

"EFFECT OF MATERNAL BODY MASS INDEX ON MATERNAL AND PERINATAL OUTCOME"





 \mathbf{BY}

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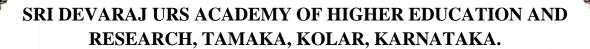


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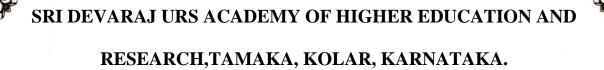
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ABBREVIATIONS:



ACOG : AMERICAN COLLGE OF OBSTETRICS AND GYNECOLOGY

ANC : ANTENATAL CARE

AVI : ABDOMINAL VOLUME INDEX

BMI : BODY MASS INDEX

BPD : BILIOPANCREATIC DIVERSION

CI : CONICITY INDEX

DD : DEXA DENSITOMETRY

EFW : EXPECTED FETAL WEIGHT

FVC : FORCED VITAL CAPACITY

FEV : FORCED EXPIRATORY VOLUME

GDM : GESTATIONAL DIABETES MELLITUS

IGT : IMPAIRED GLUCOSE TOLERANCE

IL-6 : INTERLEUKIN 6

IOM : INSTITUTE OF MEDICINE

IUD : INTRA UTERINE DEATH

IUGR : INTRA UTERINE GROWTH RETARDATION

KGS : KILOGRAMS

LAP BAND: LAPAROSCOPIC GASTRIC BANDING

LGA : LARGE FOR GESTATIONAL AGE

LSCS : LOWER SEGMENT CAESAREAN SECTION

M : METERS

MRI : MAGNETIC RESONANT IMAGING



NFHS : NATIONAL HEALTH FAMILY

NTD : NEURAL TUBE DEFECTS

NICU :NEONATAL INTENSIVE CARE UNIT

PCOS : POLY CYSTIC OVARIAN SYNDROME

PPH : POST PARTUM HAEMORRHAGE

PPROM: PRETERM PREMATURE RUPTURE OF MEMBRANE

RCOG : ROYAL COLLEGE OF OBSTETRICS AND GYNECOLOGY

RGB : ROUX – EN- Y GASTRIC BYPASS

SGA : SMALL FOR GESTATIONAL AGE

SHBG : SEX HARMONE BINDING GLOBULIN

U.S : UNITED STATES

UT'S : UNION TERRITORIES

VBG :VERTICAL BANDED GASTROPLASTY

WC : WAIST CIRCUMFERENCE

WHtR : WAIST TO HEIGHT RATIO







TABLE OF CONTENTS

Sl. No	Contents	Page No.
1.	INTRODUCTION	1
2.	OBJECTIVES	4
3.	REVIEW OF LITERATURE	5
4.	MATERIALS AND METHODS	24
5.	RESULTS	27
6.	DISCUSSION	42
7.	SUMMARY	53
8.	CONCLUSION	55
9.	BIBLIOGRAPHY	56
10.	ANNEXURES PATIENT INFORMATIONSHEET PROFORMA CONSENT FORM-ENGLISH CONSENT FORM - KANNADA KEY TO MASTERCHART MASTERCHART	66







LIST OF TABLES

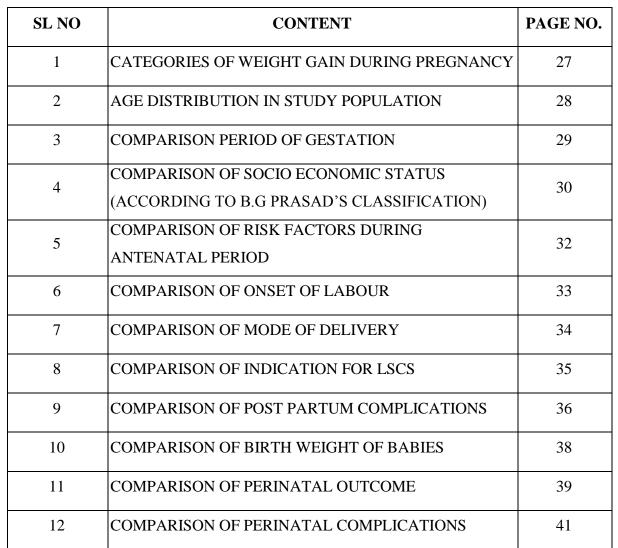
SL NO	CONTENT	PAGE NO.
1	CATEGORIES OF WEIGHT GAIN DURING PREGNANCY	27
2	AGE DISTRIBUTION IN STUDY POPULATION	28
3	COMPARISON OF PERIOD OF GESTATION	29
4	COMPARISON OF SOCIO ECONOMIC STATUS (ACCORDING TO B.G PRASAD'S CLASSIFICATION)	30
5	COMPARISON OF RISK FACTORS DURING ANTENATAL PERIOD	31
6	COMPARISON OF ONSET OF LABOUR	33
7	COMPARISON OF MODE OF DELIVERY	34
8	COMPARISON OF INDICATION OF LSCS	35
9	COMPARISON OF POST PARTUM COMPLICATIONS	36
10.1	COMPARISON OF BIRTH WEIGHT OF BABIES	37
10.2	COMPARISON OF STUDY POPULATION BASED ON APGAR AT 1st MIN	37
10.3	COMPARISON OF STUDY POPULATION BASED ON APGAR AT 5th MIN	37
11	COMPARISON OF PERINATAL OUTCOME	39
12	COMPARISON OF PERINATAL COMPLICATIONS	40







LIST OF CHARTS

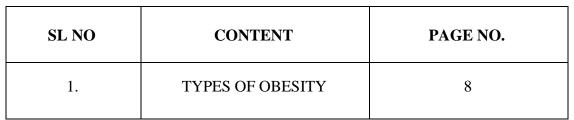








LIST OF FIGURES







ABSTRACT



INTRODUCTION:

India is a country with diverse people facing the burden of both under nourishment and over nourishment. Maternal malnourishment and over nourishment affects more than 30% of population in India. It's the most common co-morbidity in pregnancy. Body mass index provides simple numeric measure of a person's fitness and nutrition. Enormous studies have observed that being underweight and overweight, predisposes women to complicated pregnancies. Amongst the many indices and predictors of nutritional status of a person like Waist circumference (WC), waist to height ratio (WHtR), Abdominal volume index (AVI), Conicity Index (CI), underwater weighing, Dexa densitometry and BMI(Body mass index), BMI is the most acceptable index for determining the nutritional status. This study will help in bridging the gap in lack of knowledge among the rural antenatal population regarding the importance of nutrition and diet during the antenatal period. BMI assessment and correction of Abnormal BMI in pre-conceptional period improves the Obstetric prognosis and decreases the chances of mortality and morbidity in both the mother and her baby. This study is essential in reducing the burden of maternal and perinatal complication due to nutritional imbalance to a great extent.

AIMS AND OBJECTIVES:

- 1. To assess the risk factors of abnormal BMI in pregnant women.
- 2. To evaluate the effect of BMI on maternal and perinatal outcome.

METHODOLOGY:

In this prospective observational study, 87 Antenatal women with period of gestation more than 28 weeks to 42 weeks, were selected and categorized into underweight, normal weight

and overweight according to pre-pregnancy BMI considering the inclusion and exclusion criteria and were assessed for the risk factors that they developed during the antenatal period and the eventual maternal and perinatal outcome. The outcomes were recorded and tabulated. The results were statistically analysed using chi-square test, test for significance, mean and median.

RESULTS:

There was significant difference between the three groups in the risk factors they developed during the antenatal period (p= 0.041), onset of labour (0.022), mode of delivery(0.002) and perinatal outcome(0.002), post partum complications (0.001)in mother and perinatal complications (0.004) in the baby. Antenatal risk factors were more prevalent in overweight women than in underweight and normal weight women. The most common risk factors developed during antenatal period in overweight women are pre ecclampsia and ante partum ecclampsia and in underweight women are anaemia and preterm labour. Adverse maternal outcome like increased rate of caesarean section and post partum ecclampsia were more commonly seen in overweight women and increased rate assisted/instrumental vaginal delivery and post partum haemorrhage were more commonly seen in underweight women. Babies born to overweight mothers had the highest rate of NICU admissions while the babies born to underweight mothers has the highest incidence of perinatal mortality and IUDs.

CONCLUSION:

Both maternal under weight and overweight has adverse pregnancy outcomes. Therefore, preconceptional stabilisation of body mass index is essential for having a healthy mother and baby.



Antenatal counselling regarding nutrition, importance of healthy diet with customised diet chart should be prescribed for underweight women .weight reduction and normalising BMI during pre conceptional period in overweight women helps in reducing adverse pregnancy outcomes.

KEY WORDS:

Body mass index, Underweight mothers, overweight in pregnancy, Increased rate of LSCS, NICU admissions, perinatal mortality.





INTRODUCTION



INTRODUCTION

In 1830's Lambert Adolphe Jacques Quetelet, a Belgian mathematician, invented a mathematical formula to estimate whether a person is healthy or not by dividing their weight in kilograms (kg) by their height in meters (m) squared with the contemplation that mathematical mean of a population was the ideal. This formulae instantly became very popular among the public due to it's easy feasibility and undeniable logic of considering weight for height without taking age into consideration.

India is considered as a country with diverse people under the different economic and social strata. People from different financial and educational backgrounds live in communities and hence people couldn't be clustered into a community due to the existing differences. India has some of the richest and wealthiest people in par with the poorest. Due to westernization and influence of fast food and sedentary lifestyle, prevalence of overweight has increased to an alarming extent. Similarly, the presence of unignorable poverty amongst people, lack of knowledge regarding nutrition and health, presence of psychiatric problems like Anorexia nervosa and the constant pressure of being body shamed has led to the undernourishment amongst women in reproductive age group.

India faces double burden of both undernourishment and overweight due to the diverse population. More than 36 % women in India, have BMI less than 18.5Kgs/m2. In India, most number of underweight women reside in Bihar, Jharkhand and Chhattisgarh while most of the overweight women are from urban parts of Kerala, Punjab and Delhi⁽¹⁾ (National Family Health Survey on Adult Nutrition. 2005–2006).

Both Overweight and underweight have gained importance and significance in pregnancy owing to the complications that pregnant women with abnormal body mass index face during delivery and puerperium. Women with high BMI face Complications like miscarriages, increased rate of congenital anomalies, gestational hypertension and preeclampsia, gestational diabetes, thromboembolic disease, recurrent infections, sleep apnoea and prolonged pregnancy. Also there is an increased incidence of induction of labour, failed induction, operative vaginal delivery, large for gestational age babies, shoulder dystocia and third and fourth degree perineal lacerations. Both Elective and Emergency caesarean section rate is increased in women with obesity. Anaesthetic complications like regional blocks and difficult intubation are common in overweight women. Obesity in pregnancy carries a higher risk (1.32 times) of complications for both mother and her baby.

Underweight women are found to have a positive association with IUGR & Anemia. The amount of weight gain during pregnancy has been specified critically by various guidelines. If the weight gain is more or less than the proposed, it is found to have an adverse outcome in both the mother and her baby (2)

Pregnancy is the most important event in the life of every woman. During antenatal visits women visiting antenatal clinics ignore basic changes like weight gain in pregnancy. Also, Obstetricians tend to forget to tract the weight changes between the previous visits. Critical weight gain within the set limits is an important factor for a good pregnancy outcome. The incidence of obesity in women visiting antenatal clinics, are as high as 17 %. The incidence of maternal obesity in India in a few antenatal clinics is in par with the incidence in united states which is 20%

Incidence of underweight on average in every Indian antenatal clinic is 18 %, which is similar to that of overweight. Although pregnancy complications in obese and overweight women are well analyzed, the evidence of underweight causing complications in pregnancy is still not clear⁽³⁾.

Multiple research activities among different obstetric populations, states that increased pre pregnancy BMI is associated with heightened pregnancy interventions like labor induction and surgical interventions.

Timely correction of body mass index improves the prognosis and decreases the incidence of maternal and perinatal morbidity and mortality to a great extent. This study will help in reducing the burden of Abnormal BMI and adverse outcomes caused by it to a great extent. Pregnancy is the most important event in the life of every woman. During antenatal visits, women visiting antenatal clinics ignore basic changes like weight gain in pregnancy. Also, Obstetricians tend to forget to tract the weight changes between the previous visits. Critical weight gain within the set limits is an important factor for a good pregnancy outcome. The incidence of over weight in women visiting antenatal clinics are as high as 17 %. The incidence of maternal obesity in India in a few antenatal clinics is in par with the incidence in united states which is 20%.





AIMS AND OBJECTIVES:

- 1. To assess the risk factors of abnormal BMI in pregnant women.
- 2. To evaluate the effect of BMI on maternal and perinatal outcome.



REVIEW OF LITERATURE:

HISTORICAL REVIEW:

EPIDEMIOLOGY , PREVELANCE OF OBESITY AND COMPLICATIONS IN PREGNANCY

WORLD PREVALANCE:

In a survey published in Europe in 2020 by Hassan et al., to analyze the trend of underweight and overweight in women of child bearing age in low and middle income countries concluded that during the study period between 1990 to 2018, The highest number of underweight women were in Morocco (5.5%) and overweight women we in Nepal (12.4%). The study also estimated that In 2030, Madagascar (36.8%), Senegal (32.2%), and Burundi (29.2%) will experience the highest burden of underweight. Whereas countries like Egypt (94.7%), Jordan (75.0%), and Pakistan (74.1%) will have the highest burden of overweight. It was noted that, highest rate of overweight was in high-income, high-education and in urban women. The probability of eradicating overweight and underweight is nearly 0% for all countries by 2030, except Egypt which is forecasted to eliminate underweight⁽¹⁾.

