IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH

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MAY - 2022

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This is to certify that the dissertation entitled **IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH** is a bonafide work done by **Dr. R.THILAGA** at R.S.R.M Lying in Hospital , Stanley Medical College, Chennai-1. This dissertation is submitted to Tamil Nadu Dr.M.G.R Medical University in partial fulfilment of university rules and regulations for the award of M.S Degree in Obstetrics and Gynaecology.

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I, Dr.R.THILAGA, solemnly declare that the dissertation titled **"IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH"** is a bonafide work done by me at Govt. R.S.R.M Lying in Hospital, Stanley Medical College, Chennai, under the supervision and guidance of DR.RAJALAKSHMI.V M.D.DGO,., Professor and HOD in the Department of Obstetrics and Gynaecology, Stanley Medical College, Chennai. This thesis is submitted to The Tamil Nadu Dr.M.G.R Medical University in partial fulfillment of the rules and regulations for the M.S Degree examinations in obstetrics and Gynaecology to be held in MAY 2022.

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PLAGIARISM CERTIFICATE

This is to certify that this dissertation work titled "**IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH"** of the candidate **Dr.R.THILAGA** with registration Number **221916069** for the award of **M.S.** Degree in the branch of **OBSTETRICS AND GYNAECOLOGY (II).** I personally verified the urkund.com website for the purpose of plagiarism check. I found that the uploaded thesis file contains from introduction to conclusion page and result shows 13 **percentage** of plagiarism in the dissertation.

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CONTENTS

INTRODUCTION

Pregnancy is one of the most cherished events in women's life .Any complication affecting fetal prognosis may leave adverse impact on mother .Preterm birth (PTB) is the leading cause of perinatal morbidity and mortality worldwide.

Preterm birth is defined as birth between the age of fetal viability and 37 completed weeks of gestation.[1]In the United kingdom ,PTB includes deliveries between 24^{+0} and 36^{+6} weeks gestation. In many developed and developing countries all births in which the birth weight is ≥ 500gm are included in the PTB statistics .Globally , an estimated 15 million babies are born prematurely each year ,representing 11.1% of all live births .One million of them die from the complications of PTB[2].Infants who survive PTB make up most of the cases of serious morbidity and mortality in infants younger than 5 years of age[3].

Recent advances in neonatology have resulted in increased survival rates ,particularly amongst extremely premature infants, but this has also been associated with an increased morbidity. Preterm babies are at increased risk of neurological impairments, respiratory and gastrointestinal complications ,sepsis etc[4].Approximately,40-50% of preterm birth are idiopathic,30% due to PPROM, 15-20% are due to medical reasons.

Prediction of Preterm labour is one of the most important tasks faced by the clinicians .Many studies have been conducted to found a suitable predictive factor for preterm labour , for its early prediction and appropriate treatment.

Various **etiological factors** for preterm birth include low BMI , Caucasion , Mullerian anomalies, smoking ,maternal age<18yrs or >35 years ,previous cervical dilatations, occupational, genetic factors ,periodontal disease and infections .Infections contributes 25-35% causes of PTB.[567] Cervical tissue composed of matrix of collagen fibres and it is supported by the cardinal ligaments and uterosacral ligaments.[8,9,10]The cervix exerts the pressure from surrounding pelvic organs and withstands forces from pregnant uterus. A combination of both physiological pressures and individual anatomy affect the internal os and cervical function.[8,9]

Radiological measures like Cervical length and uterocervical angle has been studied as predictive factor for preterm birth .Both USG and digital examination of the cervix show that short cervix is a risk factor for preterm delivery .Asymptomatic women , at 24 weeks of GA ,a cervical length of less than 25 mm signifies increased risk of PTB. The shorter the cervix, the greater the risk.

Our study deals with IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH.

Uterocervical angle(UCA) is a simple technique that can be measured on a mid-sagittal transvaginal cervical image. It is the triangular segment measured between the cervical canal and uterine segment, yielding a measurable angle. This concept of UCA had been already utilized as early as 1950's,by vaginal pessary .Pessary was thought to create an immunological barrier and mechanically change the inclination of the cervical canal, thereby distributing pelvic force away from cervix. The concept behind this is based on the mechanical properties of this angle, which seems to be act as protective barrier when it is acute. An **Acute or when the angle is narrow**, UCA supports an anatomical geometry that would exert less force on the internal os, which is **protective** from deformation .An **Obtuse or wide** ,UCA lends to direct, **linear outlet of uterine contents** onto the cervix .Altered uterocervical angle to a more acute,or narrowed angle ,angle after vaginal pessary placement has been confirmed by MRI.[8-1]

Previously it has also been studied by ***Rane et al*** in 2004 for the prediction of labour outcome. **Keepanasseril et al** suggested that UCA may be mechanical barrier that might influence the progress of labour**. Sochacki-Wojcicka et al** in 2015, suggested that angle between the uterus and cervix may be related to gestational age at delivery and this angle measurement during pregnancy can be used for the prediction of spontaneous preterm labour.

