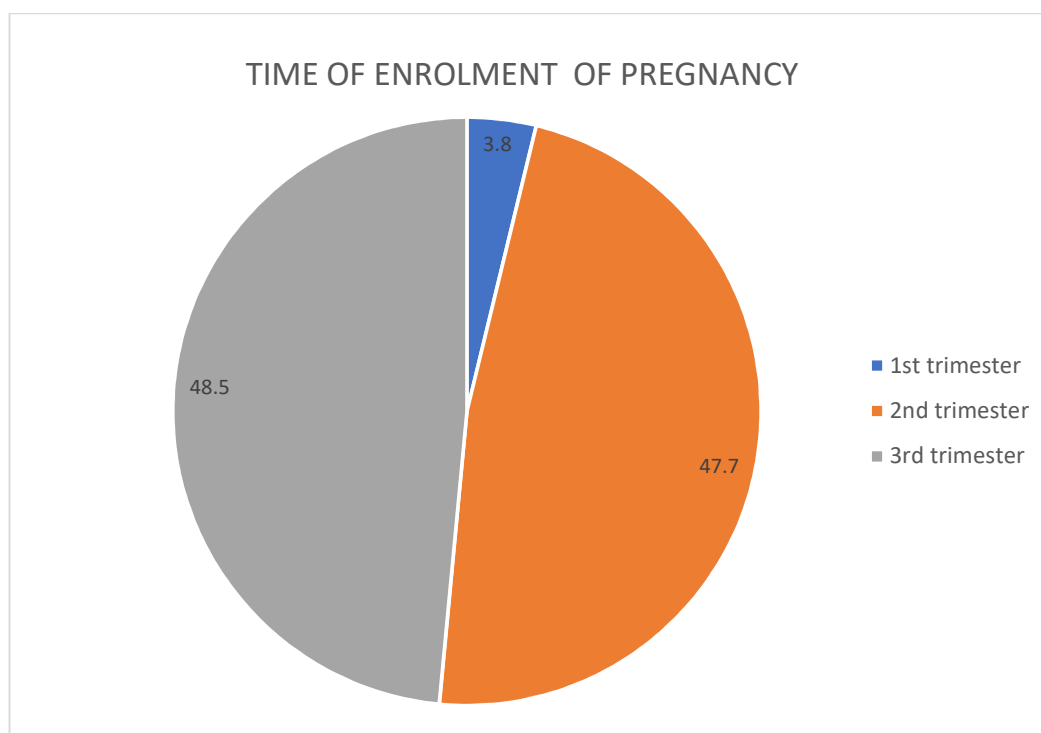


Table 22. Risk factor distribution according to follow up visit

	Visit1 (enrolment visit)	Visit2	Visit3	Visit4	Visit5	Visit6	Visit7
Previous LSCS	59	-	-	-	-	-	-
Bad obstetric history	48	-	-	-	-	-	-
Twin	8	-	-	-	-	-	-
HTN	10	4	-	-	-	1	-
Hypothyroid	15	4	-	-	-	-	-
GDM	7	2	-	-	-	-	-
Oligo	-	2	2	2	-	-	-
Severe anaemia	5	1	1	-	-	-	-
malpresentation	-	1	1	1	-	-	-
Low lying placenta	-	-	1	-	1	-	-
Rh negative	3	1	-	-	-	-	-
Cord around the neck	-	2	-	1	-	-	-

Among the 130 high-risk study participants enrolled at different trimesters. At the first visit, 59 participants had prior history of LSCS, 48 had a bad obstetric history, and 8 had multiple gestations. Hypertensive disorders were detected in 10 participants at their first visit and in 4 participants at their second visit.

Gestational diabetes mellitus (GDM) was found in 7 participants at the first visit and in 2 participants at the second visit. Anaemia was identified in 5 participants at the first visit, 1 participant at the second visit, and another participant at the third visit.

Malpresentation was detected in 1 participant each during the second, third, and fourth visits.

Low-lying placenta was seen in 1 participant during the third visit and in another during the fifth visit. Rh-negative pregnancy was found in 3 participants at the first visit and in 1 participant at the second visit. Cord around the neck was seen in 2 participants during the second visit and 1 in fourth visits.

IV RISK FACTORS ASSOCIATED WITH HIGH-RISK PREGNANCY

**Table 23. Association between Socio-demographic variables and Modified
Cooplend high-risk pregnancy Scoring Categories**

Variables	Low	Moderate	High	Chi-Square	p-value
	n (%)	n (%)	n (%)		
Age					
≤25	54(84.4%)	7(10.9%)	3(4.7%)	7.994	0.023*MC
>25	42(63.6%)	20(30.3%)	4(6.1%)		
Religion					
Hindu	14 (70)	5 (25)	1 (5)	2.668	0.63MC
Muslim	81 (75)	21 (19.4)	6 (5.6)		
Others	1 (50)	1 (50)	0 (0)		
Education of pregnant women					
Illiterate	2(40)	1(20)	2(40)	9.414	0.218
Primary	17(81)	4(19)	0		
Secondary	48(70.6)	16(23.5)	4(5.9)		
Higher secondary	12(80)	2(13.3)	1(6.7)		
UG or PG	17(81)	4(19)	0		
Occupation of pregnant women					
House wife	91(74)	25(20.3)	7(5.7)	4.432	0.76
Employee	3(75)	1(25)	0		
Labourer	1(100)	0	0		
Self employed	1(50)	1(50)	0		

Education of husband					
Illiterate	1(50%)	1(50)	0	6.33	0.588MC
Primary	20(76.9)	4(15.4)	2(7.7)		
Secondary	49(70)	16(22.9)	5(7.1)		
Higher secondary	7(100)	0	0		
UG or PG	19(76)	6(24)	0		
Occupation of husband					
Farmer	0	0	1(100)	8.386	0.216
Employee	28(73.7)	9(23.7)	1(2.6)		
Labourer	50(76.9)	12(18.5)	3(4.6)		
Self employed	18(69.2)	6(23.1)	2(7.7)		
Type of family					
Nuclear	23(74.2)	8(25.8)	0	2.377	0.291
Joint	73(74.5)	19(19.4)	7(6.1)		
SES					
Class 1	6(75)	2(25)	0	6.19	0.583
Class 2	13(68.4)	6(31.6)	0		
Class 3	35(68.7)	12(23.5)	4(7.8)		
Class 4	31(81.6)	4(10.5)	3(7.9)		
Class 5	11(78.6)	3(21.4)	0		
H/o of tobacco chewing					
Yes	3(42.8)	2(28.6)	2(28.6)	6.556	0.025*FT
No	93(75.6)	25(20.3)	5(4.1)		

Enrolled trimester					
1 st trimester	4(80)	1(20)	0	1.612	0.833
2 nd trimester	47(75.8)	13(21)	2(3.2)		
3 rd trimester	45(71.5)	13(20.6)	5(7.9)		
Family history					
Nil	75(75.8)	20(20.2)	4(4)	14.89	0.039*MC
DM	15(78.9)	4(21.1)	0		
HTN	2(40)	1(20)	2(40)		
DM+HTN	4(57.1)	2(28.6)	1(14.3)		
H/o medical illness					
Nil	92(74.8)	25(20.3)	6(4.9)	5.409	0.207
Thyroid	4(66.6)	1(16.7)	1(16.7)		
HTN	0	1(100)	0		
Consanguineous marriage					
No	76(74.6)	23(22.5)	3(2.9)	5.16	0.071
Yes	20(71.4)	4(14.3)	4(14.3)		