PREVALENCE IN INDIA:

India is a country with people from diverse culture, tradition, religion, practices and languages. India embraces such huge population from diverse reeds, customs and colours quintessentially. Therefore India can be considered as a sample of the world. A study done on comparing the prevalence of underweight, overweight and obesity among Indian women using the updated data from various NFHS (National health family surveys) which suggested that National rural prevalence of overweight and Underweight were of 12% and 3.1%

respectively. While, the national urban prevalence was (22.2% and 9.1%) respectively. In 2015-16 (NFHS-4), It was predicted that 22.9% of Indian women were reported to be underweight, 15.5% overweight and 5.1% obese. The states/UTs belonging to Central (25.3% – 28.3%) and Eastern regions (21.3% - 31.5%) showed higher prevalence of underweight. While states/UTs from Northern (3.3% - 14.9%), Southern (6.4% - 14.6%) and Western (5.0% - 9.9%) regions showed higher prevalence of overweight⁽⁴⁾.

The body mass index (BMI), or Quetelet index, coined by AdolpheQuetelet, is a representative for body fat based on the individual's weight and height. BMI a mathematical formula to estimate whether a person is healthy or not by dividing their weight in kilograms (kg) by their height in meters (m) squared with the contemplation that mathematical mean of a population was the ideal. This formulae instantly became very popular among the public due to it's easy feasibility and undeniable logic of considering weight for height without taking age into consideration. BMI it is usually used to identify the problems in relation to weight.

BMI FORMULA:

The BMI is calculated by dividing person's weight by their height.

BMI =(weight in pounds/ height in inches) x 703

Or

BMI = (weight in kilograms /height in meters ²)

CATEGORIES OF BODY MASS INDEX:

The association between BMI and the fat distribution, percentage differs between various populations. Hence BMI classifications vary between countries.

CATEGORIES OF WEIGHT GAIN DURING PREGNANCY $^{(5)}$

CATEGORIES	BODY MASS INDEX
UNDERWEIGHT	$< 18.5 \mathrm{Kgs/m}^2$
NORMAL WEIGHT	18.5 to 24.9 Kgs/m ²
OVER WEIGHT	25.0 to 29.9 Kgs/m ²
OBESE	>/= 30Kgs/m ²

OTHER METHODS TO ASSESS BODY FAT:

- Infra red spectroscopy
- Underwater weighing
- Dexa densitometry
- Waist hip ratio
- Skin fold thickness
- MRI

TYPES OF OBESITY

Quantity of fat is not significant compared to placement or location of fat. Irrespective of weight, abdominal fat is more dangerous and it appears to have a dangerous effect on woman's ability to conceive. Obesity can be of the different types based on the distribution of fat.

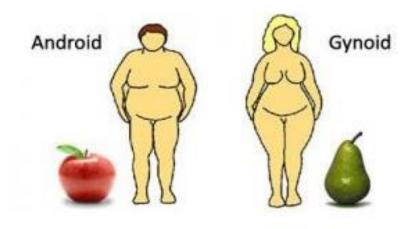
GLOBAL –no particular defined distribution

ANDROID - mainly in trunk and abdomen (APPLE shape obesity)

ABDOMINAL VISCERAL OBESITY – most deleterious effects

GYNOID - mainly in gluteo femoral region (PEAR shape obesity)

Android type (apple shape) obesity is more significant than gynoid type (pear type).



PREVALENCE OF OBESITY IN INDIA:

According to NFHS 3, nearly 10% of Indian population are overweight. Nearly 20% of school populations were under weight. Also, percentage of women in reproductive age between 15 to 49 years, who are over weight has been increased from 11% in NFHS 2 to 15% in NFHS 3. The incidence differs between urban and rural areas. Also, more than one third of obesity occurs in high income group.

HEALTH CONSEQUENCES OF OVERWEIGHT:

Overweight increases the risk of:

- Dyslipidemia
- Coronary artery disease
- Gallbladder disease
- Hypertension
- Stroke
- Diabetes type 2
- Liver disease nonalcoholic steato hepatitis (NASH)
- Insulin resistance
- Pulmonary dysfunction
- Osteoarthritis
- Pulmonary dysfunction
- Sleep apnea & respiratory problems
- Thromboembolic manifestations
- Stress on weight bearing joints.
- Pulmonary dysfunction Atherosclerosis
- Cardiomyopathy

MANAGEMENT OF OVERWEIGHT:

Prepregnancy counseling and body weight normalization is important for overweight women.

A multi- dimensional approach is needed which includes Diet, Physical activity and Behavior change.

PHARMACOTHERAPY

- Adjunct to diet & physical activity
- Usually used in BMI more than 30Kgs/m2 associated with other risk factors.
- contraindicated for aesthetic purposes
- •To be used only when 6-month trial of diet & physical activity fails to achieve weight loss
- SIBUITRAMINE and ORLISTAT are used.

SURGICAL TREATMENT

- 100 pounds overweight or BMI > 35 to 40 kgs/m2 with 2 significant comorbidities
- Age 18 to 60
- Documented failure at nonsurgical efforts.

1.Restrictive Surgery - uses bands or staples to create food intake restriction:

- ➤ Vertical Banded Gastroplasty (VBG) is a restrictive surgery and is very frequently performed procedure for obesity and overweight.
- ➤ Gastric Banding requires the use of a band to create stomach pouch.
- ➤ Laparoscopic Gastric Banding (Lap-Band)

2. Combined Restrictive and Mal absorptive Surgery

- ➤ Combination of restrictive surgery (stomach pouch) with *bypass* (mal absorptive surgery), in which the stomach is connected to the jejunum or ileum of the small intestine, bypassing the duodenum.
- ➤ Roux-en-Y Gastric Bypass (RGB) is the most commonly performed gastric bypass procedure, and the next most commonly performed surgical procedure for overweight and obesity after VBG.

➤ Bilio pancreatic Diversion (BPD)

EFFECT OF OVERWEIGHT ON PREGNANCY- THE SEQUELAE FROM ADOLESCENCE.

OVER WEIGHT AND PCOS:

Overweight is a common but not an essential feature of PCOS. About 30-60% of women with PCOS are overweight. Obesity contributes modestly to the risk of developing PCOS. Obesity adds to the pathophysiology in already affected women by aggravating the degree of insulin resistance and hyperinsulinemia. About 30% of PCOS have IGT and 10% have DM.

CHRONIC ANOVULATION:

Prevalence of overweight in women with chronic anovulation is 35 - 60%

Chronic anovulation is caused by:

- 1. Increased peripheral aromatization of androgens resulting in chronically elevated estrogen.
- 2. Decreased levels of hepatic SHBG production.
- 3. Insulin resistance leading to increased Insulin levels that increases androgen production in ovaries resulting in impaired follicular development.

SUBFERTILITY:

Women who are overweight are at 3 times increased risk of infertility (6)

In the presence of irregular cycles, infertility is associated with anovulation

➤ In the presence of regular cycles, There is anovulation even with regular cycles. There happens to be due to release of oocytes with reduced fertilization potential and endometrial abnormalities.

Ovulation induction poses a special challenge in overweight women. This is attributed to sequestration of these drugs in adipose tissue. Many studies show that increasing dosage of ovulation induction drugs and gonadotropins are needed to induce ovulation.

Positive results are obtained in women subjects who lost 5% of body weight. Women who lost 10% body weight and waist circumference decreased by 4 cm, insulin sensitivity increased by 70%, menstrual regularity and ovulation is improved.

OVERWEIGHT AND PREGNANCY:

MISCARRIAGES:

Women with overweight have higher risk of having miscarriages. Bellver and associates (2010) studies showed that implantation and rates of live birth were reduced with high BMI. Listen et al showed that, in women undergoing assisted reproductive techniques, obesity and overweight is related to increased rates of miscarriages and subsequently a reduced live birth rate⁽²⁾

CONGENITAL MALFORMATIONS:

Many evidences support that overweight in women, have a higher risk of congenital anomalies. Moreover congenital malformation risk appears as a dose response, with increase in the amount of fat content. Increased triglycerides, uric acid, resistance to insulin and chronic hypoxia may be the possible mechanisms in the occurrence of congenital anomalies. NTD is increased in infants of women with overweight. It may be because of low folic acid levels reaching the embryo because of poor absorption and increased metabolic demands.

Watkins et al in 2003 reported a two times greater risk for NTD, cardiac anomalies and ventral wall defects in overweight women^[3].

GESTATIONAL DIABETES:

Due to its strong association with over weight in general population, Type 2 DM is the most common medical complications in overweight pregnant women[6]. The increased risk of T2DM is related to exaggerated increase in insulin resistance in the overweight state^[7].

The incidence of gestational diabetes in overweight women is also increased when compared with general population. Bianco AT et al (1998) in their study of 613 patients with over weight, there was a higher incidence of GDM in the overweight group (14.2%) when compared to the normal weight group (1.2%)⁽⁸⁾

Glucose intolerance associated with gestational diabetes generally resolves postpartum. However, Overweight women with a history of gestational diabetes have a two-fold increased prevalence of subsequent T2DM compared to lean women.

PREGNANCY ASSOCIATED HYPERTENSION:

A link between overweight and hypertensive disorders during pregnancy is consistently reported. A low level of inflammation and activation of endothelium is seen in overweight mothers. This may also play a role in the patho physiology of preeclampsia in overweight women.

Wolf and coworkers (2001) linked endothelial activation and inflammation in overweight women with preeclampsia^[9].

Ramsay and coworkers (2002) confirmed that over weight pregnant women had elevated levels of IL6 and CRP as well as evidence of endothelial activation^[10].

O'Brien and associates (2003) found that risk of preeclampsia is doubled with every by 5-7kg/m2 increase in basal BMI.

Ehrenthal DB (2011) found that incidence of preeclampsia was more prevalent in the women with overweight[11]. Baeten JM et al. (2001) found that pregnancy with increased BMI is found to be associated with an increased incidence of eclampsia^[12].

Cunningham and colleagues(1986) found that overweight and preeclampsia are cofactors in peripartum cardiac failure⁽¹³⁾.

RESPIRATORY COMPLICATIONS:

Chest wall compliance is decreased with increased airway resistance causing excess work of breathing in overweight women. Also FVC and FEV1 are decreased in overweight women. There has been a causal relationship of overweight with sleep apnoea and asthma. Sahota et al reported increased rates of snoring, sleep apnoea and oxygen desaturation in pregnant women with overweight when compared with normal weight women.

CARDIOVASCULAR COMPLICATIONS:

Depending on the duration of overweight, profound effects were noted on vascular, endothelial and cardiac function. Cunningham and colleagues (1986) found that over weight and preeclampsia are cofactors in peripartum heart failure^[13].

THROMBOEMBOLIC COMPLICATIONS:

Many researches have concluded that pro coagulant factors that are increased in overweight mothers which can lead to increased risk of thrombo-embolism. Andreasen KR has

suggested in his study that overweight as a common risk factor associated with thromboembolic disease. RCOG reports on maternal deaths includes maternal overweight and obesity is a major risk factor for thromboembolism^[14].

INFECTIONS:

There is an increased incidence of urinary tract infections, endometritis and postpartum wound infections. Increased risk of urinary tract infection was reported by UshaKTS[15],but there was no increase reported in genital or wound infections.

Tilton Z has also reported increased risk of urinary tract infection, genital and wound infections in overweight women^[16].

PRETERM LABOUR:

Preterm labour risk in overweight mothers have been studied. Reasons are not clear. But it may be related to the related medical conditions associated with obesity.

Aly H etal (2010) reported that overweight women have increased chances to deliver preterm^[17].

Mandal D etal (2011) said that preterm labor in < 34 week gestation was more common over weight patients^[18].

Hendler*et al* (2005) studied the relation between pre-pregnancy BMI and preterm birth. They found significant occurrence of preterm birth among underweight and also in obese pregnant women^[19].

MALPRESENTATIONS:

Sheiner E et al[20] (2004) reported malpresentations that occurs at a higher rate in overweight women. It is difficult in overweight women to palpate and detect fetal parts due to

thick anterior abdominal wall. Also in overweight women with breech presentation it is difficult to do external cephalic version.

INDUCTION OF LABOUR:

The rate of induction is more in overweight women because of increased rate of hypertensive disorders, gestational diabetes or prolonged pregnancy. Failed induction is most commonly seen in overweight women.

Jensen DM etal(2003) reported from his study that the risk of induction of labor was increased in overweight women when compared with women who were of normal weight^[21]. Rossi et al. in 2019 reported that overweight women have a significantly increased incidence of requiring induction of labour in comparison with normal weight women^[22].

LABOUR COMPLICATIONS:

Labour is sometimes in coordinate because of increased incidence of macrosomia and cephalo pelvic disproportion happens to be more common in overweight mothers. Overweight women have a increased risk of prolonged labour, failure of progress, need for oxytocin augmentation and fetal distress.

INCREASED RATE OF CESAREAN SECTIONS:

Because of the above reasons operative vaginal delivery by forceps, vacuum and cesarean section is increased.

Perlow (1994)showed from his study that overweight women had higher rates of emergency cesarean delivery as well as increased operative time, increased blood loss, multiple epidural placements, higher rate of infections and prolonged hospitalization⁽²³⁾.