AIMS AND OBJECTIVES

AIMS

To study the impact of uterocervical angle on preterm birth.

OBJECTIVES

To study the impact of uterocervical angle by transvaginal ultrasonography on preterm birth.

REVIEW OF LITERATURE

Preterm labour leading to preterm birth(PTB) is a major clinical problem, especially in developing countries that have limited resources to handle the problems of the premature neonate. More than 60% of preterm births occur in Africa and south Asia, but preterm birth is a global problem. It is the leading direct cause of neonatal death worldwide and the second most common cause of death for children under the age of 5, after pneumonia. An estimated 15 million babies are born preterm every year. This is more than 1 in 10 babies[16].In the lower economic countries, an average, 12% of babies are born preterm as compared with 9 in higher economic countries. Spontaneous preterm birth is the cause of around half of the preterm births, for which there was no effective preventive measures.

PRETERM LABOUR;

Preterm labour is defined by ACOG (2016) as regular uterine contractions accompanied by a change in cervical dilatation, effacement ,or both, or initial presentation with regular uterine contractions and atleast 2cm cervical dilatation[17]

PRETERM BIRTH;

Preterm birth is defined by ACOG (2016) as a birth occurring between 20 0/7 weeks of gestation and 36 6/7 weeks of gestation[17]According to **WHO**(2018) ,Preterm birth is defined as babies born alive before 27 completed weeks of gestation or fewer than 259 days of gestation since the first day of a woman's last menstrualperiod(LMP).