Among high-risk pregnant women, several significant associations were identified between various factors and modified Cooplend risk scores:

a. Age:

- 30.3% of women over the age of 25 had a moderate modified Coopland score compared to 10.9% of women aged 25 and under.
- Additionally, 6.1% of women over 25 had a high modified Coopland score, while only 4.7% of women aged 25 and under had a higher score.
- This indicates a significant association between age and modified Coopland risk scoring, with a p-value of 0.023.

b. Tobacco Use:

- Among tobacco chewers, 28.6% had a high modified Coopland score, while only 4.1% of non-tobacco chewers had a high modified Coopland score.
- This suggests that tobacco chewers are significantly more likely to have a higher Coopland score compared to non-tobacco chewers, with a p-value of 0.025.

c. Family History of Hypertension:

- 40% of high-risk pregnant women with a family history of hypertension had a high modified Coopland score, compared to those with other family risk factors.
- This indicates a significant association between hypertension and high-risk pregnancy, with a p-value of 0.039.

d. Consanguineous Marriage:

- 14.3% of those in consanguineous marriages had a high modified Coopland score, while only 2.9% of those not in consanguineous marriages had a high score.

- This shows a slightly significant association between consanguineous marriage and modified Coopland scoring, with a p-value of 0.071.

e. Religion:

- There was no significant association between religion and modified Coopland scoring categories, as indicated by a p-value of 0.63.

f. Education:

- No significant association was found between the education levels of husbands and mothers with modified Coopland high-risk scoring categories, with p-values of 0.588 and 0.218, respectively.

g. Other Factors:

- No significant association was found between modified Coopland scoring and the occupation of husbands, occupation of study participants, family history, socioeconomic status (SES), the trimester in which participants enrolled, and history of medical illness, all with p-values greater than 0.05.

Table 24: Association of pregnancy-related variables with modified coopland scoring categories

Pregnancy related Variables	Low	Moderate	High	Chi-Square	p-value
	n (%)	n (%)	n (%)		
Gravida					
1	15(65.2)	8(34.8)	0	12.5	0.22
2	34(77.3)	7(15.9)	3(6.8)		
3	36(80)	7(15.6)	2(4.4)		
4	7(58.3)	3(25)	2(16.7)		
5	4(80)	1(20)	0		
6	0	1(100)	0		
Para					
0	24(75)	7(21.9)	1(3.1)	13.26	0.018*
1	48(80)	9(15)	3(5)		
2	23(71.8)	8(25)	1(3.2)		
≥3	1(16.7)	2(50)	2(33.3)		
Previous Death					
Yes	1(16.7)	3(50)	2(33.3)	11.47	0.004*
No	95(76.6)	24(19.4)	5(4)		

Living					
0	31(70.4)	12(27.3)	1(2.3)	11.26	0.216MC
1	42(82.4)	7(13.7)	2(3.9)		
2	21(70)	6(20)	3(10)		
3	1(33.3)	1(33.3)	1(33.3)		
4	1(50)	1(50)	0		
Previous Still birth					
Yes	1(100)	0	0	0.357	1.00MC
No	95(73.6)	27(20.9)	7(5.4)		

Among high-risk pregnant women, significant associations were identified:

1. Parity (Para):

- 33.3% of women who had conceived three or more times had a high modified Copland score, compared to other women with two or fewer pregnancies.
- This indicates that women with three or more pregnancies are significantly more likely to have a higher Copland score compared to those with two or fewer pregnancies, with a p-value of 0.018.

2. Child Mortality:

- 33.3% of women whose children had died previously had a high modified Copland score, compared to 4.0% of women with no previous child deaths.

- This suggests that women with a history of child mortality are significantly more likely to have a higher modified Coopland score compared to those whose children had not died, with a p-value of 0.004.

3. Other Factors:

- No significant association was found between modified Coopland scores and gravida, the number of living children, or previous stillbirth history, as indicated by p-values greater than 0.05.

Table 25: Association of risk factors with modified Cooplاند scoring categories

Pregnancy related Variables	Low	Moderate	high	Chi-Square	p-value
	n (%)	n (%)	n (%)		
Severe anaemia					
Yes	7(100)	0	0	2.62	0.284
No	89(72.3)	27(22)	7(5.7)		
PIH					
Yes	7(46.7)	5(33.3)	3(20)	8.387	0.011*
No	89(77.4)	22(19.1)	4(3.5)		
GDM					
Yes	5(55.66)	3(33.3)	1(11.1)	2.62	0.284 MC
No	80(75.2)	24(19.8)	6(5)		
Hypothyroidism					
Yes	16(84.2)	2(10.5)	1(5.3)	1.387	0.538
No	80(72.1)	25(22.5)	6(5.4)		
Younger primi/older primi					
Yes	2(66.7)	0	1(33.3)	5.114	0.151
No	94(74)	27(21.3)	6(4.7)		
Twin					
Yes	1(12.5)	4(50)	3(37.5)	17.54	<0.001*
No	95(77.8)	23(18.9)	4(3.3)		
Mal presentation					
Yes	1(33.3)	2(66.7)	0	3.963	0.242MC
No	95(74.8)	25(19.7)	7(5.5)		

Previous LSCS					
Yes	45(76.2)	9(15.3)	5(8.5)	3.469	0.17
No	51(71.8)	18(25.4)	2(2.8)		
Low lying placenta					
Yes	1(50)	0	1(50)	8.087	0.097
No	95(74.2)	27(21.1)	6(4.7)		
Positive bad obstetric history					
Yes	38(79.1)	8(16.7)	2(4.2)	1.044	0.632FT
No	58(70.7)	19(23.2)	5(6.1)		
Rh negative pregnancy					
Yes	1(25)	2(50)	1(25)	6.16	0.040*
No	95(75.4)	25(19.8)	6(4.8)		
Other high-risk factor					
Yes	4(66.7)	2(33.3)	0	0.861	0.722
No	92(74.2)	25(20.2)	7(5.6)		

Among high-risk pregnant women, several significant associations with modified Cooplund risk scores were identified:

1. Pregnancy-Induced Hypertension (PIH):

- 20% of women with PIH had a higher modified Coopland score compared to 3.5% of women without PIH.
- This indicates that women with hypertension are significantly more likely to have a higher modified Coopland risk score compared to women without hypertension, with a p-value of 0.011.

2. Multiple Pregnancy:

- 37.5% of women with twin or multiple pregnancies had higher modified Coopland score compared to 3.3% of women without multiple pregnancies.
- This suggests that women with multiple pregnancies are more likely to have a higher modified Coopland score compared to women without multiple pregnancies.

3. Rh-Negative Pregnancy:

- 25% of women with Rh-negative pregnancies had higher modified Coopland score compared to 4.8% of women without Rh-negative pregnancies.
- This indicates that women with Rh-negative pregnancies are more likely to have a higher modified Coopland score compared to women without Rh-negative pregnancies.

4. Other Factors:

- There was no significant association between severe anaemia, gestational diabetes mellitus (GDM), younger or older primigravida, malpresentation, previous lower segment caesarean section (LSCS),

low-lying placenta, bad obstetric history, and other general risk factors with modified Cooplant high-risk scoring, as indicated by p-values greater than 0.05.

TABLE 26: Association of foetal outcome with modified cooplant scoring categories

Risk group	Adverse foetal outcome	Normal outcome	Chi square	P value
Low	9(9.4)	87(90.6)	10.12	0.03*
Moderate	5(18.5)	22(81.5)		
High	4(57.1)	3(42.9)		

Among 130 high risk pregnant mother, majority of mothers had normal foetal outcome 87(90.6%) in low risk group, whereas only 42.9% mother had normal outcome in high risk group. A significant association (p value of 0.03) was observed between high-risk pregnancy and foetal outcome.