Pevzner L et al (2009) found that the incidence of LSCS increased from 21.3% in the BMI less than 30 group to 29.8% in the BMI 30-39.9 group and 36.5% in the BMI 40 and above^[24].

Haeri and co-workers (2009) in their study found increased rates of LSCS in overweight women.

Lynch and associates, (2008), found higher rates of emergency cesarean section in women with overweight⁽²⁵⁾. Poobalan and colleagues, (2009) also reported that higher rates of cesarean section in overweight women^[26].

Kominiarek MA etal (2010) stated that the cesarean section risks were increased as BMI increased for all subgroups, $P < .001^{(27)}$.

MACROSOMIA:

Obesity and GDM were isolated risk factors for macrosomia^[28]. Overweight is associated with increased insulin resistance and fetal hyper insulinemia in the absence of GDM. There is an increased energy flux to the fetus along with fetal hyperinsulinemia even in overweight patients without GDM which may contribute to the increased incidence of macrosomia in overweight mothers. Because of macrosomia, there is an increased incidence of shoulder dystocia in overweight women.

Meher-Un-Nisaetal (2009), in their study reported the frequency of shoulder dystocia is high in overweight females (1–7%) when compared to normal weight group (0%)^[29]. Maternal obesity is linked with obesity in childhood. It is also found that breast feeding decreases the risk of overweight in childhood.

Catalano and associates (2005) found a direct link of childhood obesity with maternal pre pregnancy obesity^[30].

ANAESTHETIC COMPLICATIONS:

Overweight women present anaesthesia challenges that include difficult epidural and spinal analgesia placement and complications from failed or difficult incubations. Regional anaesthesia is to be preferred to general anaesthesia. Mace HS et al. in 2011, reported that overweight women have higher chance of morbidity and mortality associated with regional and general anaesthesia. Caesarean deliveries are associated with increased anaesthesia associated complications in overweight mothers. [31].

POSTPARTUM HEMORRHAGE

Postpartum hemorrhage is also more common because of the delivery of macrosomic babies. Overweight mothers had a 70% increase in risk of PPH. Though it is difficult to quantify blood loss there is definite need for blood transfusion. Postoperative complications are most common, veins are less accessible for transfusion and the duration of hospital stay is longer.

POSTPARTUM COMPLICATIONS

WOUND INFECTION

In overweight women, post operative wound infection are common. The Pfannenstiel incision is advantageous in overweight women from the point of recovery, although it may not be a comfortable incision for delivering a large baby. Wall and colleagues (2003) reported a fourfold increase in wound complication rate when a vertical abdominal incision was compared with a transverse incision^[32].

Subcutaneous closure in wound thickness >2cm resulted in 6% decrease in wound disruption. There is a 2 to 3 times increased chance of infection in overweight women after caesarean delivery in both primary or secondary caesarean delivery.

LACTATE DYSFUNCTION:

Overweight women have a link with alteration in hypothalamic-pituitary ovarian axis and fat metabolism resulting in failure to initiate lactation and decreased duration of lactation.

AFTERCARE:

Due to increased incidence of diabetes, hypertensive disorders, increased rates of instrumental deliveries, cesarean sections, increased rates of NICU admissions and postpartum infections, there is more incidence of prolonged hospitalization in overweight mothers.

POSTPARTUM DEPRESSION:

Lacoursiere and varner(2009) found in his study that postpartum depression is increased in overweight women^[33].

CONTRACEPTION:

Overweight women have more chance of oral contraceptive failure and higher rates of pregnancy because of altered drug metabolism.

Holt and colleagues (2009) found in their study that in women with weight more than 70.5 kg on oral contraceptives had more failure rate and pregnancy was increased by 1.6 fold ⁽³⁴⁾.

EFFECT OF UNDERWEIGHT ON PREGNANCY:

Patient can be too lean and thin as per genetic constitution or more commonly nutritional deprivation which may arise from starvation, dietary or chronic eating disorders, such as anorexia nervosa and bulimia. Though pre pregnancy BMI has a genetic and nutritional component, in underweight women BMI is a indicator of decreased tissue nutrients.

The determinants of IUGR and low birth weight that are well studied are smoking cigarettes, low BMI and low gestational weight gain. Low birth weight forms 30% of all births, with low basal BMI and malnutrition as risk factors. Low birth weight rises the risk for infant mortality and morbidity. Infant mortality rate rises with decreasing birth weight.

It has been noted that underweight women have decreased cardiac output, rise in vascular disease, decreased rennin angiotensin aldosterone response and these are associated with insufficiency in utero placental circulation which can in turn lead to low birth weight in babies.

BMI can be considered as a marker to detect underweight. Studies done to assess the risk factors for IUGR and low birth weight showed that smoking cigarettes, low BMI and low gestational weight gain are well associated with the same. Low birth weight in turn increases the risk for infant mortality and morbidity^{[31].}

Many studies show that low BMI is associated with:

- preterm delivery,
- low birth weight both small for gestational age and IUGR babies
- increased risk of anemia,
- •increased rate of perinatal mortality
- health problems like electrolyte imbalance, dehydration and depression especially if the mother was having eating disorders at the time of conception.

But there is a low risk of hypertensive disorders and gestational diabetes, decreased risk of LSCS, assisted vaginal delivery and postpartum haemorrhage.

Bhowmik JM.et al (2018) concluded that maternal nutritional status determines the fetal size⁽³⁵⁾. Hendler *et al* (2005) in his study on preterm births found significant occurrence of preterm births among lean women⁽¹⁹⁾

WEIGHT GAIN IN PREGNANCY:

In 20th century, weight gain recommendations have changed. Strict restriction of weight gain that was first recommended in the first half was changed to considerable weight gain in 1980's. In the year1990, Institute of medicine(IOM) has given recommendations for ranges of weight gain with the important goal to improves weight of the infants. Whether guidelines of IOM are the finest and only recommendation of average amount of pregnancy weight gain is another question and is not clearly studied. The risk of less birth weight rises with inadequate weight gain on a longtime.

Low weight gain during pregnancy was related to:

- increased fetal death rates
- lower birth weight
- higher incidence of anemia

High weight gain was associated with:

- hypertension during pregnancy (preeclampsia)
- macrosomia
- dysfunctional labor
- Malpresentation
- cephalopelvic disproportion
- fetal distress.

RECOMMENDATIONS FOR TOTAL AND RATE OF WEIGHT GAIN DURING PREGNANCY⁽⁵⁾

CATEGORY (BMI)	TOTAL WEIGHT GAIN RANGE (lb)	WEIGHT GAIN IN SECOND AND THIRD TRIMESTERS MEAN IN Lb /wk (range)
UNDERWEIGHT	28 to 40	1 (1-1.3)
$(<18.5 \text{ kgs/m}^2)$		
NORMAL WEIGHT	25 to 35	1 (0.8 to 1)
$(18.5 \text{ to } 24.9 \text{ kgs/m}^2)$		
OVER WEIGHT	15 to 25	0.6 (0.5 -0.7)
$(25.0 \text{ to } 29.9 \text{ kgs/m}^2)$		
OBESE (>/=30 kgs/m ²)	11 to 20	0.5 (0.4 – 0.6)

WEIGHT REDUCTION DURING PREGNANCY:

Since maternal catabolism during pregnancy is not good for the fetus, even overweight mothers are not advised weight loss during pregnancy. IOM also advices the same. But weight gain should be optimal.

PREGNANCY FOLLOWING BARIATRIC SURGERY:

Bariatric surgery is a good option for infertile women with morbid obesity. The pregnancy complications are less in morbidly obese women after bariatric surgery. Nutrient supplementation should be adequate for women who conceived after bariatric surgery.

Falcone and colleagues(2018) did not report any long term complications in pregnant women following Roux-en Y gastric bypass surgery^[36].

MANAGEMENT OF PREGNANCY WITH ABNORMAL BMI:

PREPREGNANCY COUNSELLING:

- Underweight women should be counseled for weight reduction before conception.
- Smoking and alcohol consumption should be avoided.
- Preconceptional folic acid should be advised.

MANAGEMENT DURING PREGNANCY:

- BMI should be recorded at the first antenatal visit. ACOG recommends recording of BMI at first antenatal visit.
- Advice regarding optimal weight gain in pregnancy according to their BMI should be advised.
- Screening for GDM should be done at the initial visit and subsequently at 24-28weeks and at 32-34weeks should be done.
- Close monitoring for hypertensive disorders should be made.
- Anomaly screening at 11to 13weeks and 18 to 22 weeks should be made.
- Monitoring of fetal growth profile.
- Careful antenatal and fetal heart rate monitoring during labour.
- Consider cesarean section if EFW >4.5kg in obese non-diabetic women and >4kg in a women with diabetes.
- Prophylactic antibiotics and thrombo prophylaxis should be considered in overweight women undergoing cesarean section.
- Breastfeeding should be started early to prevent failure of initiation of lactation
- Advice for contraception and weight reduction should be given in the postpartum period.



METHODS AND MATERIALS

METHODS AND MATERIALS:

SOURCE OF DATA:

Antenatal mothers visiting our Outpatient department/labour room at Sri Devaraj Urs

Academy of Higher education and Research Centre, R.L.Jalappa hospital of more than 28

weeks of Gestational age were selected by assessing the inclusion and exclusion criteria,

after obtaining informed consent.

Study design: A prospective observational study

Study period- January 2020- June 2021

METHODOLOGY:

This is an prospective observational study conducted in The Department of Obstetrics and

Gynaecology, RL Jalappa Hospital, Tamaka, Kolar from JANUARY 2020 to June 2021. All

antenatal cases with period of gestation > 28 weeks to 42 weeks were selected and classified

into underweight, normal and overweight women according to BMI and were observed for

Maternal and Perinatal outcome.

INCLUSION CRITERIA:

Primigravida with singleton pregnancy of Gestational age of >28 weeks to 42 weeks.

EXCLUSION CRITERIA:

Pregnant women with co-morbidities like pre-existing chronic hypertension, overt diabetes

mellitus, renal disease, pulmonary disease and cardiac disorders.

Multiple pregnancies like Twin gestation, triplet gestation.

Page 24

METHOD OF DATA COLLECTION:

- 1. All pregnant woman with gestational age> 28 weeks visiting RLJH hospital fulfilling the criteria were studied.
- 2. At the time of enrolment, an informed written consent was obtained from the study population
- 3. A detailed history and clinical examination including general Physical, Obstetric and systemic examination was done. Height, weight was measured and BMI was calculated by the formula BMI=Weight in Kgs/ square of height in meters and categorized into 3 groups.
- 4. Category I-underweight women(BMI <18.5 Kgs/m2), Category II-Normal woman (BMI- 18.5 to 24.9 kg/m2) and Category III- Over weight (BMI> / = 25 to 29.9 Kgs/m2) according to William's classification of Body mass index.[5]
- 5. Routine investigation including CBC with blood grouping, BT, CT, Urine Routine, serology, obstetric scan with BPP was done
- 6. Each pregnant woman was followed up until delivery and the maternal and perinatal outcome was recorded
- 7. Apgar score at 1 min and 5 mins, LGA, SGA, Low birth weight, IUGR, NICU admission was recorded and included in the study.

DATA COLLECTION TOOLS:

All the relevant parameters were documented in a structured study proforma.

ETHICAL CONSIDERATIONS:

The current Study was permitted by institutional human ethics committee. Informed written consent was obtained from all the participants and only those participants willing to sign the informed consent were counted in the study. The jeopardizes and profits related in the study and voluntary nature of participation were clarified to the participant before getting consent. Confidentiality of the study samples was maintained.





STATISTICS:

95% confidence levels and 7% precision

with average prevalence of 12% of Abnormal BMI in pregnancies. Sample size was

determined by epi info version 3.0 open source calculator. 12% reference is taken as observed

in a study by :Bhushan N et al 2017 [37].

Data was entered in M.S Excel and transferred to SPSS version 22 software.

For quantitative data, mean was calculated and for qualitative data, Chi square test was

calculated.

• Sample size was calculated by the formula

n=[DEFF*Np (1-p)]/[(d*d/Z2 1-alpha/28 (n-1)+p*(1-p)]

n = sample size

N = population size

p = Hypothesized percentage frequency of outcome factor in the population

d = Confidence limits as percentage of 100

DEFF = Design effect for cluster surveys.

SAMPLE SIZE: 87 CASES





RESULTS

Among the total study population- The 87 people. 32 subjects belonged to underweight category, 30 belonged to Normal weight category and 25 belonged to overweight category.