CATEGORIZATION OF PRETERM BIRTH

- **By gestational age at birth**

  - Extremely preterm:<28 weeks

  -Very Preterm:28-31 weeks

  -Moderate-to-late preterm:32 to $<36^{+6 weeks}$

- **By birth weight**

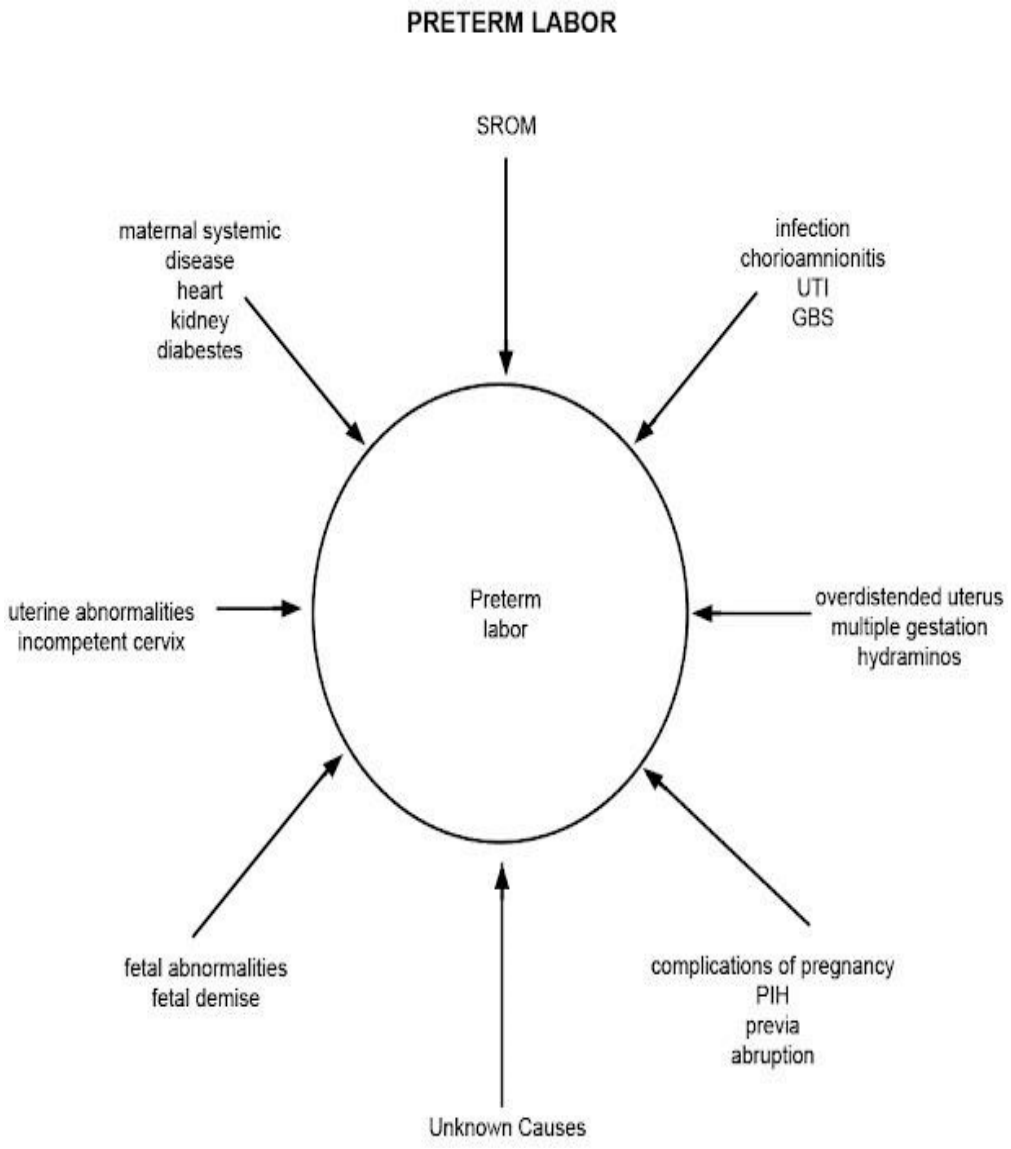
  -Low birth weight(LBW):2500g

  -Very low birth weight(VLBW):<1500g

  -Extremely low birth weight(ELBW):<1000g

Identification of risk factors in women with improved care before, between and during pregnancies; better access to contraceptives and increased empowerment and education can decrease the preterm birth rate. Successful PTB prevention requires a multifaceted approach, combining public health and educational programs, lifestyle modification, access to optimization of obstetric healthcare, effective prediction and diagnostic modalities and the application of effective targeted interventions.

Over the past few decades, the perinatal outcomes of preterm neonates have markedly improved by advances in neonatal care, whereas rate of spontaneous PTB remain static. However, research into casual pathways and new diagnostic and treatment modalities is now been successful and many initiatives are begin to impact upon spontaneous preterm birth rates. Current prenatal screening protocols during the first and second trimester ,identify only approximately 55-70% of cases of spontaneous PTB, respectively



PATHOPHYSIOLOGY OF PRETERM LABOUR

MECHANISM OF PRETERM LABOUR

CAUSES	MECHANISM
stress Premature activation of physiological factors	Activation of maternal and fetal HPA-Axis -CRH leads to secretion of fetal androgens -Placental estrogen and progesterone -secretion of prostaglandins leads to contractions, cervical change, PPROM
Inflammation and infection Mainly due to mycoplasma hominis and Ureaplasma Urealyticum It may also associated with chlamydia trichomatis, bacterial vaginosis, Niesseria gonorrhea, Trichiomonias, group B streptococcal infection.	-Pro-inflammatory cytokines -Fetal inflammatory response syndrome
Ischemia and decidual hemorrhage	Thrombin activation
Pathological uterine distension	Increased gap junction along with contraction associated proteins and upregulation of prostaglandins and oxytocin receptors

RISK FACTORS

MATERNAL	FETAL
Prior preterm labour -strongest predictor -increased twofold risk if there is prior SPB<34wks Prior miscarriage Prior induced abortion Overdistended uterus Fibroid uterus placenta previa ,abruption PROM and PPROM Cervical factors -short cervix -previous cervical surgery Medical condition Severe preeclampsia GDM APLA Sepsis Genetic causes Antepartum hemorrhage Pregnancy following ART	Multi fetal gestation Intrauterine growth restriction Congenital anomaly of fetus Intra uterine demise

EPIDEMIOLOGY AND CONTRIBUTING FACTORS

Race

Common among black women.

Age

More Common in women under 20 and over 35.

Weight

Poor nutrition, low weight gain and low pre pregnancy weight

Stature

Short stature are more prone to produce preterm birth.

Socio Economic Status

Lower Socio economic status Poor knowledge
Poor access to medical care

Poor general and personal hygiene more prone for pre term labour.

Addictions

Cigarettes smoking, cocaine, alcohol consumption

Occupation:

Women who undergoing strenuous exercise are prone to preterm labour

Contributing Factors

Threatened abortion

Birth defects

Inter-pregnancy interval

Coitus history

Stress

Previous abortion and previous preterm delivery

Periodontal disease Genetic factors

DIAGNOSTIC CRITERIA FOR PRETERM LABOUR:

1. **Symptoms**
2. **Pelvic examinations**
3. **Ultrasonogram assessment**
4. **Tococardiography**
5. **Fetal fibronectin Threatened preterm labour:**

- Irregular or regular uterine activity

- Associated with

-cervical dilatation 1-2 cm

-cervical length by TVUS >20mm

Preterm labour:

- Regular uterine activity

-Contraction frequency of

≥4 every 20 minutes or

≥8 in 60minutes

-Associated with

- Cervical dilation of ≥3cm or

- Cervical length<20mm on TVUS

- “show” or rupture of membranes

ULTRASOUND EXAMINATION:

Trans-vaginal ultrasound examination is performed to measure cervical length. It is reproducible, dependable, and a very sensitive approach to measuring **cervical length**.