DISCUSSION

A longitudinal study was conducted in urban health care settings among 130 high-risk pregnant women, and followed up till delivery to find outcomes and risk factors linked with high risk pregnancy.

Table 1. Distribution of participants according to their age (n=130)

In our study revealed that mean age of the study participants was 25.86 years, with a standard deviation of 3.9 years. Of the 130 pregnant women, 2 (1.6%) belonged to the 15–19 age group, 53 (40.8%) to the 20–24 age group, and 52 (40%) to the 25–29 age group. Approximately 18.8% of the sample belonged to the 30-34 age bracket, whereas 3.8% of the sample was older than 35.

A similar study conducted in Telangana found a mean age of 24 ± 4 years, with 60.5% of participants aged 20-25, 21.1% aged 26-29, and 11.6% over 30 years old.^[13] Another study by Rajini et al. reported a mean age of 25 ± 3 years, with 51% of participants aged 20-25, aligning with our results.^[1]

However, the study done in Taif, Saudi which is focused on high risk pregnant women, showed a notably different age distribution, with a higher proportion of participants in the older age groups of 30-35 and 35-40 years. This variation could be attributed to regional differences.^[41]

Table 2. Distribution of participants according to their religion (n=130)

In the present study 108 (83.1%) participants were Muslims, 20 (15.4%) were Hindus, and 2 (1.5%) belonged to other religions.

In contrast, study conducted in Belagavi reported a different distribution, with 81.6% Hindus, 8.8% Muslims, 4.1% Christians, and 5.3% from other religious backgrounds. This shows a difference compared to our findings.^[6]

Similarly, another study done in Belagavi showed that 87.6% of their participants were Hindus, with the remaining 12.7% being non-Hindus, highlighting a different religious makeup from our study,^[23] which may be due to varied socio-demographic factors in each geographic area

Table 3. Distribution of participants according to their literacy status (n=130)

Our study showed that 5 participants (3.8%) were illiterate, 21 (16.2%) had completed primary education, 68 (52.3%) had completed secondary education, 15 (11.5%) had completed higher secondary education, and 21 (16.2%) were graduates.

Comparatively, the Puducherry survey revealed that 13.4% of participants had completed high school, 30% had completed further secondary education, and 40% had graduated.^[5]

Similarly, conducted in Belagavi found that 86% of participants were literate, while 14% were illiterate.^[6]

Table 4. Distribution of participants according to their occupation(n=130)

In this study, 123 participants (94.6%) were housewives, 4 (3.1%) were employees, 1 (0.8%) was a labourer, and 2 (1.5%) were self-employed.

Similarly, a study conducted in Haryana reported that 92.6% of their participants were housewives, 4.4% were laborers, and 1.1% were engaged in business.^[42]

In contrast, a study done in Nepal found that 76.4% of participants were housewives, 9.3% were professionals, 4.7% held clerical positions, 4% were in sales, 1.9% were skilled workers, 0.4% were unskilled workers, and 1.6% were involved in agriculture. There is more diverse occupational distribution with lower percentage of housewives compared to our study.^[18]

Table 5. Distribution of participants according to education of the Husband (n=130)

Regarding the education of study participants' husbands, 2 (1.5%) were illiterate, 26 (20%) had completed primary education, 70 (53.8%) had completed secondary education, 7 (5.4%) had completed higher secondary education, and 25 (19.3%) were graduates.

In contrast, study done in Belagavi found that approximately 97.3% of the husbands were literate.^[13]

Table 6. Distribution of participants according to occupation of Husband (n=130)

Out of 130 participants, 1 (0.8%) was a farmer, 38 (29.2%) were employees, 65 (50%) were laborers, and 26 (20%) were self-employed.

In contrast, a study done at Belagavi noted that the predominant occupation among the spouses of expectant mothers worked in the private sector, with approximately 84.4% of them engaged in such employment.^[13]

Table 7. Distribution of participants according to type of family (n=130)

In our study among 130 study participants, 31 (23.8%) belonged to nuclear families, while 99 (76.2%) belonged to joint families.

A study done in Belagavi found that 82% of participants lived in joint families and 44.2% were in nuclear families, similar to our findings.^[13]

Majority of the participants in our study lived in joint families, as our study clarifies the most common family configurations among them. These results highlight the continued importance of conventional families in our culture.

Table 8. Distribution of participants according to the Socio-Economic Status (n=130)

In our study revealed that, based on Modified B. G. Prasad's Classification of socioeconomic status, class I comprised 8 individuals (6.2%), class II comprised 19 (14.6%), class III comprised 51 (39.2%), class IV comprised 38 (29.2%), and class V comprised 14 participants (10.8%).

A similar finding was reported by a study done in Belagavi, where 3.66% were in Class I, 6.5% in Class II, 39.66% in Class III, 40.33% in Class IV, and 9.83% in Class V. (according to modified B.G. Prasad' classification.^[6]

Another survey conducted in Belagavi revealed that 16.2% of the population belonged to Class V, 12.4% to Class II, 33.3% to Class III, and 34.3% to Class IV. 3.8% constituted Class I.^[23]

Table 9. Distribution of participants according to time of registration of pregnancy (n=130)

In our study showed that among 130 participants, 50 (38.5%) were registered in the first trimester, 76 (58.6%) were registered in the second trimester, and 4 (3.1%) were registered in the third trimester.

In contrast, another study done in Chennai reported that 64.6% of participants were registered, while 34.4% were not registered.^[2]

A Puducherry study found that 74.3% of women reported being pregnant in the first trimester.^[4]

Table 10. Distribution of participants according to habits, medical history and family history (n=130)

In our study Among 130 study participants, 7 (5.4%) had a history of tobacco chewing and 123 (94.6%) had no history of tobacco chewing or smoking.

In contrast, a study conducted in Portugal revealed that 20.2% of the participants smoked during pregnancy, 42.5% had never smoked, 18.3% quit smoking before pregnancy, and 19% stopped smoking before pregnancy.^[43] These differences may be attributed to regional variations.

Regarding past history of medical illness, 123 participants (94.6%) had no history of medical illness, 6 (4.6%) had history of thyroid abnormalities, and 1 participant had history of hypertension; none had a history of diabetes.

Comparatively, study conducted in Bhopal showed that 89.6% of participants had no medical illness, while 10.4% had a history of various medical conditions such as diabetes mellitus and tuberculosis.^[27]

Among 130 study participants, 99(76.2%) were did not have any significant family history, 19(14.6%) had only history of DM, 5(3.8%) had a history of hypertension and 7(5.4%) had a history of both DM and HTN.

Table 11. Distribution of participants according to their BMI

In our study of 130 women, approximately 46.2% were classified as obese, 30% had a normal BMI, 16.9% were overweight, and only 6.9% were underweight. These findings highlight a considerable prevalence of obesity and overweight among our study population.

Another study done in Belagavi reported different proportions of BMI categories among high-risk pregnant women. They found that 22.9% were underweight, 61.9% were classified as normal, and 15.2% were overweight.^[23]

Table 12. Distribution of participants according to obstetric history (n=130)

Our study showed that 50 (38.5%) were married between the age of 15 -19, 61(46.9%) were married between the age of 20 - 24, 17 (13.1%) between the age of 25 - 29, and 2 (1.5%) between the age group of 30 - 34. Mean age at marriage was 20 ± 3.1.