Table 1: CATEGORIES OF WEIGHT GAIN DURING PREGNANCY (2)
TOTAL SAMPLE (N = 87)

CATEGORY 1 : UNDER WEIGHT (BMI < 18.5 Kgs/m ²)	CATEGORY 2: NORMAL WEIGHT(BMI 18.5 TO 24.9 Kgs/m ²)	CATEGORY 3: OVER WEIGHT (BMI >/= 25 TO 29.9 Kgs/m ²)
32 (36.78%)	30 (34.48%)	25(28.73%)

Fig 1: Bar chart of distribution of study population

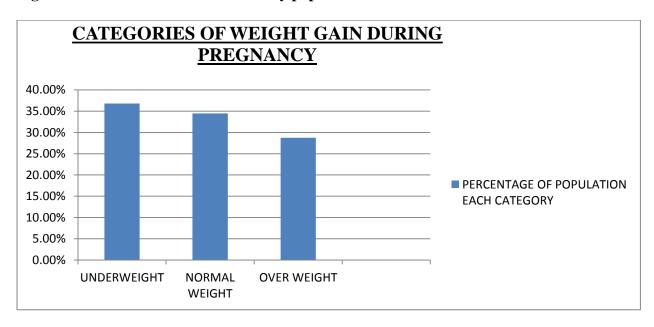
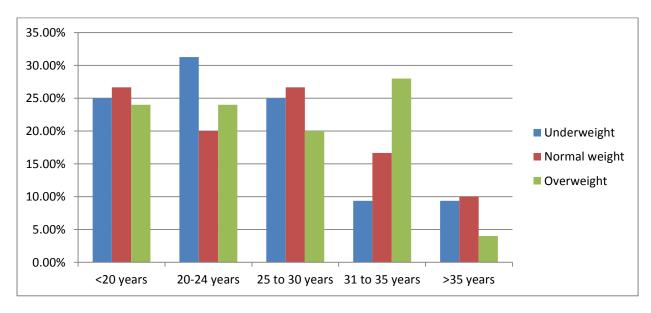


TABLE 2: AGE DISTRIBUTION IN STUDY POPULATION

AGE WISE	UNDER	NORMAL	OVER	CHI	P
	WEIGHT	WEIGHT	WEIGHT	SQUAR	
DISTRIBUTION	N = 32	N = 30	N = 25	E TEST	VALUE
LESS THAN 20					
YEARS	8 (25.00%)	8 (26.66%)	6 (24.00%)		
20 TO 24 YEARS	10 (31.25%)	6 (20.00%)	6 (24.00%)		
25 TO 30 YEARS	8 (25.00%)	8 (26.66%)	5(20.00%)	3.542	0.896
31 TO 35 YEARS	3 (9.375%)	5 (16.66%)	7 (28.00%)		
MORE THAN 35					
	3 (9.375%)	3 (10.00%)	1 (4.00%)		
YEARS					

Fig 2: Bar diagram of Age wise distribution of study population.

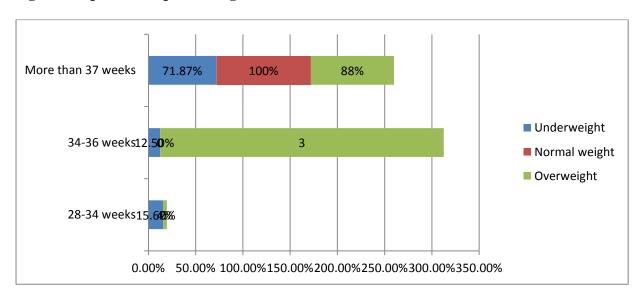


The table 2 shows distribution of patients under different age groups according to BMI. There isn't any significant relationship between the age and BMI of patients as the sample population is uniformly distributed.

TABLE 3: COMPARISON OF PERIOD OF GESTATION

PERIOD OF	UNDERWE	NORMAL	OVER	CHI	P VALUE
GESTATION	IGHT	WEIGHT	WEIGHT	SQUARE	PVALUE
	N= 32	N= 30	N = 25	TEST	
28 WEEKS 1					
DAY TO 34	5 (15.62%)	0	1 (4%)		
WEEKS					
34 WEEKS 1					
DAY TO 36	4 (12 50/)	0	2(80/)	8.727	.068
WEEKS 6	4 (12.5%)	0	2(8%)		
DAYS					
MORE THAN	23 (71.87%)	30 (100%)	22 (88%)		
37 WEEKS	23 (71.0770)	30 (100%)	22 (66/0)		

Fig 3: Comparison of period of gestation

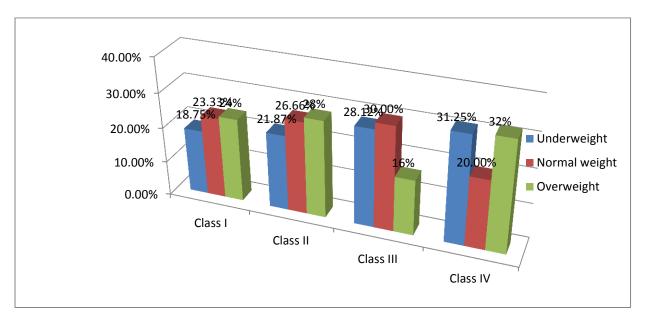


The table 3 shows, The relation between period of gestation and BMI of mothers. It shows that all normal weight mothers were 37 weeks or more than 37 weeks. About, 88% of overweight mothers presented as term gestation and 71.87% of term mothers belonged to underweight category. Early preterm gestation of about 15.62% and late preterm gestation of 12.5% of women belonged to underweight category.

TABLE 4: COMPARISON OF SOCIO ECONOMIC STATUS (ACCORDING TO B.G PRASAD'S CLASSIFICATION)

SOCIO	UNDER	NORMAL	OVER	СНІ	
ECONOMIC	WEIGHT	WEIGHT	WEIGHT	SQUARE	P VALUE
STATUS	N = 32	N = 30	N = 25	TEST	
CLASS I	6(18.75%)	7 (23.33%)	6(24%)		
CLASS II	7(21.87%)	8 (26.66%)	7(28%)	2.468	.872
CLASS III	9 (28.12%)	9 (30.00%)	4(16%)	2.100	.072
CLASS IV	10 (31.25%)	6 (20.00%)	8(32%)		

Fig 4: comparison of Socio economic status



The table 4 shows, The relation of socioeconomic status with preconceptional BMI of mothers. Majority of mothers in underweight category belonged to low socio economic status(31.25%), while majority of overweight mothers belonged to both low (32%) and high(24%) socioeconomic status. Mothers belonging to normal BMI group were equally distributed among all the socio economic groups.

TABLE 5: COMPARISON OF RISK FACTORS DURING ANTENATAL PERIOD

RISK FACTORS	UNDER	NORMAL	OVER	CHI	
DURING ANTENATAL	WEIGHT	WEIGHT	WEIGHT	SQUARE	P VALUE
PERIOD	(N=32)	(N= 30)	(N=25)	TEST	
GESTATIONAL	0	0	3 (12%)		
DIABETES MELLITUS	U	U	3 (1270)		
PRE ECLAMPSIA	3(9.37%)	4 (13.33%)	7 (28%)		
ANTE PARTUM	0	2 (6.66%)	5(20%)		
ECLAMPSIA	O	2 (0.0070)	3(2070)		
ANAEMIA	8 (25%)	2 (6.66%)	0	6.381	0.041
PRE TERM LABOUR	6 (18.75%)	0	0		
PRETERM					
PREMATURE	1 (2 120/)	0	0		
RUPTURE OF	1 (3.12%)	U	U		
MEMBRANES					

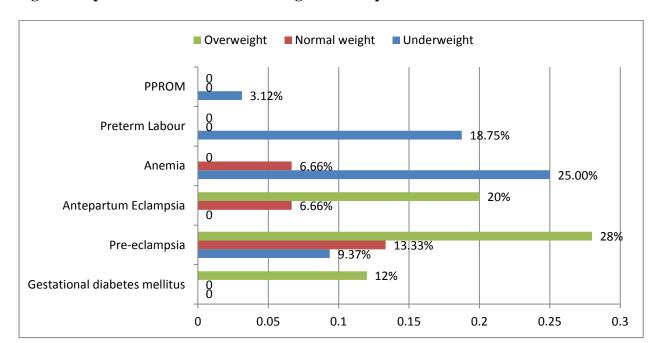


Fig 5: Comparison of Risk factors during antenatal period

The table 5 shows, The risk factors involved during antenatal period developed among women under different classifications of BMI. It shows p-value < 0.05 significance by pearson chi-square test,12% women showed gestational diabetes in high BMI group, Pre-ecclampsia was seen in 9.37%,13.33% and 28% of patients in underweight, normal weight and over weight categories. Antepartum eclampsia was seen in 20% overweight patients. Anemia was majorly seen in 25% of underweight women. Preterm labour (18.75%) and PPROM(3.12%) were seen in underweight patients. Risk factors were mostly seen to develop in overweight mothers than mothers under other groups.

TABLE 6: COMPARISON OF ONSET OF LABOUR

ONSET OF	UNDER	NORMAL	OVER	CHI	p
	WEIGHT	WEIGHT	WEIGHT	SQUARE	1
LABOUR	N = 32	N = 30	N = 25	TEST	VALUE
SPONTANEOUS	11 (34.37%)	13 (43.33%)	5 (20%)	14796	0.022
INDUCED	10(31.25%)	11 (36.66%)	10 (40%)	14.786	0.022

Fig 6: comparison of onset of labour

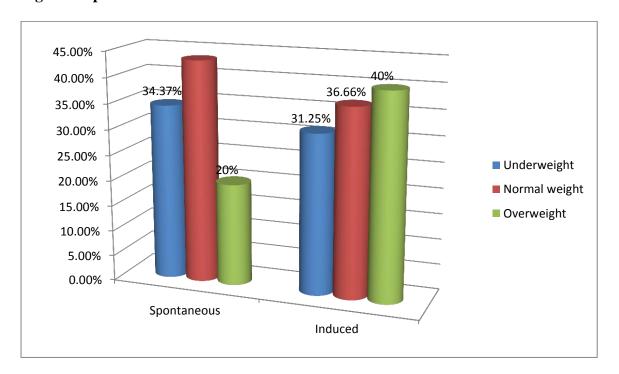


Table 6 shows, statistical significance by likelihood ratio p-value < 0.05. Spontaneous labour was seen in 34.48%, 43.33%, 20% in underweight, normal and overweight women respectively. Induction of labour was performed in 31.03%, 36.66%, 40% of underweight, normal weight and overweight patients respectively.

TABLE 7: COMPARISON OF MODE OF DELIVERY

MATERNAL OUTCOME	UNDER WEIGHT N= 32	NORMAL WEIGHT N = 30	OVER WEIGHT N = 25	CHI SQUARE TEST	P VALUE
VAGINAL DELIVERY	12 (37.5%)	18 (60.00%)	3(12.00%)		
INSTRUMENTAL/ ASSISTED VAGINAL DELIVERY	11 (34.37%)	6 (20.00%)	5 (20.00%)	17.463	0.002
LSCS	9 (28.12%)	6 (20.00%)	17 (68%)		

Fig 7: Comparison of mode of delivery

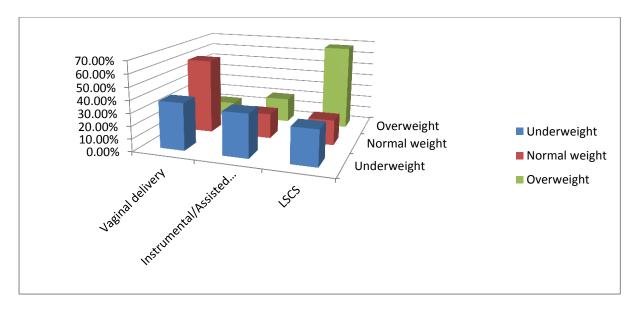
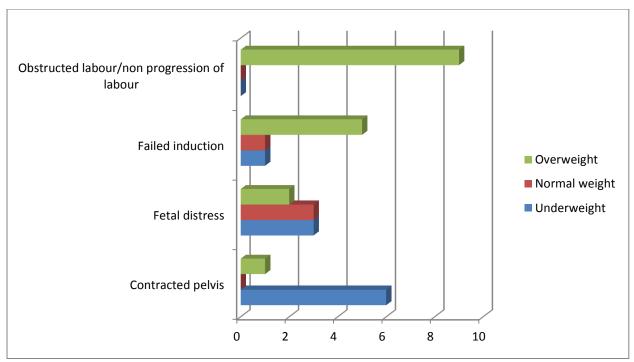


Table 7 shows p-value < 0.05 by pearson chi-square test of statistically significant outcome. 60% of Normal weight women ,37.5% underweight women and 12% of overweight patients underwent normal vaginal delivery. 34.37% of underweight and equal percentage of 20% of normal weight and overweight patient underwent assisted vaginal deliveries. Majority of overweight (68%) women underwent LSCS. 28.12% of underweight women underwent LSCS and normal BMI women have the lowest percentage of 20% LSCS.

TABLE 8: COMPARISON OF INDICATION OF LSCS:

INDICATION OF	UNDER	NORMAL	OVER	CHI	
LSCS	WEIGHT	WEIGHT	WEIGHT	SQUARE	P VALUE
Laca	N = 9	N = 6	N = 17	TEST	
CONTRACTED	6 (66.66%)	1(16.66%)	0		
PELVIS	0 (00.0070)	1(10.0070)	U		
FETAL DISTRESS	3 (33.33%)	4 (66.66%)	6(35.29%)		
FAILED	0	1 (16.66%)	7(41.17%)	5.770	0.056
INDUCTION	U	1 (10.00%)	7(41.1770)		
OBSTRUCTED	0	0	4(23.52%)		
LABOUR	U		+(23.3270)		

Fig 8: Comparison of indication of LSCS



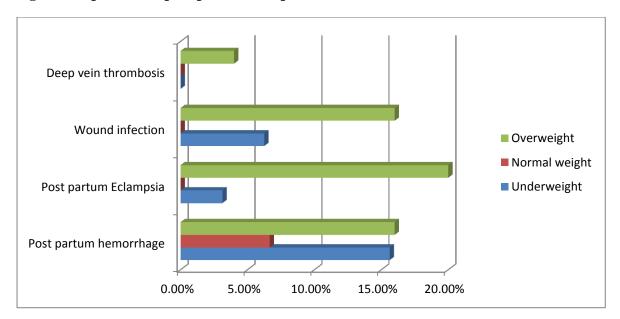
The table 8 shows, indication of LSCS across women in different BMI. Contracted pelvis (66.66%) was the most common indication in underweight women. and only one case of overweight women with contracted pelvis.