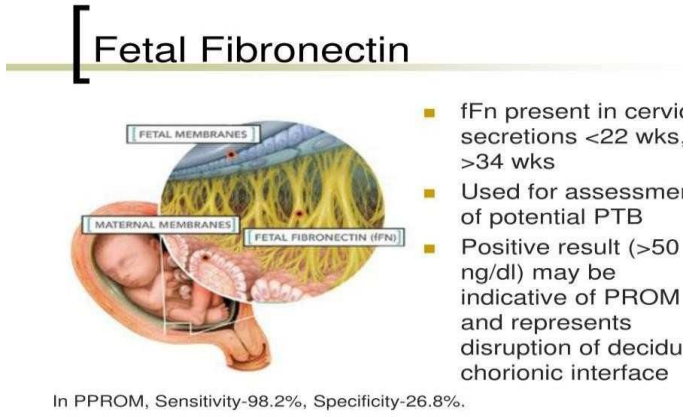
The concept of an ultrasonic measurement of the **UTEROCERVICAL ANGLE(UCA)** can be additional predictor of PTB.

Other ultrasound signs of preterm labour:

- Funneling: Protrusion of amniotic membrane into the cervical canal
- Debris/sludge(hyper-echoic matter in the amniotic fluid close to the internal cervical os)

Figure 1 short cervix with funneling

MEASUREMENT OF FETAL FIBRONECTIN:



Fetal fibronectin done after 22 weeks of gestational age

When cervical length between 20 and 30mm

Intact membranes

No gross vaginal bleeding

-(fetal fibronectin) positive≥50 ng/ml

Increased risk of preterm birth in the next 7days

-(fetal fibronectin) negative

Low risk of preterm birth

However testing of fetal fibronectin for the diagnosis of true preterm labor is expensive and not done routinely in India.

Prevention of Preterm labour

Primary Prevention
Delay childbearing until age 17 years
Maintain interpregnancy interval
Eliminate low maternal weight for height
prevention and cessation of smoking
Detection and prevention of sexually transmitted diseases,
Detect bacteriuria and treat to cure
Manage fertility to avoid multifetal gestation
Pre-conceptional counselling
Early Detection and treatment of iron-deficiency anaemia
Drug abuse prevention and treatment

Secondary Prevention

- ✔ Risk assessment in prenatal care
- ✔ Education regarding warning signs and symptoms of preterm labour
- ✔ Early-diagnosis programs
- ✔ Monitoring regarding cervical length, oncofetal fibronectin
- ✔ Early medical intervention
- ✔ Medications, surgery, early referral
- ✔ Reduced maternal physical activity
- ✔ Maternal work leave
- ✔ Eliminate barriers to care(access)

INTERVENTION WITH PROVEN BENEFIT:

- Corticosteroids for fetal lung maturity

- Tocolysis to delay delivery for 48 hrs

  -facilitates in utero transfer to tertiary center

  -provides time for corticosteroids and magnesium sulfate to act

- Magnesium sulfate for fetal neuroprotection

  -between 28-32 weeks

- Cervical encerclage

- Progesterone supplementaion

INTERVENTION WITH NO PROVEN BENEFITS:

- Complete bed rest

- Hydration

- Maintenance therapy with tocolysis

- Antibiotics-to prolong gestation

  - to decrease neonatal morbidity

CORTICOSTEROIDS :

REQUISITES FOR ANTENATAL STEROIDS:

- Preterm birth considered Imminent

  -within 7 days of starting treatment

- Preterm birth imminent in women with

  -hypertensive disorders

  -pregestational and gestational diabetes

  -growth-restricted fetus

- Singleton or multiple gestation

- Membranes intact or ruptured

- No clinical evidence of maternal infection

ADMINISTRATION OF ANTENATAL CORTICOSTEROIDS:

- **BETAMETHASONE-12 mg INTRAMUSCULAR 24 hours apart-two doses**

- **DEXAMETHASONE-6mg INTRAMUSCULAR 12 hours apart-4 doses**

✔ Accelerates fetal lung maturity

✔ Given between 24 and 36 weeks

✔ Effective for 7 days

✔ Rescue or repeat course in women

-<34 weeks gestation

-still at risk of preterm delivery in next 7 days

-prior course of antenatal corticosteroids administrated >14 days earlier

MAGNESIUM SULPHATE FOR NEUROPROTECTION:

INDICATIONS:

- Singletons or twins
- At 24 through 31^{+6} weeks of gestation
- Women at high risk for delivery because of

  -preterm prelabor rupture of membrane

  -advanced preterm labor
- Anticipated elective preterm delivery within 2-24 hrs because of