Similar findings were reported by another study done in Belagavi, which reported that 35% of participants were married before the age of 19, 47.3% between the ages of 20 and 29, and 0.16% were married above the age of 30years.^[6]

Age at first pregnancy showed that 29 participants (22.3%) conceived between the ages of 15 and 19, 75 participants (57.7%) between 20 and 24, 22 participants (16.9%) between 25 and 29, and 3 participants (2.3%) between 30 and 34. Only one participant had conceived for the first time after the age of 35. In our study mean age at first pregnancy was 21.87 years, with a standard deviation of 3.46 years.

Comparatively, another study done in Belagavi found that 43% of participants conceived before the age of 19, 55.16% between the ages of 20 and 29, and 1.3% after the age of 30.^[6]

In terms of gravidity, in our study 23 participants (17.7%) were primigravida, 44 participants (33.8%) were gravida 2, 45 participants (34.6%) were gravida 3, 12 participants (9.2%) were gravida 4, 5 participants (3.8%) were gravida 5, and 1 participant (0.8%) was gravida 6.

Another study conducted in Delhi showed that 37.7% were primigravida, and 62.3% were multigravida. In terms of parity, found that 59.6% were multiparous, 31% had one child, and 23.1% had more than one child, indicating a higher rate of multiparity compared to our findings.^[44]

Abortion 130 participants 83 participants (63.8%) had no history of abortion, 37 participants (28.5%) had one abortion, 9 participants (6.9%) had two abortions, and 2 participants (1.6%) had three or more abortions.

This is similar to the findings of another study conducted in Delhi, which reported that 12.2% of pregnant women had one abortion, and 5.4% had more than one.^[44]

Regarding history of consanguinity, 28 participants (21.5%) had consanguineous marriage, while 102 participants (78.5%) had non-consanguineous marriage.

This is in line with another study's findings from Belagavi, where 83% of marriages were non-consanguineous and 17% were consanguineous.^[45]

Table 13. Distribution of participants according to the number of risk factor (n=130)

In our study, out of 130 high-risk pregnant women, 85 (65.4%) had only one risk factor, while 45 (34.6%) had multiple risk factors. This finding aligns with a national survey that found 49.4% of currently pregnant women in India had one or more high-risk factors. Specifically, 33% had a single high-risk factor and 16.4% had multiple high-risk factors. This comparison underscores the prevalence and importance of monitoring multiple risk factors in high-risk pregnancies to improve maternal and foetal outcomes.^[12]

Table 14. Distribution according to the participants severity of anaemia(n=130)

Among the 130 study participants, the prevalence of anaemia varied in severity. Specifically, 51 participants (39.2%) had normal haemoglobin levels, 55 participants (42.3%) had mild anaemia, 17 participants (13.1%) had moderate anaemia, and 7 participants (5.4%) had severe anaemia.

In comparison, another study conducted in Chennai reported similar patterns. In their study, 48.5% of participants had mild anaemia, 8.1% had moderate anaemia, and 5.1% had severe anaemia. The proportions of mild and severe anaemia in Chennai study closely mirror those in our study, indicating a comparable distribution of anaemia severity across different populations. However, our study observed a slightly higher prevalence of moderate anaemia (13.1% compared to 8.1%).^[2]

In the first trimester, 80% of enrolled pregnant women had normal haemoglobin levels, with 20% experiencing mild anaemia. For those enrolling in the second trimester, 39% had normal haemoglobin, 43.5% had mild anaemia, 8.1% had moderate anaemia, and 9.7% had severe anaemia. Among those enrolled in the third

trimester, 36.5% had normal haemoglobin levels, 42.9% had mild anaemia, 19% had moderate anaemia, and 1.6% had severe anaemia.

A study conducted in Somaliland reported a higher overall prevalence of anaemia among pregnant women, with the severity increasing in the later stages of pregnancy. Specifically, the prevalence of anaemia was highest during the third trimester, which was attributed to insufficient antenatal care (ANC) and low iron supplement intake. This study found that 56% of women in the third trimester were anaemic, compared to lower percentages in the earlier trimesters.^[46]

Table15. Distribution of study participants according to the USG abnormalities

Among the 130 high-risk pregnant women, 109 (83.8%) had normal ultrasonography (USG). Remaining participants had specific abnormalities like 6 (4.6%) had oligohydramnios, 4 (3.1%) had malpresentation, 2 (1.5%) had a low-lying placenta, 3 (2.3%) had the umbilical cord wrapped around the neck, 8 (6.1%) had multiple gestations, and 2 (1.6%) had multiple USG abnormalities.

Another study conducted in Puducherry found that 9.85% had oligohydramnios which is similar to our study.^[5]

Table 16. Distribution of pregnant. women according to the presence of high-risk factors (According to PMSMA guidelines)

Our study revealed, the distribution of various complications was as follows: 6 (4.61%) had severe anaemia, 11.53% experienced pregnancy-induced hypertension, 6.9% had hypothyroidism, 2.3% were either younger primiparous or elderly multiparous, 6.15% had twin or multiple pregnancies, 2.3% presented with malpresentation, 46.15% had a history of previous caesarean sections (LSCS), 1.5% had a low-lying placenta or placenta previa, 36.15% had bad obstetric history, 3.07%

were Rh-negative pregnancies, and 4.6% had a history of other high-risk factors such as oligomenorrhea or infertility treatment.

Another study conducted in Nagpur, Maharashtra reported a lower prevalence of previous LSCS (14.49%), Pregnancy-induced hypertension and higher prevalence of malpresentation (7.94%), and teenage pregnancy (6.54%).^[3]

In another study conducted in Puducherry, various complication was observed like 6.2% younger or older primi, 3.1% had hypertension, 1.9% had GDM, 1.7% had severe anaemia, 1.6% % had previous LSCS, 1.4% had twin/ multiple pregnancies, 1.4% had hypothyroidism, 1.0% had rh incompatibility and 0.5% had bad obstetric history.^[4]

Table 17. Distribution of participants according to the variables related to delivery (n=129)

Among the 129 study participants, one (0.8%) opted for home delivery, while 92 (71.3%) delivered in government hospitals, and 36 (27.9%) delivered in private hospitals.

Regarding time of delivery, 15 participants (11.6%) had preterm deliveries, 111 (86%) had term deliveries, and 3 (2.4%) had post-term deliveries.

Among high-risk pregnant women, 45 (34.9%) had vaginal deliveries, while 84 (65.1%) underwent caesarean section.

A similar study done in Nagpur, Maharashtra found that 0.093% home delivery where as 99.07% had institutional delivery and 32.71% were preterm, 66.36% were full term, 0.093 were post term, also 62.62% had normal delivery, 37.38% underwent caesarean section.^[3]

Another study done in Nepal reported that 61.3% had LSCS whereas 38.7% had normal vaginal delivery.^[18]

From study done in Belagavi, it was observed that 63.7% were delivered in private hospital, where as 35.6% preferred government hospital and 0.7% had home delivery which is similar to our study.^[13]

Another study conducted in Puducherry showed that 12.5% had preterm delivery, 81.9% had term delivery, 5.6% had post term delivery. In case of mode of delivery 74.8% had vaginal delivery whereas 25.2% had LSCS.^[4]

Table 18. Distribution of participants according to maternal outcomes (n=130)

Our study showed that majority of the participants,120 (92.3%) experienced no complications. However, 9 study participant (6.9%) had various morbidities such as post-partum haemorrhage, wound infection, mastitis etc. Tragically, one woman succumbed to diabetic ketoacidosis before delivery.