66.66% of normal weight women, 33.33% of underweight women and 35.29% of overweight women had LSCS due to fetal distress. Failure of induction was seen mostly in (41.17%) overweight women, followed by normal BMI women. Obstructed labour was seen in 23.52% of overweight women.

TABLE 9: COMPARISON OF POST PARTUM COMPLICATIONS:

POST PARTUM	UNDER	NORMAL	OVER	CHI	
	WEIGHT	WEIGHT	WEIGHT	SQUARE	P VALUE
COMPLICATION	N = 32	N= 30	N= 25	TEST	
POST PARTUM	5 (15.62%)	2 (6.66%)	4 (16%)		
HAEMORRHAGE	3 (13.0270)	2 (0.0070)	4 (1070)		
POST PARTUM	1(3.125%)	0	5 (20%)		
ECLAMPSIA	1(3.12370)	O	3 (2070)	13.661	0.001
WOUND	2 (6.25%)	0	4 (16%)		
INFECTION	2 (0.2370)	Ü	1 (1070)		
DEEP VENOUS	0	0	1 (4%)		
THROMBOSIS		J	1 (770)		

Fig 9: Comparison of post partum complications



The table 9 shows, p-value < 0.05 statistically significant outcome between postpartum complications and BMI. Postpartum haemorrhage observed 15.62% of underweight patients. Postpartum eclampsia seen in 20% of over weight patients. Wound complications seen in 16% overweight and 6.15% underweight patients. Deep vein thrombosis seen in only one overweight patient.

TABLE 10.1: COMPARISON OF BIRTH WEIGHT OF BABIES

BABY BIRTH WEIGHT	UNDER WEIGHT N= 29	NORMAL WEIGHT N = 30	OVER WEIGHT N=23	CHI SQUARE TEST	P VALUE
≤2.5 kgs	15(51.72%)	7(23.33%)	6 (26.08%)	11.723	0.164
2.6 to 3.5 kgs	11(37.93%)	13 (43.33%)	7 (30.43%)	111,20	01101
≥3.6 kgs	3(10.34%)	10(33.33%)	10(43.47%)		
MEAN BIRTH WEIGHT	2.1 Kgs	2.9 Kgs	3.2 Kgs		

TABLE 10.2: COMPARISON OF STUDY POPULATION BASED ON APGAR AT 1 MIN

	STUDY GROUP			СНІ	
APGAR	UNDER	NORMAL	OVER		P VALUE
at 1 min	WEIGHT	WEIGHT	WEIGHT	SQUARE	PVALUE
	N = 29	N =30	N=23	TEST	
5	2(6.89%)	0	5(21.73%)		
6	12(41.37%)	5(16.66%)	10(43.47%)	1.043	0.121
7	15(51.72%)	25(83.33%)	7(30.43%)		3.522

TABLE 10.3: COMPARISON OF STUDY POPULATION BASED ON APGAR 5 MINS

	S	TUDY GROU	СНІ		
APGAR	UNDER	NORMAL	OVER	SQUARE	P VALUE
at 5 min	WEIGHT	WEIGHT	WEIGHT	TEST	1 VALUE
	N = 29	N = 30	N=23	1ES1	
7	4(13.79%)	0	6(26.08%)	10.654	1.12
8	10(34.48%)	4(13.33%)	10(43.47%)	10.05	1.12
9	15 (51.72%)	26(86.66%)	7(30.43%)		

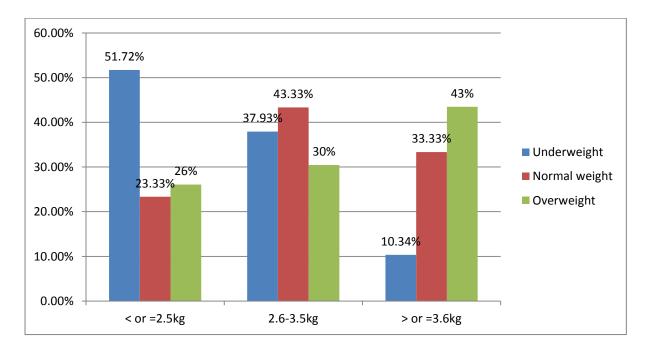


Fig10:Comparison of birth weight of babies

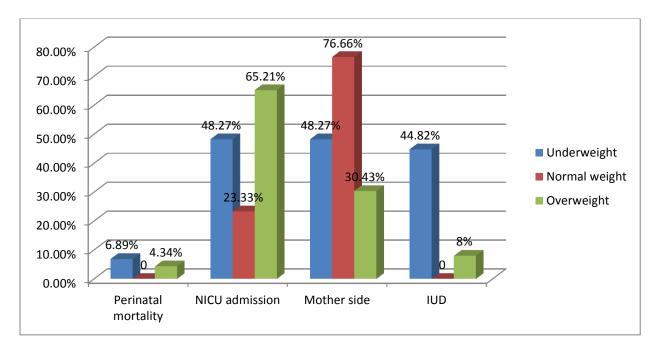
Table 10.1, 10.2 and 10.3 shows the relation between BMI and birth weight of babies.

51.72% of underweight women, 26.08% of overweight women and 23.33% of normal weight women had deliveries with birth weight less than 2.5kg. The babies with birth weight in range of 2.6-3.5kg included 43.33% of babies born to normal weight BMI women, 30.43% of overweight BMI women and 37.93% of underweight women. Babies with birth weight more than 3.5 Kgs are seen mostly born to overweight and normal weight BMI mothers.

TABLE 11:COMPARISON OF PERINATAL OUTCOME:

PERINATAL COMPLICATIONS	UNDER WEIGHT N = 29	NORMAL WEIGHT N = 30	OVER WEIGHT N = 23	CHI SQUARE TEST	P VALUE
PERINATAL MORTALITY	2 (6.89%)	0	1 (4.34%)		
NICU ADMISSION	14 (48.27%)	7(23.33%)	15 (65.21%)	17.074	0.002
MOTHER SIDE	13 (44.82%)	23 (76.66%)	7 (30.43%)		
IUD	3 (9.37%)	0	2 (8%)		

Fig 11: Comparison of perinatal outcome



The table 11 shows statistically significant outcome between perinatal outcome and maternal BMI.Perinatal mortality is seen in 6.89% in underweight women and 4,34% in overweight women. Most babies born to overweight mothers had NICU admission.(65.21%) followed by babies born to under weight mothers(48.27%).IUD's were mostly seen in underweight women (9.37%)followed by overweight women.(8%)

TABLE 12:COMPARISON OF PERINATAL COMPLICATIONS

	UNDER WEIGHT N = 29	NORMAL WEIGHT N = 30	OVER WEIGHT N = 23	CHI SQUARE TEST	P VALUE
SMALL FOR GESTATIONAL AGE	5 (17.24%)	2 (6.66%)	3(13.04%)		
LARGE FOR GESTATIONAL AGE	0	1 (3.33%)	4 (17.39%)		
PRE TERM CARE	5 (17.24%)	0	1 (4.34%)	11.275	0.004
RESPIRATORY DISTRESS	3 (10.34%)	3 (10.00%)	3 (13.04%)		
MECONIUM ASPIRATION SYNDROME	1 (3.44%)	2 (6.66%)	3 (13.04%)		
BIRTH ASPHYXIA	1 (3.44%)	0	2 (8.69%)		
PERINATAL SEPSIS	3 (10.34%)	0	1 (4.34%)		
PERINATAL JAUNDICE	1(3.44%)	0	3 (13.04 %)		

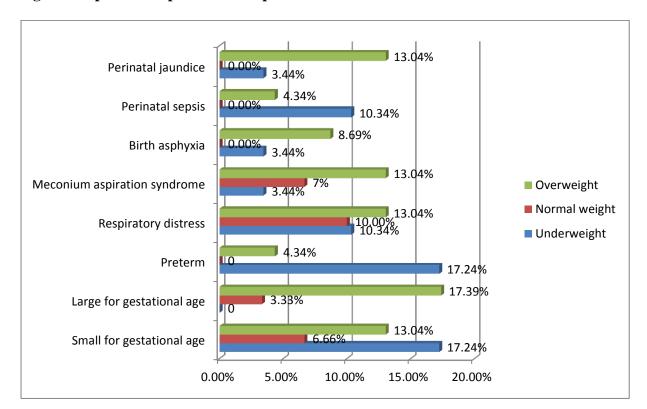


Fig 12:comparison of perinatal complications

The table 12 shows, the statistically significant p<0.05 by pearson-chi square test. Small for gestational age or IUGR was seen in 17.24% of babies born to underweight mothers followed by 13.04% of babies born to overweight mothers.

Large for gestational babies were mostly seen in overweight mothers (17.39%) followed by 3.33% of normal weight mothers. Babies went to nicu in overweight category due to respiratory distress (13.04%). In normal weight categories babies went to nicu for respiratory distress in 10% of women. Preterm majority 17.24% was seen in underweight. Meconium aspiration syndrome was seen in 3,44%, 6.66% and 13.04% of babies born to underweight, normal weight and overweight mothers. No birth asphyxia seen in normal weight patients. 8.69% of birth asphyxic babies were born to overweight mothers. Perinatal sepsis was seen in 10.34% of underweight patients and 4.34% seen in overweight patients. no cases seen in normal weight patients.13.4% babies born to overweight mothers had perinatal jaundice.



DISCUSSION

SOCIO-ECONOMIC STATUS:

Our study showed no major difference in socioeconomic status and BMI difference between underweight(18.75%), normal weight(23.33%) and overweight(24%). However, patients with low socioeconomic status or class IV showed a slightly higher proportion of overweight patients 32% which is similar to the study done by Praween Agrawal et al in 2012, that women of low socioeconomic status or those belonging to tribal community with limited access to media had higher BMI[38], Similar study done by Jung H. Park et al 2011 a retrospective cohort study of 3554 singleton pregnancies results showed were higher percentages of low levels of education and low economic status in the overweight gravidas and their husbands (P < 0.05)[39].

A Study done by Sohinee Bhattacharya et al 2007 showed fewer women in the abnormal BMI categories were from higher socioeconomic groups in comparison with women with normal BMI. Our study showed 13.79% women with abnormal BMI belonging to high socio economic status[2].

PERIOD OF GESTATION:

Our results showed statistical significance in relation between gestational age of patient and maternal BMI. The patients with normal BMI have higher likelihood of reaching full term gestational age while overweight patients showed nearly 88% reaching more than 37 weeks similar study done by Meng-kai DU et al 2016 showed significant outcome and our study showed preterm labour is seen in 28.12% in underweight patients. These results are comparable to study done by P. Kalk et al 2009 showed 16.8% preterm labour associated with underweight.[40][41].

Another study done by Zhen Han et al 2010 with 78 studies were included involving 1,025,794 women systematic review and meta-analyses, determined that singletons born to underweight women have higher risks of PTB (overall, spontaneous and induced) and LBW than those born normal weight mothers[42]. Kramer MS et al 1995 study concluded that adequate supplementation is required to prevent preterm labour showed increased incidence of preterm labour in underweight BMI patients(43).

A study done by H.M. Salihuetal 2009 showed similar results underweight mothers had about 40% increased likelihood for preterm (adjusted odds ratio (AOR) = 1.41; 95% confidence interval (CI) (1.37–1.45)) and about 50% increased risk for very preterm delivery[44].A Study done by Katja Vince et al 2020 on 32,051 pregnant women, 5.3% were underweight, 65.5% had normal BMI, 20.4% were overweight and 8.8% were obese showed underweight and overweight women had a higher prevalence of preterm birth (p<.001)[45].

RISK FACTORS DURING ANTE NATAL PERIOD:

Our study shows a statistical significance and higher percentage of risk factors in overweight patients with gestational diabetes(12%),increasing the maternal morbidity similar study done by kim et al 2015 showed increased risk of gestational diabetes mellitus in overweight individuals(46).

Another study done by Michael Conal Dennedy et al 2010 showed dysglycemia and GDM were seen significantly higher in patients with overweight and obesity [47]. A Study done by Ramya S et al 2019 showed, out of 38 women with overweight, 18.42% (n=7) had GDM which is similar to our findings [48]. Another study done by A. S. Poobalanet al 2009 showed

maternal obesity or overweight associated with gestational diabetes, macrosomia and still birth[26].

Our study showed pre-eclampsia (28%) in overweight patients which is similar to study conducted by Katja Vince et al 2020 on 32,051 pregnant women, 5.3% were under-weight, 65.5% had normal BMI, 20.4% were overweight and 8.8% were obese. They showed gestational diabetes (GD), gestational hypertension and preeclampsia were higher in overweightgroup[45].

In our study preeclampsia is seen in 28% of overweight women, which is similar to study done by Doherty et al 2006 reported an increased risk in both gestational hypertension and pre- eclampsia hypertension (p<0.001), preeclampsia (p<0.001) in overweight women[49]. In our study majority patient with anemia belonged to underweight and no patients with obesity showed sign of anemia which is similar to study done by Sumi Agrawal et al 2016[50]. A study in Institute of Medicine WIC nutrition risk criteria: a scientific assessment by donna v 1996 both study concluded increased prevalence of anemia in underweight patients(51).