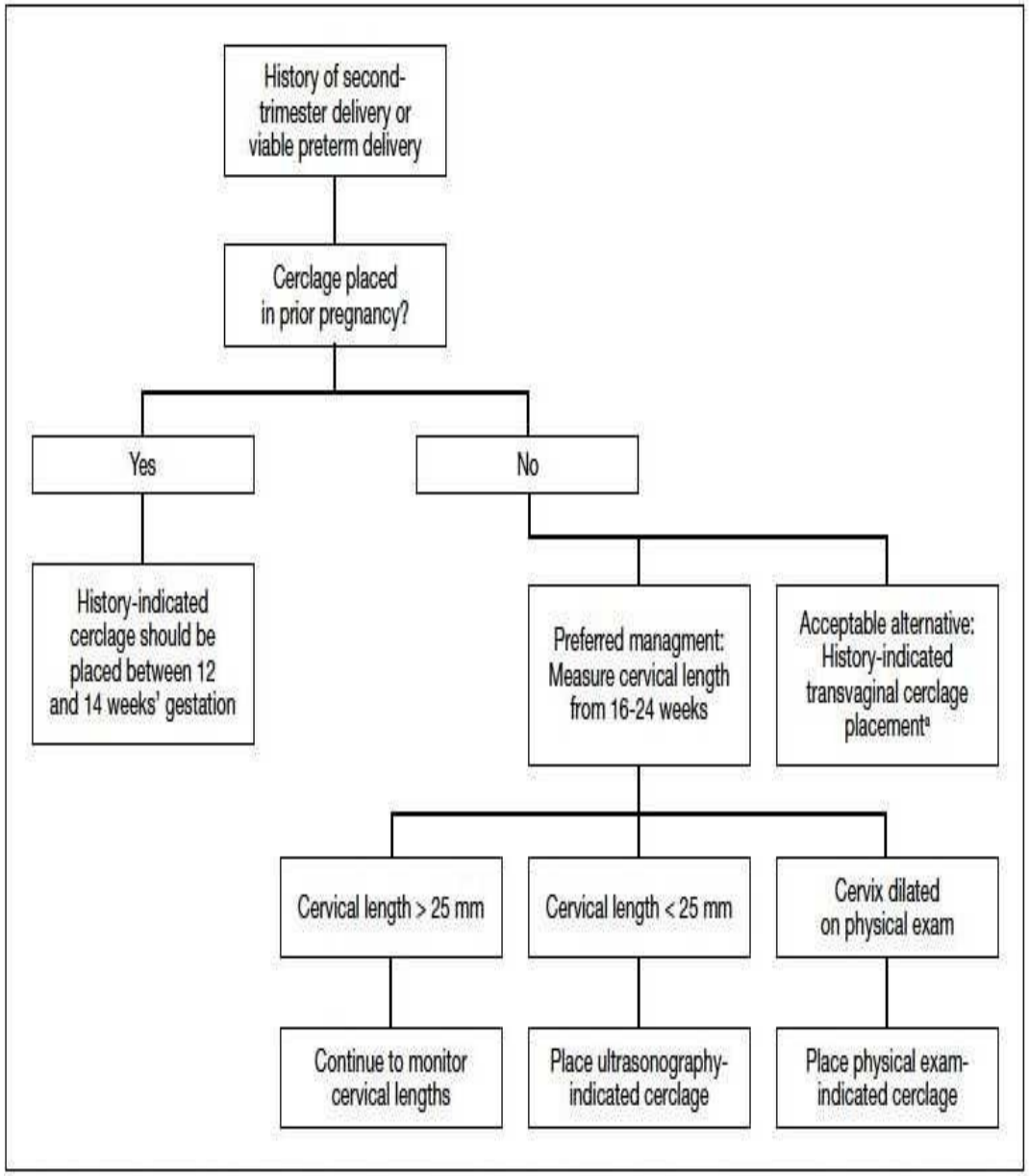
  -fetal indication(fetal growth restriction)

  -maternal indication(uncontrolled hypertension)

DOSE:

- 4 gm iv loading dose over 20 minutes
- Followed by maintenance dose 1gm/hr with infusion pump
- Stopped as soon as delivery
- Given for maximum of 24 hours

FIGURE 1 Decision tree for placement of transvaginal cerclage[1]



[a]According to the American College of Obstetricians and Gynecologists, history-indicated transvaginal cerclage can be placed in the case of a history of 1 or more second-trimester pregnancy losses related to painless cervical dilation even if no cerclage was placed in a prior pregnancy; however, more recently, tracking cervical length has become preferred management as it avoids unnecessary cerclage in one-half of patients.[1]

TOCOLYSIS:

To suppress uterine contractions to prevent preterm labour.

CRITERIA:

Gestational age between 28-36 weeks Intact membranes

Dilatation of cervix Alive fetus

Uterine contraction associated with cervical changes

CONTRAINDICATION:

Intrauterine fetal demise Lethal fetal anomaly

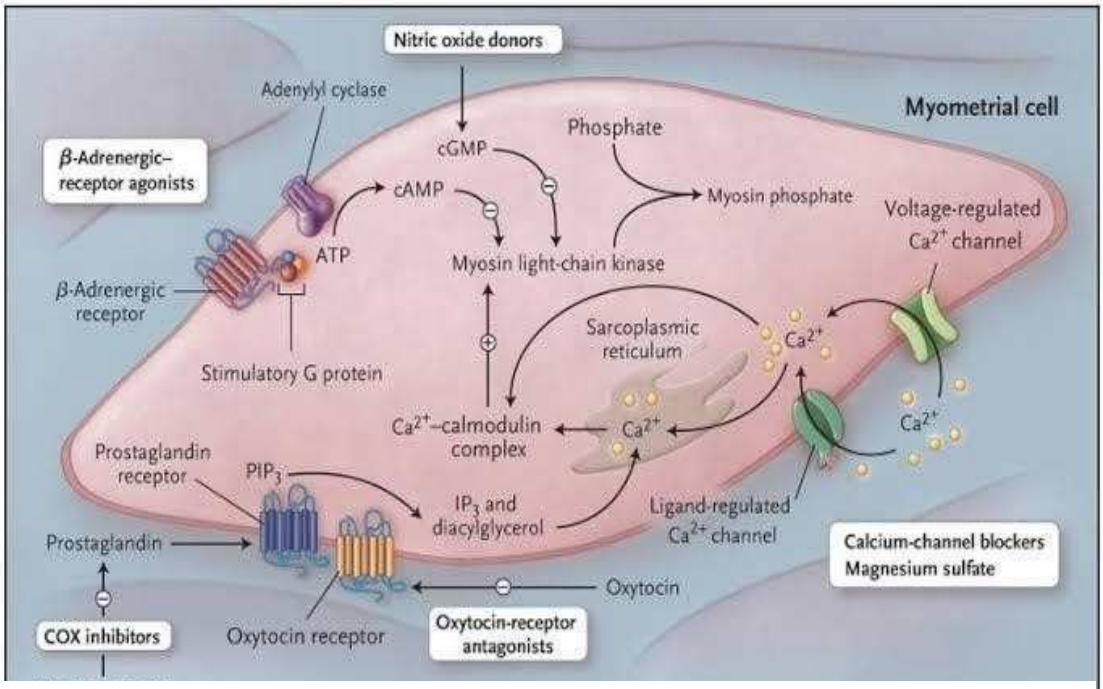
Non-reassuring fetal stress Severe preeclampsia or eclampsia