Among 130 study participants, 10(7.7%) had adverse maternal outcome and 120(92.3%) did not have any adverse maternal outcome.

Another study done in Ethiopia showed that 77% mothers had normal maternal birth outcome,33% had adverse maternal outcome.^[26]

Table 19. Distribution of participants according to neonatal outcome (n=130- because of twin deliveries)

Out of 138 neonates, including 8 twins, one (0.7%) was intrauterine death, while 131 (94%) were born live birth, one (0.7%) was stillbirth, and 5 (3.6%) died during the neonatal period.

Among the 137 babies (excluding intrauterine death), 118 (86.1%) had normal birth weight, while 19 (13.9%) had low birth weight.

A study done in Puducherry reported that 94.9% had live birth, 33.4% had abortion, 1.7% had still birth.^[4]

Another study in Puducherry found that 98.3% had live birth and 1.7% had stillbirths.^[5]

Our study revealed that, adverse foetal outcomes occurred in 18 cases (13.8%), while 112 (86.2%) experienced no such adverse outcomes

An additional study carried out in Belagavi revealed that good foetal outcomes were seen in 70.5% of high-risk pregnancies, while poor foetal outcomes were seen in 29.5% of cases.^[13]

Table 20. Distribution of high-risk pregnancies according to modified Copland scoring(n=130)

Among the 130 pregnant women, 96 (73.8%) had a low modified Copland score, 27 (20.8%) had a moderate modified Copland score, and 7 (5.4%) had a high modified Copland score.

A separate study conducted in Belagavi revealed that 13.7% had a severe score, 45.9% had a high-risk score, and 40.4 percent had a low modified Copeland score.^[13]

Another study conducted in Kerala found that 65.66% had a low risk score, 19.66% belonged to moderate risk group 14.66% belonged to high risk group.^[33]

Another study done in Bhopal reported that 31% had no risk, 46% had low risk, 59% had high risk.^[27]

Another study done in Belagavi found that 8.6% had no risk, 29.5% had low risk, 30.5% had moderate risk, 31.4% had high risk according to another prenatal scoring system.^[23]

Table 21. Distribution of participants according to time of enrolment in the study (n=130)

Among the 130 study participants, 5 (3.8%) were in their first trimester, 62 (47.7%) were in their second trimester, and 63 (48.5%) were in their third trimester.

Another study in Belagavi showed that 59.1% were enrolled in study in the second trimester, 35.4% in the third trimester and 5.7 % in the first trimester which is similar to our study.^[23]

Table 23: Association between Socio-demographic variables and modified Cooplant high-risk pregnancy Scoring Categories

Among high-risk pregnant women, several significant associations were identified between various factors and modified Cooplant risk scores: 30.3% of women over the age of 25 had a moderate modified modified Cooplant score compared to 10.9% of women aged 25 and below. Additionally, 6.1% of women over 25 had a high modified Cooplant score, while only 4.7% of women aged 25 and under had a high score. This indicates a significant association between age and modified Cooplant risk scoring, with a p-value of 0.023.

Among tobacco chewers, 28.6% had a high modified Cooplant score, while only 4.1% of non-tobacco chewers had a high modified Cooplant score. This suggests

that tobacco chewers are significantly more likely to have a higher modified Coopland score compared to non-tobacco chewers, with a p-value of 0.025.

40% of high-risk pregnant women with a family history of hypertension had a high modified Coopland score, compared to those with other family risk factors. This indicates a significant association between hypertension and high-risk pregnancy, with a p-value of 0.039.

Around 14.3% of those in consanguineous marriage, had a high modified Coopland score, while only 2.9% of those not in consanguineous marriages had a high score. This shows a slightly significant association between consanguineous marriage and high modified Coopland scoring, with a p-value of 0.071. There was no significant association between religion and modified Coopland scoring categories, as indicated by a p-value of 0.63. No significant association was found between the education levels of husbands and study participants with modified Coopland high-risk scoring categories, with p-values of 0.588 and 0.218, respectively. No significant association was found between modified Coopland scoring and the occupation of husbands, occupation of study participants, family history, socioeconomic status (SES), the trimester in which participants enrolled, and history of medical illness, all with p-values > 0.05.

According to an another Belagavi study, there is no statistically significant association between socioeconomic class, religion, and pregnancy risk status.^[23]

A study done in Telangana found that there was no significant statistical association between high risk pregnancy and time of registration of pregnancy.^[1]

High risk pregnancy was nearly twice as likely in women from below-poverty line families as it was in women from above-poverty line families, according to a

Puducherry study. Also found that time of registration of pregnancy was not associated with it.^[4]

A study conducted in Bhavnagar, Gujarat found that high risk mother whose age above 25-36 years had more than one risk factors, the association between age group and number of risk factor present was found to be statistically significant in worst performing with p value 0.033, while the association was not significant in best performing PHC with p value 0.710. Association of other sociodemographic variables such as education, SES, and the number of risk factors present were also insignificant.^[22]

A Haryana study discovered that the prevalence of high-risk pregnancies was considerably greater in the group with lesser education (36.5%) than in the group with higher education. (24.9%) Additionally, it was noted that the prevalence of high-risk pregnancy (33.4%) was considerably higher in the lower socioeconomic group than in the upper socioeconomic group.^[26]

Table 24. Association of pregnancy-related variables with modified Coopland scoring categories

33.3% of women who had conceived three or more times had a high modified Coopland score, compared to other women with two or fewer pregnancies. This indicates that women with three or more pregnancies are significantly more likely to have a high mldified Coopland score compared to those with two or fewer pregnancies, with a p-value of 0.018. 33.3% of women whose children had died previously had a high modified Coopland score, compared to 4.0% of women with no previous child deaths. This suggests that women with a history of child mortality are significantly more likely to have a higher modified Coopland score compared to those

whose children had not died, with a p-value of 0.004. No significant association was found between Coopland scores and gravida, the number of living children, or previous stillbirth history, as indicated by p-values > 0.05 .

A Belagavi study revealed no statistically significant associations between the pregnancy's risk status and trimester.^[23]

According to a Telangana study, nulliparous women were shown to be statistically significantly more likely than multiparous women to become pregnant with high-risk offspring ($p < 0.05$). Additionally, they discovered that gravidity was not significantly associated with high-risk pregnancies.^[1]

A Puducherry study revealed that the chance of a high-risk pregnancy was 1.14 times higher for nulliparous women than for multiparous ones, and this difference was statistically significant. In their study, gravidity had no relation with high-risk pregnancy.^[4]

Table 25. Association of risk factors with modified Coopland scoring categories

Among high-risk pregnant women, several significant associations with modified Coopland risk scores were identified: 20% of women with PIH had a higher modified Coopland score compared to 3.5% of women without PIH. This indicates that women with hypertension are significantly more likely to have a higher modified Coopland risk score compared to women without hypertension, with a p-value of 0.011.