In our study both preterm labour(18.75%) and PPROM(3.12%) were seen in patients with underweight similar study done by ChaturicaAthukorala et al 2010 shows similar outcomes of preterm labour in patients with low BMI[52]. Another study done by Zhen Han et al 2010 showed over all risk of PTB <37 weeks was increased in underweight women compared with normal BMI women[42]. Another study done by Rachna Chaudhary et al 2021 showed preterm labor pains occurred in 12% of the pregnancies with normal BMI, 32% in the low BMI and 4% in overweight group, the difference was statistically significant with a p value

of 0.000. overall patients with normal BMI has less risk factors(68.96%) compared to other two group[53].

ONSET OF LABOUR:

In our study 40% women in overweight category required induction of labour which was similar to study done by Chu et al.2007 and Athukorala C et al 2010. It showed overweight pregnant women are prone to undergo labour induction or have delivery by caesarean section compared to women with normal BMI[54][52]

In our study spontaneous labour is seen in 34.37% underweight women and 43.33% normal weight women compared to only 20% in over weightwomen which is similar to study done by Katja Vince et al 2020 which showed 80.9% underweight women and 76.2% normal women had spontaneous onset of labour[45].

Another study done by NishuBhushan et al 2017 showed higher percentage of underweight and normal weight women having spontaneous onset of labour while induction of labour was mostly used in overweight women[37].

MATERNAL OUTCOME:

In our study majority of overweight patients 68% underwent caesarean section which is similar to study conducted by Sohineebhattacharya et al 2007 which showed 19.9% overweight women and 26.3% in obese women needed to undergo emergency LSCS [2].

Our study shows 60% normal weight women having normal vaginal deliveries. Similar study done by Anjanaverma et al 2012 showed 83.7% normal weight women and 87% underweight women having vaginal deliveries [55]. Underweight women having Assisted vaginal

deliveries could be due to poor maternal bearing down efforts due to increased exhausion secondary to Anaemia. Also, shortening the duration of second stage of labour in Anaemia and cardiac diseases is recommended. Our study showed that 34.37% of underweight women underwent assisted vaginal delivery followed by 20% of women in normal weight category. similar study done by Leonie K Callaway in 2006 showed higher percentage of normal weight women requiring assisted delivery significant outcome P<0.001(56).

INDICATION OF LSCS:

In our study, 66.66% women in underweight category had contracted pelvis requiring caesarean section. similar study was done by F E Okonofua et al 1988, which was a retrospective study of 2150 cases women undergoing LSCS showed increased rate of cephalo pelvic disproportion in malnourished mothers with contracted pelvis and high numbers of failed induction(57).

In our study, normal weight women underwent LSCS mostly due to fetal distress(66.66%) which is different from findings seen in study done by Doherty, D. A in 2006 which showed higher proportion of overweight women having fetal distress as an indication for caesarean section. This difference in observation can be due to observer bias in assessing the fetal distress in considering LSCS[49].

In our study 23.52% overweight women with obstructed labour underwent LSCS which is similar to study conducted by Marie I. Cedergren et al. in 2008, which showed higher proportion of women with higher BMI requiring LSCS[58].

POST PARTUM COMPLICATIONS:

Our study shows higher percentage of overweight women having post partum complications compared to underweight women. Our results were similar to study conducted by Sohinee Bhattacharya et al in 2007, which showed majority of overweight women(16%) having complications of postpartum haemorrhage[2].

Another study done by rebecka DALBYE et al in 2021, showed women in obesity classes II and III had higher rates of postpartum hemorrhage. Our study shows other factors may be involved in higher incidence of postpartum haemorrhage in underweight women [59].

Our study showed higher rates of postpartum eclampsia of about 20% of over weight women, similar to results shown by Joana Lopes Perdigaoetal in 2020, which proved that women with higher BMI had more prevalence of postpartum raise in BP[60].

In our study, 16% of overweight women presented with wound infection similar to study done by LETÍCIA VIEIRA DE PAIVA et al in 2012, which showed surgical wound infection (16.7%) in overweight patients. They also concluded that there is increased the risk for wound infection by 9.3 fold in women with high BMI[61].

Another study done by Weiss JL et al in 2004 and Sebire NJ et al 2001 showed overweight women are more likely to develop deep vein thrombosis and poor wound healing which is similar to the findings in our study.[62][63]

BIRTH WEIGHT OF BABIES:

In our study, the low birth babies less than 2.5 kgs are seen mostly in underweight women which is consistent with other study done by Austrida Gondwe et al 2018, which showed prepregnancy BMI was not found to be associated with duration of pregnancy (p = 0.926), but

was positively associated with birth weight (p value <0.001)[64]. A study done by Amy M. Branum et al in 2003, showed maternal underweight is associated with increased risk of low birth weight, neonatal morbidity and mortality[65].

In our study, large number of women with overweight BMI had greater percentage of babies with large for gestational age or macrosomic babies. Similarly, study done by Meng-kai DU et al in 2017, concluded that overweight mothers have higher chance of giving birth to a macrosomic babies (OR=2.90, 95% CI=1.99–4.23) and LGA babies[40]. Another study done by Rachna Chaudhary et al 2021 concluded higher maternal BMI adversely increases mean birth weight(53). Study done by JanneØrskou et al in 2003, conducted a study on 24,093 non diabetic pregnant women with potential risk factors for high birth weight, concluded that a statistically significantly increased risk of giving birth to infants weighing more than 4000 g for women with high pre pregnancy BMI.[66]

In our study, 26.08% women with overweight had low birth weight babies. this trend could be due to maternal complications like severe pre- eclampsia and antepartum eclampsia causing intra uterine growth retardation in babies born to overweight mothers.

The trend of normal birth babies in underweight women and normal birth weight babies in normal BMI women is supported by study done by Ravi Kumar Bhaskar et al in 2015. The study concluded that normal maternal BMI and regular timely ANC visits were found to be significantly protective against low birth weight babies[67].

PERINATAL OUTCOME:

In our study, majority of babies born to overweight women required NICU admission. A study done by Joan M. G. Crane et al, 2013 proved babies of overweight women were more

likely to weigh \geq 4000 g and 4500 grams and have neonatal metabolic abnormalities, and require NICU admission[68]. Study done by Nishu Bhushan et al in 2017 also concluded that perinatal complications were present in 14% babies of overweight women and needed NICU admissions as compared to 5% each in underweight and normal weight categories. The difference in the incidence of NICU admissions was statistically significant. In our study, we observed higher percentage of NICU admission in underweight women as well(37).

In our study intrauterine death seen in 9.37% of underweight and 8% of overweight women . similar study done by SavvasEfkarpidis et al 2004,showed a total of 161 singleton pregnancies resulting in stillbirth at Nottingham City Hospital from 1991 to 1997 were compared with 499 live births concluded Almost half of the stillbirths (48.4%) were small for gestational age (< 10th percentile) on the grade of gestational age-specific weight. The difference in customized birth weight between stillbirths and live births was statistically significant (P < .0001).since a majority of SGA occurs in underweight women there is correlation between maternal low BMI with IU(69).

In our study, No perinatal complications were found in 76.66% of babies of normal BMI mothers, 30.43% of babies of overweight mothers and 44.82% of babies of underweight mothers. Study done by N Heslehurst et al in 2007, also has similar conclusions in their study(70).

PERINATAL COMPLICATIONS:

In our study, 17.24% of babies born to underweight women had either small for gestational age babies or IUGR babies. similar study done by Abrams HA et al in 2007, Doherty DA et al in 2006, Sukalich Set al in 2006, sahu et al in 2007 all concluded in respective studies that

IUGR had higher prevalence in underweight women whereas there is slightly higher percentage of IUGR in overweight women(71)(49)(72).

In our study, respiratory distress (13.04%) during perinatal period seen in majority of babies of overweight mothers. similar study done by Callaway LK et al 2006 showed significant relationship with maternal obesity and incubator requirement in babies(56).

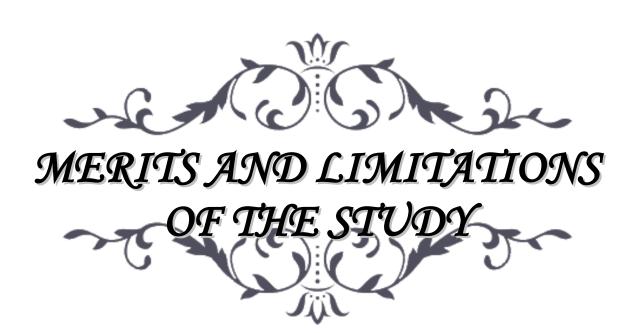
In our study, 17.39% of babies of overweight mothers, had large for gestational age and no babies were found to have large for gestational age when born to underweight mothers. similar study done by Jung H. Park et al in 2011 showed overweight gravidas and women with massive weight gain in pregnancy had higher risks of having large for gestational age (LGA) babies (adjusted OR, 2.4)(39). Another study done by Renate L. Bergmann in 2003, proved pre pregnancy BMI (body mass index) \geq 26 kg/m2 and pregnancy weight gain > 16 kgs is associated with large for gestational age babies(73).

Our study showed majority of overweight mothers having babies complicated with meconium aspiration syndrome(13.04%) compared to normal weight women, study done by Rachna Chaudhary et al 2021 concluded overweight women were associated with significantly increased, meconium stained liquor and NICU admissions for babies(53).

In our study 3.44% of underweight women and 8.69% of overweight women had babies with birth asphyxia. while, no cases of birth asphyxia was seen in normal weight women. A study done by Rachna Chaudhary et al 2021 showed out of 50 patients belonging to underweight BMI, 7 babies required NICU admission due to reasons like meconium stained liquor, low birth weight, birth asphyxia. 5 babies out of 50 babies born to mothers who were overweight were admitted in NICU. while, none of the babies out of the 50 babies of normal BMI mothers got admitted in NICU(53).

In our study, 10.34% of underweight and 4.34% of overweight women had babies complicated with perinatal sepsis. while a study done by CD Acosta et al 2011 concluded that overweight women had higher chances of perinatal sepsis owing to higher antenatal complications(74). Our study value gives an understanding that underweight women with PPROM have higher chances of perinatal sepsis owning to increased chances of ascending infection.

In our study 13.04% of babies born to overweight women had perinatal jaundice which was similar to a study done by Callaway LK et al 2006 provided data on morbid obesity showed a significant increase in the odds of jaundice in babies(OR 1.44, 95% CI 1.09, 1.89) which is different from the findings in our study indicating that multiple variables are involved in development of jaundice in babies apart from maternal BMI(56).



MERITS OF THE STUDY:

- Many studies were done regarding the effects of overweight in pregnancy while only limited studies were available on impact of underweight and overweight in pregnancy.
 This study is an eye-opener as it compares the impact of underweight, normal weight and over weight body mass indices on pregnancy outcomes.
- 2. While conducting this study, patients were promptly identified based on standard Williams guidelines of Body mass Index and followed up for pregnancy outcomes.
- 3. Antenatal mothers in all 3 categories were identified by random sampling which which eliminated the observer's bias and helped us in tabulating the risk factors without any confounding factors.
- 4. Only primigravidas were included in the study which eliminated the bias of confounding factors associated with multigravidas like Spontaneous onset and faster progression of labour.
- 5. The effect of underweight in pregnancy is still a topic with scope for research. Our study was conducted in a rural tertiary care centre which is known to have underweight and malnourished women. This study would be of good contribution for source of literature and for further research activities.

LIMITATIONS OF THE STUDY:

- 1. Small sample size
- 2. Neonatal follow-up after 7 days was lacking.
- 3. The diagnosis of fetal distress in perinatal outcome was depending on FHR tracing and was not proved by fetal scalp blood sampling or other methods because of non availability which might have altered the perinatal outcome.



SUMMARY

In this prospective observational study, 87 Antenatal women with gestational age more than 28 weeks to 42 weeks of gestation, were selected and categorized into under weight, normal weight and over weight according to pre-pregnancy BMI and were assessed for the risk factors that each category developed during the antenatal period and the eventual maternal and perinatal outcomes.

These 87 antenatal mothers were divided into 3 groups according to Williams classification of BMI as Underweight <18.5 Kgs/m², normal weight 18.5 to 24.9 kgs/m² and overweight >25kgs/m2 to 29.9Kgs/m² and were assessed for pregnancy outcomes.

There were statistical significance between the three category women in the risk factors they developed and acquired during the pregnancy period (p=0.041), onset of labour (0.022), maternal(0.002) and perinatal outcome(0.002), post partum complications (0.001) in mother and perinatal complications (0.004) in the baby.

Women belonging to over weight category developed the maximum risk factors during the antenatal period like pre-eclampsia (28%), Antepartum eclampsia (20%) and gestational diabetes mellitus (12%). Women in underweight category developed risk factors like Preterm labour(18.75%) and Anaemia (25%). Women in normal weight category has the least risk of developing antenatal risk factors. About 13.33% of women developed pre-eclampsia.

Most women with normal weight (43.33%) and underweight (34.37%) had spontaneous start of labour and successful induction of labour accounting to 30% in normal weight category

and 31.25% in under weight category. Women in over weight category had highest rates of failed induction (41.17%) and about 68% went for caesarean section with the most frequent indication for caesarean section being failed induction (41.17%) and fetal distress(35.29%). Post partum complications were significant in over weight mothers than in under weight and normal weight mothers. Most common post partum complication observed was Post partum ecclampsia(20%) in over weight mothers and post partum haemorrhage in under weight mothers(15.62%).

Perinatal outcome was best in mothers belonging to normal weight BMI. Babies belonging to over weight mothers mostly went to NICU (65.21%) while babies belonging to underweight group had the maximum number of IUD's (9.37%) and perinatal mortalities(6.89%).