Maternal bleeding with hemodynamic instability Chorioamnionitis

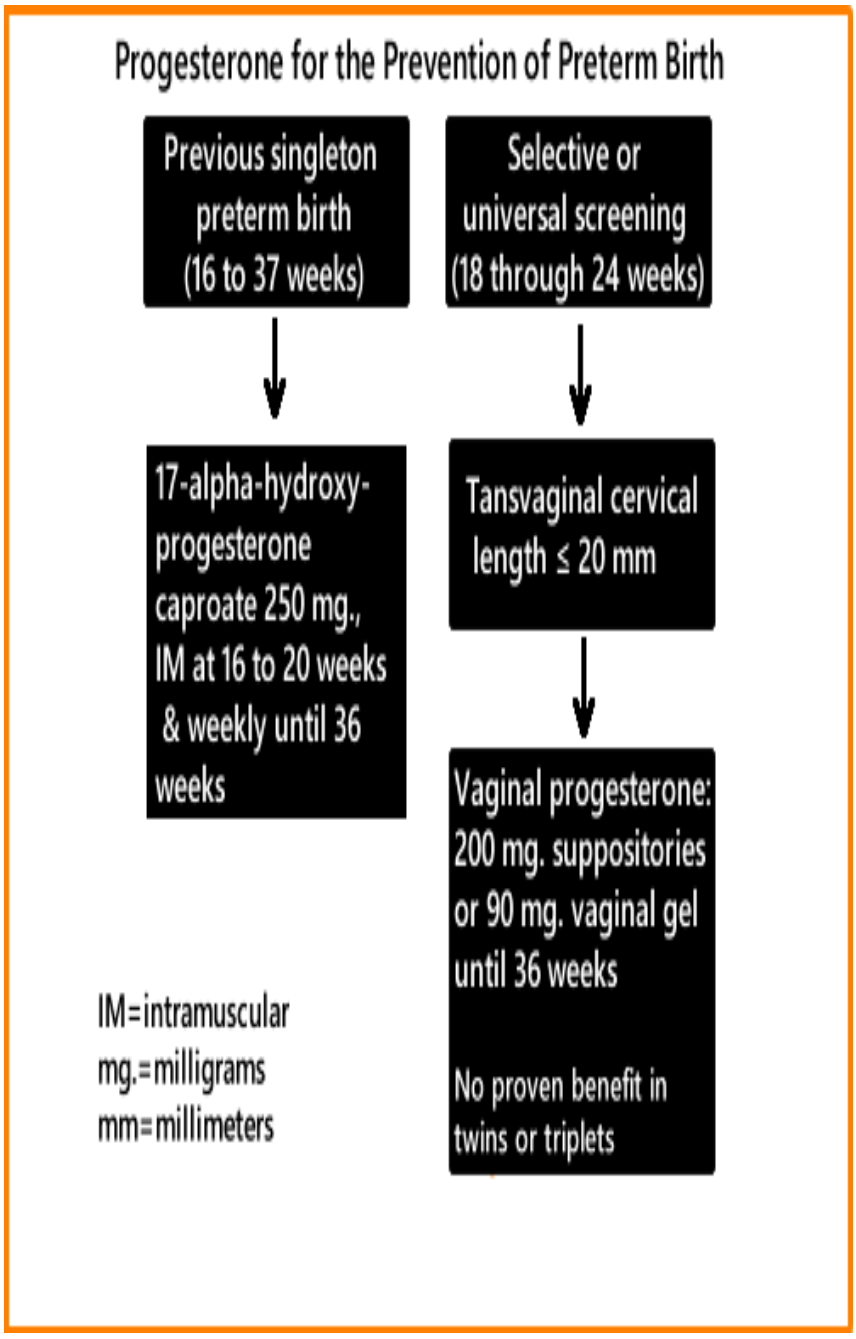
Preterm premature rupture of membrane

Maternal contraindications of tocolysis(agent specific)

Mechanism of action of the Tocolysis:



Medication or Drug Class	Dosage	Description	Rationale
Nifedipine	30 mg loading dose, 10–30 mg q 4–6 hr	Calcium channel blocker; tocolytic	Inhibits contraction of smooth muscles by reducing intracellular calcium influx
Indomethacin	100 mg PR, then mg PO every 6 hr for 8 doses	Prostaglandin synthetase inhibitor; tocolytic (labor repressant)	Reduces prostaglandin systhesis and decreases inflammation
Magnesium sulfate (contraindicated in myasthenia gravis)	4–6 g IV loading dose, 1–4 g/hr of IV maintenance	Central nervous system depressant; tocolytic	Decreases contraction of smooth muscles by reducing intracellular calcium influx; some controversy about its effectiveness
Terbutaline (Brethine)	Initially, 2.5 mcg/min; increase to a max of 20 mcg/min OR 0.25 mg SQ q 20 min × 3 doses, then q 3 hr; after IV is discontinued, follow with 5 mg PO q 4–6 hr	Beta-adrenergic	Relaxes smooth muscle, inhibiting uterine contractions; use has been curtailed due to side effects such as palpitations, tachycardia, and transient hyperglycemia, hypokalemia, and myocardial ischemia in the mother and fetus
Betamethasone (Celestone)	12 mg IM q 24 hr × 2	Glucocorticoid	Hastens fetal lung maturity; indicated if delivery is anticipated between 24 and 34 wk


Progesterone for the Prevention of Preterm Birth
Previous singleton preterm birth (16 to 37 weeks)
Selective or universal screening (18 through 24 weeks)
17-alpha-hydroxy-progesterone caproate 250 mg., IM at 16 to 20 weeks & weekly until 36 weeks
Tansvaginal cervical length ≤ 20 mm
Vaginal progesterone: 200 mg. suppositories or 90 mg. vaginal gel until 36 weeks
No proven benefit in twins or triplets
IM=intramuscular
mg.=milligrams
mm=millimeters

Prediction of preterm labour is one of the most difficult and important task faced by clinicians. Many studies have been conducted to find suitable predictor for preterm labour for its timely prediction and appropriate management.

RADIOLOGICAL MARKERS like

1. Cervical length
2. Uterocervical angle may have major impact on preterm birth

CERVICAL LENGTH:

Cervical length is a measure of the distance between internal os and external os.It can be performed by 4 methods :Digital examination, Transvaginal ultrasound ,transabdominal ultrasound and by transperineal ultrasound. Each technique has its costs and benefits

Digital examination or the per vaginum examination is one of the most common methods practiced by clinicians. However number of studies have failed to prove its sensitivity. The main underlying reason for this is its user subjectively and also it cannot detect reproducibly any changes at the level of internal os and the upper portion of the cervical canal. The majority of studies have found that ultrasound assessment of cervical length is superior to digital examination for the prediction of preterm birth. Measuring cervical length by usg has become a routine practice today as an objective and noninvasive method to evaluate the preterm labour. With this, apart from cervical length measurement, it is possible to do structural and functional evaluations, such as condition and appearance of internal os, cervical dilatation together with membrane herniation and cervical responses to uterine contractions and fundal pressure.

Transvaginal ultrasound is considerably more sensitive than transabdominal ultrasound for the measurement of cervical length. The main reason behind this is that in transabdominal approach, the cervix may not be visualized in up to 50% of cases unless the bladder is full, but bladder filling also significantly increases the length of the cervix .In contrast, transvaginal ultrasound is performed is performed with empty bladder. Therefore the cervix should be assessed by TVS.

In those cases, where TVS should be avoided, such as in those with preterm prelabour rupture of membranes or when the patient is not willing for transvaginal route, the cervical length can be measured by transperineal ultrasonography. Theoretically, transperineal ultrasonography has an advantage over transvaginal ultrasonography, that no pressure is put on the cervix to artifactually elongated the cervical canal, as can occur in the TVS approach .It has been found that transperineal ultrasound can be accurate as transabdominal ultrasound for examining the cervix and one study found it was more acceptable to women than TVS. Other studies have shown that when adequate images obtained, Transperineal ultrasound can predict preterm labour as accurately as TVS.