37.5% of women with twin or multiple pregnancies had a higher modified Coopland score compared to 3.3% of women without multiple pregnancies. This suggests that women with multiple pregnancies are more likely to have a higher modified Coopland score compared to women without multiple pregnancies. 25% of

women with Rh-negative pregnancies had a higher modified Coopland score compared to 4.8% of women without Rh-negative pregnancies. This indicates that women with Rh-negative pregnancies are more likely to have a higher modified Coopland score compared to women without Rh-negative pregnancies. There was no significant association between severe anaemia, gestational diabetes mellitus (GDM), younger or older primigravida, malpresentation, previous lower segment caesarean section (LSCS), low-lying placenta, positive bad obstetric history, and other general risk factors with modified Coopland high-risk scoring, as indicated by p-values greater than 0.05. Another Belagavi study revealed no statistically significant relationships between risk status and hypothyroidism, gestational diabetes mellitus, or either condition alone.^[23]

TABLE 26. Association of foetal outcome with modified Coopland scoring categories

Among 130 high risk pregnant mother, majority of mothers had normal foetal outcome 87(90.6) in low risk group whereas only 42.9% mother had normal outcome in high risk group. It was shown that there was a significant association between high risk pregnancy and foetal outcome (p value 0.03).

Another study conducted at Belagavi reported similar findings that most of the good foetal outcome were found in low risk group compare to high risk (p value 0.04).^[13]

CONCLUSION

The present study revealed that adverse maternal outcomes were present in 8.5% of mothers. In case of foetal outcomes, 94% had live births, 3.7% neonatal death, 0.7% stillbirth and IUD. In the case of birth weight 86.1% had normal birth weight whereas 13.9% had low birth weight. In total 13.8% had adverse foetal outcomes whereas 86.2% had normal outcomes

In our study, factors significantly associated with high-risk pregnancy were socio-demographic variables like age, tobacco chewing habit and family history of hypertension. In pregnancy-related risk factors parity, previous childbirth was significantly related with high-risk pregnancy. There was a significant association found between high-risk pregnancy and risk factors such as multiple pregnancies, pregnancy-induced hypertension, and Rh-negative status.

RECOMMENDATIONS

1. Enhanced screening and early detection of high-risk factors: Early and regular screening for high-risk factors anaemia, GDM, and thyroid abnormalities should be mandatory for all pregnant women. These screening facilities should be available at the primary healthcare level to ensure early identification and timely intervention. Incorporate advanced diagnostic tools and technologies to improve the accuracy of detecting high-risk pregnancy.
2. Targeted interventions in high-risk groups: Make individualized care for high-risk mothers based on specific risk factors, like frequent antenatal visits, personalized counselling etc. provide good nutritional support to anaemia and malnutrition.
3. Education and awareness programme: Community-based education by targeting high-risk and family. Enhance health literacy in pregnant women by providing educational material.
4. Regular monitoring and follow-up: Help for timely assessment and management. Ensure postnatal follow-up to see neonatal outcome and postnatal maternal morbidity
5. Training and capacity building: Regular training about latest guidelines to health care providers.
6. We can make ASHA/USHA, ANM, Anganwadi workers and other health workers aware about a simple scoring system like modified coopland scoring which helps them to categorize the high-risk pregnant women and appropriate measures can be taken accordingly. Modified Coopland criteria can be used to train health workers and utilize the service easily to identify high risk pregnancy to prevent adverse outcomes as the primary health care workers are the first point of care.

STRENGTHS

1. Identification of significant association between modified Copland score and risk factors like age of marriage, tobacco use, family h/o hypertension, adverse foetal outcome etc
2. Analysis of outcome helps in understanding high-risk factors impact on pregnant women and risk factor analysis helps in early detection and prevention.

LIMITATIONS

1. Small sample size of 130 participants, may limit the generalizability of the study.
2. Study was done in urban area. Factors affecting high risk pregnancy in rural area were not studied. A comparative study could throw more light on this.

SUMMARY

The present study – “A longitudinal study of high-risk pregnancy and its outcome in antenatal women residing in urban field practice area” was undertaken to know the high-risk pregnancy and its outcome.

This study was carried out in 2 urban areas Rukmini Nagar and Ashok Nagar, field practice areas of JNMC Belagavi. A total of 130 high-risk pregnant women were enrolled in the study and the objective was to study the high-risk pregnancy and its outcome according to PMSMA guidelines. Modified Coopland score was used to categorize high-risk pregnancy and find the associated risk factors. Around 40.8% study participants were in the age group of 20-24 years. Majority of the study participants 52.3% had completed secondary education and 94.6% were housewives. 76.2% of our study participants belonged to a joint family. Based on Modified B.G. Prasad’s Classification, the socioeconomic status showed that the largest group (39.2%) belonged to Class III. This study reported that 58.6% of the participants registered for antenatal care in the second trimester. A predominant number of study participants 94.6% did not use tobacco, and 94.6% had no history of medical illness, though 4.6% had thyroid abnormalities.

Regarding obstetric history, 46.9% of participants were married between 20 and 24 years, and 57.7% conceived their first child within the same age range. Consanguineous marriages were reported in 21.5% of high-risk women. Gravidity data showed that 34.6% were gravida 3. History of abortion indicated that 63.1% had no history of abortions, while 28.5% had experienced one abortion.

Anaemia was prevalent and severe anaemia was observed in 5.45% of study participants. The study highlighted that 46.2% participants were obese BMI. Among

high-risk factors, previous LSCS was the most prevalent risk factor followed by bad obstetric history. Place of delivery revealed that more deliveries (71.3%) were occurring at government hospitals, and in case of mode of delivery 65.1% had caesarean section.

Adverse maternal outcomes were relatively rare, with 8.5% experiencing such outcomes, and adverse foetal outcomes occurred in 13.8% of cases. Neonatal outcomes included a 0.7% intrauterine death and 3.6% neonatal deaths. Around 13.9% of the new-borns had low birth weight.

The study identified significant association between various factors and modified Copland risk scores. Age, tobacco use and family history of hypertension showed significant associations with high Copland scores. That shows age, tobacco use, and a family history of hypertension were significantly associated with high-risk pregnancy.

Parity, previous child mortality, and conditions like pregnancy-induced hypertension, multiple pregnancies, and Rh-negative pregnancies were also significantly associated with higher Copland scores, indicating that there is a significant association with high-risk pregnancies. Conversely, no significant associations were found between modified Copland scores and factors such as severe anaemia, gestational diabetes, malpresentation, previous caesarean sections, and other general risk factors. There is a significant association between modified copland score and adverse foetal outcome. Hence the present study recommends that to improve the health of high-risk pregnant mothers and neonates we need periodic follow-ups, IEC activities have to be held at villages and people, and principally family members need to be told about the complications and ill effects of high-risk pregnancies and outcomes.

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ANNEXURE – I - INFORMED CONSENT FORM

KAHERs JNMC

BELAGAVI

“A longitudinal study of high-risk pregnancy and its outcome among antenatal women residing in an urban field practice area.”

Name of Student/Principal Investigator: DR.

Name of Guide/Co Investigators: DR.

Objective:

1. To study the outcome of high risk pregnancy
2. To study risk factors associated with high risk pregnancy

Introduction: Identification of high-risk pregnancy, causes, and its complications through quality antenatal care helps in achieving favourable maternal, obstetric, and neonatal outcome. In addition, women identified to be at high risk need to be followed up at regular intervals through routine care by the health workers at health facility and home visits to prevent the development of any maternal or foetal complications. Hence, identification of type of high-risk pregnancy at earliest stage will be useful in directing the appropriate intervention measures for pregnant women. so the current study will be done to find out the high-risk pregnancy and its outcome among antenatal women residing in urban area.

Explanation of procedure: I will personally interview you using a pre designed and pre tested questionnaire to obtain the socio-demographic details, relevant obstetric history to asses high risk pregnancy. The interview will take not more than 15mins per participant. Every month follow-up will be done till the outcome.