Most common perinatal complication encountered by babies belonging to underweight women that went to NICU are for small for gestational age (17.24%) and preterm care (17.24%). While, babies belonging to over weight women that went to NICU are mostly for large for gestational age(17.39%) and respiratory distress (13.04%).

About 13.04% of babies of over weight mothers had perinatal jaundice and 10.34% of babies of underweight mothers had perinatal sepsis. Birth asphyxia (8.69%) was seen in babies of overweight mothers.



CONCLUSION

Overweight women are more prone for developing Antenatal risk factors than women belonging to underweight category. Most commonly encountered risk factor by over weight women is pre-eclampsia and while underweight women are mostly found to have Anaemia.

Most women in over weight category had Caesrean deliveries .Most common post partum complication encountered by over weight mother is post partum eclampsia and under weight mother is post partum haemorrhage.

Perinatal outcome was poor in mothers belonging to underweight group as they had the maximum number of IUD's and perinatal mortalities. While majority of babies of overweight mothers needed NICU care. Babies of over weight mothers went to NICU because of respiratory distress. While, babies of underweight mothers went to NICU for preterm care.

Both maternal under weight and over weight has adverse pregnancy outcomes. But, the burden overweight in pregnancy is more compared to under weight. Therefore, preconceptional counselling plays a vital role in stabilisation of BMI for having a healthy mother and baby. Antenatal counselling regarding nutrition, importance of healthy diet with customised diet chart should be prescribed for underweight women weight reduction and normalising BMI during pre conceptional period in over weight women helps in reducing adverse pregnancy outcomes.



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ANNEXURE 1:

PATIENT INFORMATION SHEET

STUDY TITLE: "EFFECT OF MATERNAL BODY MASS INDEX ON MATERNAL

AND PERINATAL OUTCOME".

STUDY SITE: R.L Jalappa Hospital and Research Centre, Tamaka, Kolar.

This is to inform you that, you require routine antenatal investigations. The investigations are

required for the making the diagnosis of the disease

We are conducting this study to predict the onset and severity of this condition.

If you are willing you will be enrolled in this study and we will do routine antenatal

investigations other relevant investigations which are required . You will receive the standard

care pre and post operatively

This will facilitate identifying THE EFFECT OF MATERNAL BODY MASS INDEX

ON MATERNAL AND PERINATAL OUTCOME (if any) in early stage and treating it.

It will also benefit other patients with abnormal Body mass index in future. You are free to

opt-out of the study at any time if you are not satisfied or apprehensive to be a part of the

study. Your treatment and care will not be compromised if you refuse to be a part of the

study. The study will not add any risk or financial burden to you if you are part of the

study. Your identity and clinical details will be confidential. You will not receive any

financial benefit for being part of the study. You are free to contact DR.C.JAHNAVI or any

other member of the above research team for any doubt or clarification you have.

Dr. C. JAHNAVI

Mobile no: 9962207065

E-mail id: drcjahnavi@gmail.com

ANNEXURE II:

PROFORMA

EFFECT OF MATERNAL BODY MASS INDEX ON MATERNAL AND

PERINATAL OUTCOME

NAME:	GENDER:
AGE:	HUSBANDNAME:
ADDRESS:	RELIGION:
UHID NO:	
I.P NO:	
DATE &TIME OF ADMISSION :	
DATE &TIME OF DISCHARGE :	
<u>Complaints</u>	
Chief complaints :	
History of present pregnancy	
H/o amennorhea	
H/o bleeding /pvspotting	
H/o pain abdomen	
Obstetrical history:	

BOOKED/UNBOOKED/REFERRED

obtestrical score	Gravida	Para	Living	Abortion
Age of menarche:				
married life		consangious marr	iage yes/no	
Menstrual history	:regular/iri	regular		
Clots/ dysmenorrh	nea			
LMP				
EDD				
C EDD				
POG:				
PAST HISTORY	<u>Y</u>			
Any h/o diabetes i	mellitus/hy	pertension/epileps	y/bronchial asth	ma
Any h/o previous	surgeries			
Any h/o drug aller	rgies			

PERSONAL HISTORY

Diet			
Appetite			
Smoking			
Alcohol			
Bowel habits			
GENERAL PHY	SICAL EXAMINATION		
Pallor/icterus/cya	nosis/clubbing /lymphadenopat	:hy/edema	
Height:	weight:		BMI:
Pulse:	Blood pressure:		
R/R:	Temp:		
CVS			
RS:			
Breast:	spine: thyroid:		
P/A:			

UTERUS		
APPROPRIATE FOR GE	STATIONAL AGE	
LIE OR PRESENTATION	N	
CONTRACTIONS		
FHR		
P/S:		
P/V:		
PROVISIONAL DIGNO	OSIS:	
INVESTIGATIONS:		
CBC:-		
CBC:- Hb: TC:	DC: N-, L-,E- ,M- , B-	PLATELET:
		PLATELET:
Hb: TC: BLOOD GROUP:	RBS:	PLATELET: VDRL :
Hb: TC: BLOOD GROUP:	RBS: HBsAg:	
Hb: TC: BLOOD GROUP: HIV:	RBS: HBsAg: CROSCOPY:	
Hb: TC: BLOOD GROUP: HIV: URINE ROUTINE & MIC	RBS: HBsAg: CROSCOPY:	
Hb: TC: BLOOD GROUP: HIV: URINE ROUTINE & MIC	RBS: HBsAg: CROSCOPY:	
Hb: TC: BLOOD GROUP: HIV: URINE ROUTINE & MIC	RBS: HBsAg: CROSCOPY: al Delivery / LSCS	
Hb: TC: BLOOD GROUP: HIV: URINE ROUTINE & MIC Mode of delivery: Vagin	RBS: HBsAg: CROSCOPY: al Delivery / LSCS	

post partum eclampsia:
Need for blood or blood components transfusion :yes/no
Puerperal complication :yes/no
Death:yes/no
FETAL OUTCOME:
Pre term/term
Liveborn/still born/macerated
Sex:
Congenital anomalies
Birthweight:
Apgarscore: 1 min: 5 min:
If live born motherside or NICU admission:
Condition on discharge

ANNEXURE III

PATIENT CONSENT FORM

EFFECT OF MATERNAL BODY MASS INDEX ON MATERNAL AND PERINATAL OUTCOME

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I have understood that I have the right to refuse consent or withdraw it at any time during the study and this will not affect my treatment in any way. I consent voluntarily to participate in this study.

Name of Participant		
Signature/ thumb print of Participant	Date	

STATEMENT BY THE RESEARCHER/PERSON TAKING CONSENT: I have accurately read out the information sheet to the potential participant to the best of my ability made sure that the participant understands that the following will be done:Routine blood investigations, Height, weight will be calculated and the patient would be monitored.

I confirm that the participant was given an opportunity to ask questions about the study and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent: Dr. C.JAHNAVI

Signature of Researcher /person taking the consent	_ Date
Name and Address of Principal Investigator:	
Dr.C.JAHNAVI,	
R.L Jalappa Hospital,	
Tamaka, Kolar.	

ANNEXURE IV:

KANNADA CONSENT AND PATIENT INFORMATON SHEET(KANNADA)

ರೂಳಿಯ ಮಾಹಿತಿ ನಮೂನ

ಅಧ್ಯಯನ ತೀರ್ಷಿಕ : " ತಾಯಿಯ ದೇಹದ ದ್ರವ್ಯರಾಕಿಯ ಪರಿಣಾಮ ಮತ್ತು ಪೆರಿನಾಟಲ್ ಫಲಿತಾಂಶದ ಸೂಚ್ಯಂಕ— ಒಂದು ಅಧ್ಯಯನ

ಅಧ್ಯಯನ ಸ್ಥಳ: ಆರ್.ಎರ್.ಜೆ. ಅಸ್ಪತ್ರ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ಜೋಡಿಸಲಾದ ಶ್ರೀ ದೇವರಾಜ ಅರಸು ವೈದ್ಯಕೀಯ ಕಾಲೇಜು, ಚಮಕ, ಕೋರಾರ.

ಇದು ನಿಮಗೆ ತಿಳಿಸಲು, ನಿಮಗೆ ದಿನನಿತ್ಯದ ರಕ್ತ ತನಿಖೆಯ ಅಗತ್ಯವಿರುತ್ತದೆ. ರಕ್ತದ ಘಟಕದ ಪ್ರಕಾರ ಮತ್ತು ಪರಿಮಾಣವನ್ನು ತಿಳಿಯಲು ತನಿಖೆಯ ಅಗತ್ಯವಿದೆ.

ಈ ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿಯ ದಸ್ತಾವೇಜನ್ನು ಅಧ್ಯಯನದ ಸಾಮಾನ್ಯ ಹಿನ್ನೆಲೆ ನೀಡಲು ಉದ್ದೇಶಿಸಲಾಗಿದೆ. ದಯವಿಟ್ಟು ಈ ಕೆಳಗಿನ ಮಾಹಿತಿಯನ್ನು ಎಚ್ಚರಿಕೆಯಿಂದ ಓದಿ ಮತ್ತು ನಿಮ್ಮ ಕುಟುಂಬ ಸದಸ್ಯರೊಂದಿಗೆ ಚರ್ಚಿಸಿ .ನೀವು ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಅಧ್ಯಯನಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ನಿಮ್ಮ ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಬಹುದು.

ಈ ಅಧ್ಯಯನವನ್ನು ಸಾಂಸ್ಥಿಕ ನೈತಿಕ ಸಮಿತಿಯು ಅನುಮೋದಿಸುತ್ತದೆ. ಸಂಗ್ರಹಿಸಿದ ಮಾಹಿತಿಯನ್ನು ಪ್ರಕಟಣೆಗೆ ಮಾತ್ರ ಬಳಸಲಾಗುತ್ತದೆ. ಭಾಗವಹಿಸಲು ಒಪ್ಪಿಕೊಳ್ಳಲು ಯಾವುದೇ ಒತ್ತಾಯವಿಲ್ಲ. ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನೀವು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಒಪ್ಪಿಕೊಂಡರೆ ಮಾತ್ರ ಹೆಬ್ಬೆರಳಿನ ಅನಿಸಿಕೆಗೆ ಸಹಿ ಹಾಕಲು / ಒದಗಿಸಲು ನಿಮ್ಮನ್ನು ವಿನಂತಿಸಲಾಗುತ್ತದೆ.

ನಿಮ್ಮಿಂದ ಸಂಗ್ರಹಿಸಲಾದ ಎಲ್ಲಾ ಮಾಹಿತಿಯನ್ನು ಗೌಪ್ಯವಾಗಿಡಲಾಗುತ್ತದೆ ಮತ್ತು ಯಾವುದೇ ಹೊರಗಿನವರಿಗೆ ಬಹಿರಂಗಪಡಿಸುವುದಿಲ್ಲ. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಲಾಗುವುದಿಲ್ಲ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನೀವು ಯಾವುದೇ ವಿತ್ತೀಯ ಪ್ರಯೋಜನಗಳನ್ನು ಪಡೆಯುವುದಿಲ್ಲ.

ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಸಿದ್ದರಿದ್ದರೆ ತಿಳುವಳಿಕೆಯುಳ್ಳ ಒಪ್ಪಿಗೆ ಪತ್ರಶ್ನೆ ಸಹಿ ಹಾಕುವಂತೆ ನಿಮ್ಮನ್ನು ಕೇಳಲಾಗುತ್ತದೆ, ಅದರ ಮೂಲಕ ನೀವು ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಬಯಸುತ್ತೀರಿ ಎಂದು ಒಪ್ಪಿಕೊಳ್ಳುತ್ತೀರಿ ಮತ್ತು ಸಂಪೂರ್ಣ ಕಾರ್ಯವಿಧಾನವನ್ನು ಅಧ್ಯಯನ ಪೈದ್ಯರು ನಿಮಗೆ ವಿವರಿಸುತ್ತಾರೆ. ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ವಿವರಣೆಯಿಲ್ಲದೆ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ನಿಮ್ಮ ಒಪ್ಪಿಗೆಯನ್ನು ಹಿಂಪಡೆಯಲು ನೀವು ಮುಕ್ತರಾಗಿದ್ದೀರಿ ಮತ್ತು ಇದು ನಿಮ್ಮ ಭವಿಷ್ಯದ ಅರೈಕೆಯನ್ನು ಬದಲಾಯಿಸುವುದಿಲ.