Withdrawal from participation in the study:

Participation in this study is voluntary. You will be free to decide whether to participate in this study or continue participation once enrolled. In case you decide to withdraw your participation, you are free to do so. However, please convey the decision to the principal investigator.

Possible benefits from participating in the study: You will/will not have nor get any benefits by participating in this study. The data gathered will help the population at large.

Possible risks from participating in the study: There are no risks involved in participating in this study.

Privacy and confidentiality: The information collected from you will be coded, to prevent any person from identifying you. Your identity will never be revealed. The data collected from you will be kept confidential and only processed or aggregated data will be used for publication.

Financial incentives: You will not receive any payment for participating in this study.

Authorization for publication of aggregated data: Results obtained after processing of the aggregated data will be published for scientific purposes and or presented to scientific groups. However, your identity will never be revealed.

Questions: In case of any questions with regard to this study, you are free to contact: “**DR. _____**, Post graduate, Dept. of community medicine, J.N Medical College, Belagavi-590010, Mobile number:_____” or If you have any question or complaints with regard to your right as study participant you may contact **Dr Harsha Hegde**, Chairperson, Ethical committee of JNMC, 0831-2473777 Extension 4052.

Legal rights: By signing this consent form, we are not waving any of your legal rights.

CONSENT STATEMENT

I am making a voluntary decision to participate in the study “**A longitudinal study of high-risk pregnancy and its outcome among antenatal women residing in an urban field practice area**”. My signature below indicates that I have decided to participate and I have read the information provided above or the information provided above has been read to me in the language that I understand best. I was given the opportunity to ask questions and that they have been answered to my satisfaction.

Name of the participant:

Signature or left thumb impression of the participant:

Name of the witness:

Signature or left thumb impression of the witness:

Name of the investigator:

Signature of the investigator:

Date:

Place:

ANNEXURE – II - QUESTIONNAIRE

KAHER, JNMC, BELAGAVI

DEPARTMENT OF COMMUNITY MEDICINE

TITLE: A longitudinal study of high- risk pregnancy and its outcome among antenatal women residing in an urban field practice area.

Primary Investigator: Dr.

Guide: Dr.

I. Socio demographic details

1. Name- Sl.no-
2. Age (in years) -
3. Address -
4. Religion – 1) Hindu 2) Muslim 3) Christian 4) Jain 5) Others
5. Education of husband –1) illiterate 2) Primary 3) Secondary
4) Higher secondary 5) Graduate 6) Post graduate 7) Others
6. Education of wife – 1) illiterate 2) Primary 3) Secondary
4) Higher secondary 5) Graduate 6) Post graduate 7) Others
7. Occupation of husband –1) Farmer 2) Employee 3) Labourer 4) Others
8. Occupation of wife– 1)house wife 2) Employee 3) Farmer
4) Labourer 5) Others
9. Type of family –
10. No of family members –

11. Total family income –

12. Per capita income –

13. Socio economic status (according to modified B.G Prasad classification) –

1) Class I 2) Class II 3) Class III 4) Class IV 5) Class V

14. Time of registration of pregnancy –

15. Habits – Tobacco chewing - yes no

II. Obstetric history

1) Age at marriage –

2) Age at 1st pregnancy –

3) Married life –

4) Consanguinity – yes no

III. Present pregnancy history

1) Obstetric score - G P L D S A

2) Gestational age at enrolment –

3) H/o any spotting, when–

4) H/o any infection -

IV. Past pregnancy history

	Duration of pregnancy (in months)	Outcome/any congenital anomaly /IUGR	Mode of delivery& indication	Sex &weight of child at birth	Age of child (in years)
1					
2					
3					
4					
5					
6					

- 1) H/o any medical illness –
- 2) H/o manual removal of placenta –
- 3) H/o treatment for infertility –
- 4) H/o PPH –

V. Menstrual history

- 1) LMP –
- 2) EDD –

VI. Past medical history

- 1) H/o jaundice 2) H/o diabetes mellites 3) H/o hypertension
- 4) H/o RHD 5) H/o CHD 6) H/o psychiatric illness
- 7) H/o epilepsy 8) H/o thyroid disorder
- 9) H/o renal disease 10) H/o tuberculosis

VII. Previous surgical history

- 1) H/o myomectomy -
- 2) Repair of complete perineal tear -
- 3) Repair of vesico vaginal fistula -
- 4) Repair of stress incontinence –

VIII. Family history

- 1) H/o diabetes –
- 2) H/o hypertension –
- 3) Both

IX. General physical examination

1. Height

	1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit	7th visit
2.Weight (kg)							
3. B.P (mmHg)							
4.pallor							
5.icterus							
6.cyanosis							
7.clubbing							
8.oedema							
9.Any other complaints							

X. Obstetric examination

	1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit	7th visit
<u>1. Inspection</u>							
<u>2. Palpation</u>							
Fundal grip							
Lateral grip							
1 st pelvic							
2 nd pelvic							
<u>3. Auscultation</u>							

XI. Systemic examination

System	1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit	7th visit
1. CVS							
2. RS							
3. CNS							

XII. Investigations

Test	1st visit	2nd visit	3rd visit	4th visit	5th visit	6th visit	7th visit
1. Hb (<7 gm%)							
2. Blood grouping and rh typing							
3. RBS (mg%)							
4. PS for MP							

5.USG finding							
Oligo/poly hydramnios							
Multiple pregnancy							
Malpresentation							
Low lying placenta							
Abnormal Doppler							
6.TSH (Thyroid profile)							

8.VDRL –

9.HIV –

10.HbS Ag –

XIII. Outcome

1) Maternal outcome – a) Morbidity – yes no

 b) Mortality – yes no

 c) Normal

2) Mode of delivery- a) LSCS b) Normal

3) Place of delivery- a) Home b) Institution (govt/pvt)

4) Type of delivery - a) Pre term (<37 weeks)

 b) Term (37 -42 weeks)

 c) Post term (>42 week)

5) Outcome of delivery- a) Live birth b) Still birth c) Neonatal death

6) Birth weight - a) LBW (<2.5 kg) b) Normal(>2.5-4kg)

7) Adverse foetal outcome - yes no

8) adverse maternal outcome- yes no

ANNEXURE – III - KEY TO MASTER CHART**A - sl no****B - Age****C- Religion**

Hindu	1
Muslim	2
Christian	3
Others	4

D - Education of husband

Illiterate	1
Primary	2
Secondary	3
Higher secondary	4
Graduate+ post graduate	5

E Education of wife

Illiterate	1
Primary	2
Secondary	3
Higher secondary	4
Graduate+ post graduate	5

F Husbands occupation

Farmer	1
Employee	2
Labourer	3
Self-employed	4

G Wife occupation

House wife	1
Employee	2
Labourer	3
Self-employed	4

H Type of family

Nuclear	1
Joint	2

I SES

Class 1	1
Class 2	2
Class 3	3
Class 4	4
Class 5	5

J Time of registration of pregnancy

1st trimester	1
2nd trimester	2
3rd trimester	3

K h/o tobacco chewing

Yes	1
No	2

L Enrolled in study (in weeks)

1st	1
2nd	2
3rd	3

M Family history

Nil	1
DM	2
HTN	3
DM+HTN	4

N H/O medical illness

Nil	1
DM	2
HTN	3
DM+HTN	4

MARITAL HISTORY**O Marital history - Age at marriage Open****P Age at 1st pregnancy Open****Q Consanguineous marriage**

Yes	1
No	2

OBSTETRIC HISTORY**R Gravida Open****S Para Open****T Living Open****U Death****V Abortion****W Still birth**

X	High risk factor according to PMSMA	
	Severe anaemia	1
	PIH/Preeclampsia/preeclampsia toxaemia	2
	Syphilis/HIV	3
	GDM	4
	Hypothyroidism	5
	Young primi (<20 yrs) or elderly priimi(>35 years)	6
	Twin/multiple pregnancy	7
	Malpresentation	8
	Previous lscs	9
	Low lying placenta/placenta previa	10
	Positive bad obstetric history (still birth/abortion /congenital malformation/obstructed labour/premature birth)	11
	Rh -	12
	Patient with any other systemic illness	13
	Others- infertility treatment /hyperthyroid/oligo	14
Y	Single / multiple risk	
	Single	1
	Multiple	2
Z	number of visits including enrolment	
AA	Anaemia at the time of enrolment	
	Normal	1
	Mild	2
	Moderate	3
	Severe	4

AB. Height: cm

AC. weight: kg

AD. BMI

AE. BP systolic

AF. BP diastolic

AG. Pedal oedema

Present 1

Absent 2

AH. Pallor

Present 1

Absent 2

AI. Hb: g/dl

AJ. Blood group

A 1

B 2

AB 3

O 4

Rh+ 5

AK. TSH

Normal 1

Abnormal 2

AL. RBS

AM. USG

Normal 1

Oligo 2

Poly	3	
Mal presentation	5	
Low lying Placenta		6
Cord around the neck		7
Multiple gestation		8
IUGR		9
Others	10(27,29)	
AN. Maternal outcomes		
Normal		1
Morbidity		2
Mortality		3
AO. Mode of delivery		
Normal vaginal delivery		1
LSCS		2
AP. Place of delivery		
Home		1
Hospital		2
AQ. Hospital		
Government		1
Private		2
AR Type of delivery		
Preterm		1
Term		2
Post term		3
AS. Adverse maternal outcome		
Yes		1
No		2

AT. Neonatal outcomes

Still birth	1
Live birth	2
Neonatal death	3

AU. Birth weight of the child

Normal	1
LBW	2

AV. Weight in KG**AW. Adverse foetal outcomes**

Present	1
Absent	2

AX. Modified Copland score

Low	1
Moderate	2
High	3

AY-BE follow up visits

No follow up visit	-0
HTN	-2
Hypothyroid	-3
GDM	-4
Oligo	-5
severe anaemia	-6
malpresentation	-7
low lying placenta	-8
Rh negative	-9
cord around the neck	-10

sl no	age	religion	education husband	education women	husbands occupation	women occupation	type of family	SES	Time of registration in mcp card	h/o tobacco chewing	enrolled trimester	family history	h/o medical illness	Age at marriage	age at 1st pregnancy	consanguinous marriage	gravida	para	living	death	abortion	still birth	high risk factor: acc to pmsma	single/multip le risk	no of visits including enroument	anemna at the time of enroument	height	weight	bmi	BP syst	BP diast	pedal edema	pallor	Hb	blood group	TSH	RBS	USG	maternal outcome	mode of delivery	place of delivery	Hospital	Type of delivery	adverse maternal outcome	neonatal outcome	birth weight of the baby	weight in kg	adverse foetal outcome	modified Cooplant score class	visit1	visit 1	visit 3	visit 4	visit 5	visit 6	visit 7							
1	29	1	5	2	2	2	2	1	1	2	3	1	1	26	26	2	2	1	1	0	0	0	9	1	2	1	150	72	32	120	70	1	2	11.6	1	1	95	1	1	2	2	2	2	2	2	2	2	1	2.6	2	1	1	1	0	0	0	0	0	0				
2	25	2	4	3	3	1	1	2	2	2	3	1	1	18	23	2	2	1	1	0	0	0	9	1	2	2	149	67	30.17882077	120	70	2	2	10	2	1	94	1	1	2	2	2	2	2	2	2	2	1	3	2	1	1	1	0	0	0	0	0	0				
3	28	2	2	2	4	1	1	3	1	2	3	1	1	17	21	2	3	2	2	0	0	0	9	1	2	3	152	63	27.26800554	110	70	2	1	9.8	1	1	99	1	1	2	2	1	2	2	2	2	2	2	2	2	2	2	2.3	1	1	1	1	0	0	0	0	0	0
4	21	2	3	3	3	1	2	4	1	2	3	1	1	21	21	2	1	0	0	0	0	0	12	1	2	2	155	64	26.63891779	110	80	2	2	9.4	2.5	1	114	1	1	1	2	1	2	2	2	2	2	2	2	1	2.5	2	1	1	1	0	0	0	0	0	0		
5	23	2	3	3	3	3	2	4	2	2	3	1	1	20	23	2	1	1	0	0	0	0	14	1	3	2	150	54	24	100	60	2	2	10	2	1	85	1	1	2	2	1	2	2	2	2	2	2	1	2.5	2	1	1	1	1	0	0	0	0	0			
6	28	2	5	4	2	1	2	3	1	2	3	4	1	23	23	2	3	2	2	0	0	0	9,10	2	2	2	138	52	27.30518799	100	70	2	1	10.4	4	1	87	6	1	2	2	1	2	2	2	2	2	2	1	2.6	2	1	1	1	0	0	0	0	0	0			
7	32	1	2	2	3	1	1	5	2	1	3	1	1	17	18	2	5	4	4	0	0	0	4	1	2	2	150	47	20.88888889	120	90	2	1	9.2	4	1	80	1	1	1	2	1	2	2	2	2	2	2	2	1	2.8	2	1	4	9	0	0	0	0	0	0		
8	21	2	3	3	4	1	2	4	2	2	3	1	1	20	21	2	1	0	0	0	0	0	14	1	3	2	137	55	29.30363898	110	60	2	2	9.4	4	1	76	1	1	2	2	1	2	2	2	2	2	2	2	1	2.6	2	1	1	1	1	0	0	0	0	0		
9	24	2	3	3	3	1	2	3	2	2	3	1	1	19	19	1	3	2	2	0	0	0	9	1	2	1	149	56	25.224089	110	60	2	2	11.3	4	1	90	1	1	2	2	1	2	2	2	2	2	2	1	3	2	1	1	1	0	0	0	0	0	0			
10	24	2	3	3	3	1	1	2	2	2	3	1	1	19	20	2	2	0	0	0	1	0	11	1	2	2	152	65	28.13365651	130	90	1	2	9.4	4	1	122	1	1	1	2	1	1	2	2	2	2	2	1	2.6	2	1	1	1	0	0	0	0	0	0			
11	24	2	3	3	3	1	1	3	2	2	3	1	1	20	22	2	2	1	1	0	0	0	7	1	2	3	152	45	19.47714681	110	80	1	1	8	3	1	100	8	1	1	2	1	2	2	2	2	2	2	2	2	2	2.3,2.2	1	2	1	1	1	0	0	0	0	0	0
12	20	2	3	3	3	1	2	3	2	2	3	1	1	19	20	2	2	1	0	0	1	0	11,7	2	2	3	159	76	30.06210197	110	70	2	1	8.8	4	2	84	1	1	1	2	1	2	2	2	2	2	2	1	2.9	2	1	1	1	0	0	0	0	0	0			
13	26	2	3	3	2	1	2	3	2	2	2	1	1	22	22	2	3	2	1	0	1	0	11	1	5	2	150	51	22.66666667	118	80	2	1	9.9	2	1	114	1	1	1	2	1	2	2	2	2	2	2	2	1	2.5	2	1	1	1	1	1	0	0	0	0		
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