ಯಾವುದೇ ಸೃಷ್ಟೀಕರಣಕ್ಕಾಗಿ ನೀವು ತನಿಖಾಧಿಕಾರಿಯನ್ನು ಸಂಪರ್ಕಿಸಲು ಮುಕ್ತರಾಗಿದ್ದೀರಿ

ಪ್ರಾಥಮಿಕ ಪರೀಕ್ಷಕ: ಡಾ. ಜಾನವಿ <u>ಎಸ್ ಡಿಯು ಎಮ್ ಸಿ.</u> ಕೋಲಾರ ಸಂಪರ್ಕ ಸಂಖ್ಯೆ: 9962207065

ರೂಚಿಯ ತಿಳಿಪಳಿಕೆಯ ಸಮ್ಮತಿ ನಮೂನ

ನಾನು ಶ್ರೀ /ಶ್ರೀಮತಿ	ನನ್ನ ಸ್ವಂತ ಅರ್ಥವಾಗುವಂತಹ ಭಾಷೆಯಲ್ಲಿ
ವಿವರಿಸಲಾಗಿದೆ. ನಾನು ನಡೆಸಿದ ಅಧ್ಯಯನದಲ್ಲಿ ಸೇರಿಸಲಾಗುವುದ	ತು. ' ತಾಯಿಯ ದೇಹದ ದ್ರವ್ಯರಾಶಿಯ ಪರಿಣಾಮ ಮತ್ತು
ಪರಿನಾಟಲ್ ಫಲಿತಾಂಶದ ಸೂಚ್ಯಂಕ- ಒಂದು ಅಧ್ಯಯನ. ಅಧ್ಯಂ	ಬನದ ಉದ್ದೇಶ ಮತ್ತು ಕಾರ್ಯವಿಧಾನದ ಅಪಾಯಗಳು ಮತ್ತು
ತೊಡಕುಗಳ ಬಗ್ಗೆ ನನ್ನ ಸ್ವಂತ ಭಾಷೆಯಲ್ಲಿ ವಿವರಿಸಲಾಗಿದೆ.	
ನನ್ನ ಕ್ಷಿನಿಕಲ್ ಅವಿಷ್ಯಾರಗಳು, ತನಿಖೆಗಳು, ಇಂಚ್ರಾಅಪರೇಚೆಪ್ ಅ	Care richtich eitfler eitentei eitweienwischen eiseln
ಅಧ್ಯಯನದ ಉದ್ದೇಶಕ್ಕಾಗಿ ದಾಖಲಿಸಲಾಗುತ್ತದೆ ಎಂದು ನನಗೆ ವಿಕ	
out man and and and an analysis and an an an an an	SONOW IS.
ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನನ್ನ ಭಾಗಪಹಿಸುವಿಕೆಯು ಸಂಪೂರ್ಣವಾಗಿ ಸ್ವಂ	ಹಿಂಶ್ರೇರಿತವಾಗಿದೆ ಎಂದು ನನಗೆ ವಿವರಿಸಲಾಗಿದೆ, ಮತ್ತು
ನಾನು ಯಾವುದೇ ಸಮಯದಲ್ಲಿ ಅಧ್ಯಯನದಿಂದ ಹಿಂದ ಸರಿಯಬಕ	ಟರು ಮತ್ತು ಇದು ನನ್ನ ಪ _{ತಿ} ದ್ಯರೊಂದಿಗಿನ ನನ್ನ ಸಂಬಂಧ
ಅಥವಾ ನನ್ನ ಕಾಯಿಲೆಗೆ ಚಿಕಿತ್ಸೆಯ ಮೇಲೆ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ	<u>}-</u>
ಅಧ್ಯಯನದ ಸಮಯದಲ್ಲಿ ಕಂಡುಬರುವ ನನ್ನ ಎಲ್ಲಾ ವಿವರಗಳನ್ನು:	ಗೌಪ್ರವಾಗಿಡಲಾಗಿದೆ ಮತ್ತು ಸಂಶೋಧನೆಗಳನ್ನು
ಪ್ರಕಟಿಸುವಾಗ ಅಥವಾ ಹಂಚಿಕೊಳ್ಳುವಾಗ, ನನ್ನ ವಿವರಗಳನ್ನು ಮ	-
ವಿಚಾರಣೆಗಾಗಿ ನನ್ನ ಬಳಿ ಪ್ರಧಾನ ತನಿಖಾಧಿಕಾರಿ ಮೊಬೈಲ್ ಸಂಜ	(g red.
ಈ ಅಧ್ಯಯನದ ಭಾಗದಲ್ಲಿ ಸೇರಿಸಲು ನನ್ನ ಸಂಪೂರ್ಣ ಮನಸ್ಸಿನಲ್ಲಿ	ನಾನು ಒಪ್ಪಿಗೆ ನೀಡುತ್ತೇನೆ.
ರೋಗಿಯ ಸಹಿ:	
CARTION AGE:	
कॅरांद्रो:	
ಸಾಕ್ಷಿಯ ಸಹಿ:	
100	
क रहेंद्रा:	
au total.	
ರೋಗಿಗೆ ಸಂಬಂಧ:	
ದಿನಾಂಕ:	
정난:	
*	

ANNEXURE V: KEY TO MASTER CHART

A – UHID NUMBER

B - AGE

< 20 YRS = 1

20 TO 24 YRS = 2

25 TO 30 YRS = 3

31 TO 35 YRS = 4

> 35YEARS = 5

C- PERIOD OF GESTATION:

28 WEEKS 1 DAY TO 34 WEEKS 0 DAYS = 1

34 WEEKS 1 DAY TO 36 WEEKS 6 DAYS =2

MORE THAN OR EQUAL TO 37 WEEKS =3

D- SOCIO-ECONOMIC STATUS:

CLASS I = 1

CLASSII = 2

CLASSIII = 3

CLASS IV = 4

E- RISK FACTORS DURING ANTENATAL PERIOD:

GEST DIABETES MELLITUS = 1

PRE-ECLAMPSIA = 2

ANTEPARTUM ECCLAMPSIA = 3

ANAEMIA = 4

PRETERM LABOUR = 5

PPROM = 6

F- ONSET OF LABOUR:

SPONTANEOUS = 1

INDUCED =2

G- MODE OF DELIVERY

SPONTANEOUS VAGINAL DELIVERY = 1

ASSISTED VAGINAL DELIVERY = 2

LSCS = 3

H-INDICATION FOR LSCS:

CPD = 1

FETAL DISTRESS = 2

FAILED INDUCTION =3

OBSTRUCTED LABOUR = 4

I- POSTPARTUM COMPLICATIONS:

POST PARTUM HEMORRHAGE =1

POST PARTUM ECCLAMPSIA=2

WOUND INFECTION= 3

DEEP VENOUS THROMBOSIS = 4

J- BIRTH WEIGHT OF BABIES:

$$\leq$$
2.5 kgs = 1

$$2.6-3.5 \text{ kgs} = 2$$

$$\geq$$
3.6kgs = 3

K- APGAR 1 MIN:

$$5/10 = 1$$

$$6/10 = 2$$

$$7/10 = 3$$

L- APGAR 5 MIN:

$$7/10 = 1$$

$$8/10 = 2$$

$$9/10 = 3$$

M-PERINATAL COMPLICATIONS:

SMALL FOR GESTATIONAL AGE/ IUGR = 1

LARGE FOR GESTATIONAL AGE = 2

PRETERM =3

RESPIRATORY DISTRESS = 4

MECONIUM ASPIRATION SYNDROME = 5

BIRTH ASPHYXIA = 6

PERINATAL SEPSIS = 7

PERINATAL JAUNDICE = 8

N- PERINATAL OUTCOME

PERINATAL MORTALITY = 1

NICU ADMISSION = 2

MOTHER SIDE = 3

IUD = 4



	Normal Weight												
UHID	AGE	PERIOD OF GESTATION	SOCIO ECONOMIC STATUS	RISK FACTORS DURING ANTENATAL PERIOD	ONSET OF LABOUR	MODE OF DELIVERY	INDICATION FOR LSCS	POST PARTUM COMPLICATION	BIRTH WEIGHT OF BABIES	APGAR 1 MIN	APGAR 5 MIN	PERINATAL COMPLICATION S	PERINATAL OUTCOME
881612	1	3	4	2	1	1			1	1	1		3
903792	3	3	4	4	1	2			2	2	2		3
905556	3	3	4	2	1	1			1	2	3	1	2
886031	1	3	2	4	1	2			3	1	3		3
903278	1	3	3	7	1	2			3	2	1		3
889407	1	3	1	7	1	1			1	1	2	1	2
901749	1	3	2	7	1	2			3	2	3		3
906350	3	3	3	7	1	1			2	2	1		3
902043	3	3	3	7	1	3	2		3	2	3	2	2
888292	4	3	3	7	1	1		1	3	2	2		3
901001	2	3	4	7	1	1			2	2	1	3	2
889892	1	3	4	4	1	1			3	1	3		3
900652	2	3	1	7	2	2			2	2	2		3
901198	3	3	3	2	2	1			2	2	2	3	2
866999	2	3	2	2	2	1			2	2	1		3
902615	2	3	3	7	2	1			2	1	3	3	2
903278	1	3	1	7	2	3	2		3	2	2		3
891186	3	3	3	3	2	1		1	2	3	3		3
902925	5	3	2	7	2	1			2	1	2		3
891392	5	3	4	7	2	3			2	3	1		3
908126	4	3	2	7	2	3			4	1	3		3
902728	4	3	3	7	2	1			4	1	2		3
908827	4	3	2	7	2	3	2		4	1	2		3
891408	2	3	1	7	3	3	3		1	3	3		3
910923	3	3	1	7	3	2			3	3	3		3
911215	2	3	1	3	4	1			3	1	3		3
892399	1	3	1	7	4	1			2	2	3		3
911615	5	3	3	7	4	1			2	2	3		3
907615	4	3	2	7	4	1			4	3	3		3
904612	3	3	3	7	1	3	2		3	2	3	2	2

	Over Weight												
UHID	AGE	PERIOD OF GESTATION	SOCIO ECONOMIC STATUS	RISK FACTORS DURING ANTENATAL PERIOD	ONSET OF LABOUR	MODE OF DELIVERY	INDICATION FOR LSCS	POST PARTUM COMPLICATIO N	BIRTH WEIGHT OF BABIES	APGAR 1 MIN	APGAR 5 MIN	PERINATAL COMPLICATION S	PERINATAL OUTCOME
910602	1	3	1	2	2	1			1	1	1		3
891116	2	3	2	1	1	2			2	2	2	1	2
911226	3	2	3	3	1	3	1	2	3	2	3	1	2
892603	4	3	2	2	1	1			3	1	3		3
911642	1	3	3	3	2	3	2	3	1	2	1		3
893154	4	3	2	3	1	2		1	2	1	2		3
875060	3	3	4	2	2	1			3	2	3	1	2
893391	1	3	2	3	1	3	2	2	1	2	1		3
912284	4	1	1	1	2	2		3	3	2	3	1	2
866363	1	3	4		2	3	3	1	2	2	2	1	2
893828	4	3	2	3	2	1		4	1	2	1	1	2
707702	3	3	4	2	2	3	3	2	3	1	3		3
909891	1	3	2	3	2	2		3	2	2	2	2	2
893816	4	3	4	2	2	3	3	1	2	2	2	2	2
902861	1	3	1		2	3	3	3	1	2	1	2	2
869505	4	2	4	1	2	2		2	3	1	3	2	2
894127	3	3	4		1	3	3		2	2	2	3	2
907778	1	3	4	2	2	3	4	1	3	3	3	3	2
894357	2	3	4		1	2			2	1	2	3	2
894417	4	3	2	2	2	3	4	2	1	3	1	6	2
909708	2	2	4		2	3	4		3	1	3	8	3
910037	2	3	3	1	2	3	4		2	1	2	6	2
894758	2	3	1	2	2	3	4		2	1	2	8	3
910181	3	3	4	1	1	3	4		3	3	3	8	3
895007	2	3	3		2	3	4		3	3	3	5	2

Under Weight													
UHID	AGE	PERIOD OF GESTATION	SOCIO ECONOMIC STATUS	RISK FACTORS DURING ANTENATAL PERIOD	ONSET OF LABOUR	MODE OF DELIVERY	INDICATION FOR LSCS	POST PARTUM COMPLICATIO N	BIRTH WEIGHT OF BABIES	APGAR 1 MIN	APGAR 5 MIN	PERINATAL COMPLICATIONS	PERINATAL OUTCOME
885731	1	3	1	2	1	1		2	1	1	1	1	2
891513	2	3	2	4	1	2			2	2	2		3
901618	3	3	3	4	1	2			1	2	3		3
900329	2	1	2	4	1	1			1	1	3	1	2
896785	3	3	3	4	1	2			2	2	1		3
901749	1	3	1	4	1	3	1	1	3	1	2	1	2
895947	2	3	3	4	2	1			1	2	3		3
901888	1	3	1	5	1	2			2	2	1	1	2
646310	2	3	3	5	2	3	1	1	2	2	3	1	2
896102	2	2	2	5	1	1			1	2	2		3
902999	5	3	3	5	1	2	2		2	2	1	3	2
893422	1	3	1	6	2	3	1		1	1	3		3
903552	2	3	3		2	1			2	2	2	3	2
903825	3	3	3		1	2	2		1	2	2	3	2
904407	2	3	2	4	1	1			3	2	1		3
905042	5	1	4		2	2			1	1	3	3	2
906629	3	3	2		1	3	2		2	2	2	8	3
906850	3	3	2	4	2	1			1	3	3		4
907082	5	3	4		1	2	2		2	1	2	3	2
901014	3	3	2	2	3	1		1	2	3	1		3
875498	1	3	1	4	1	3	1	1	2	1	3	8	4
880695	2	3	2	5	2	3	1		3	1	2	6	2
908103	3	2	4	2	1	1		3	3	1	2		3
891525	1	3	1	2	1	3	2	3	2	3	3	7	2
876421	1	3	1	3	1	1		1	3	3	3		3
908834	2	1	1	5	1	3	2		1	1	3	8	3
898628	4	3	4		2	3	3		2	2	3	7	2
909416	4	3	4		2	3	3		3	2	3		4
909505	4	1	4		1	3	2		1	3	3	7	2
856212	3	3	3	4	1	2			2	1	3		3
678901	1	3	1	4	1	3	1	1	3	2	3	1	2
908523	2	3	3	4	2	1	2		1	2	2		3