Assessment of cervical length by transabdominal ultrasound can be used as an initial evaluation but it should be borne in mind that,especially in cases with a short cervix, this modality tends to overestimate the true cervical length. Therefore, a proper risk assessment should be based on a TVS or Transperineal ultrasound.

In our study we are going to study the impact of uterocervical angle on preterm birth.

There are many studies are being conducted to evaluate the impact of uterocervical angle on preterm birth. The concept behind this is that the cervix lies distal to the body of uterus and is bounded superiorly by the uterine isthmus. Internal os is the histological and anatomical junction between uterus and cervical stroma, and the endocervical canal extends from external to internal os

Physiologic weight distribution put pressure on the internal os, which can directly affects UCA and if UCA is wide it will increase the loading force which can lead to effacement. The patho-physiological principle behind UCA is purely physical follows the rules gravity and trigonometry. With advancing pregnancy, the force of pregnant uterus is shifted towards the cervix and depending upon the angle of inclination, the cervical canal is either pressed shut in case of an acute angle or pressed open in case of an obtuse angle.

The first article that supported predicting spontaneous preterm birth by UCA was written by Cannie et al. who reported that the efficacy of the arabian pessary in preventing preterm birth was significantly influenced by the change in the UCA pre and post pessary insertion[11-15].

Another study done by **SOCHACKI-WOJCICKS ET AL**[18] in 2015, revealed the detection rates of UCA for spontaneous PTB of 61.1% in the first trimester and 66.7% in the second trimester which were superior to cervical length(CL) in their study.

Uterocervical angle measurement was also investigated by DZIADOSZ et al[19] as a tool in prediction of preterm birth. They analyzed retrospectively the cervical images which were taken during the transvaginal ultrasound of 972 singleton pregnant women. It was found that the cases with UCA≥95 degree had significantly more preterm labors before 37 weeks of gestation(sensitivity 80%:p<0.001:negative prediction value 95%) and the cases with UCA≥105 degree had more deliveries before 37 weeks of gestation(sensitivity 81%:p<0.001:negative predictive value 99%).

A secondary result obtained in the same study was that the cervical length <25 mm was significant for the prediction of preterm birth. However ,since sensitivity was 62 % and negative predictive value was 95%in preterm births before 37 weeks of gestation and sensitivity was 63 % and negative predictive value was 97% in preterm births before 34 weeks of gestation which was more than CL, it was concluded that the UCA measurement is more successful than cervical length measurement for the prediction of preterm birth.

SUR B ET AL[20] did a prospective study in 2017 on 100 singleton pregnant patients and found that there was a significant risk of preterm labour in women with cervical length <2.5 cm in the 2nd trimester with Odds ratio 3.625, p value+0.001 , sensitivity 75% and specificity 79.31%. The positive predictive value 33.33% and negative predictive value 95.83%.The difference of mean UCA in woman who delivered preterm and that of those who delivered at term, in the 1st trimester (preterm group 114.2degree versus term group 93degree ,p value<0.001) and in the second trimester (preterm group 127.66 degree versus 103.65 degree, p value<0.001) was significant. UCA of 114 degree or more in the first trimester was associated with a risk of spontaneous preterm birth (p value 0.0065, sensitivity 90% and specificity

80%).UCA of 127.66 degree or more in the second trimester was associated with the a risk of spontaneous preterm birth(p value 0.0004,sensitivity 80% and specificity 80%). UCA of 127.66 degree or more in the second trimester was associated with a risk of spontaneous preterm birth(p value 0.0004,sensitivity 80% and specificity 88.23%). Overall UCA came out to be better predictor than CL in their study.

Bafali O et al[21] in 2018 studied 82 singleton pregnant women between 24 and 34 weeks of gestation. Bishop scores were calculated, and cervical length and UCA measurements were performed by transvaginal ultrasound. Among the etiological factors, only multiparity and abortion history were found significantly high in pregnant woman who had preterm delivery. The cut-off value for UCA measurements was determined to be 80.5%. the prevalence of UCA >80.5degree in women who delivered before 37 weeks of gestation was found to be 75% and it was significantly higher than the term cases (p=0.007).For this value, it was found that UCA sensitivity was 75 %, specificity was 58% ,positive predictive value was 53% and negative predictive value was 77%.

Notably, D'Onofrio and colleagues estimate the extent to which the associations between early gestational age and offspring mortality and morbidity are the result of confounding factors. The authors conducted a population-based cohort study, combining Swedish registries to identify all individuals born in Sweden from 1973 to 2008 (3,300,708 offspring of 1,736,735 mothers) and link them with multiple outcomes. The results showed that there was a dose-response relationship between risks of PTB and infant mortality.

In concordance with our findings, Llobet and colleagues[18] assessed the ability of the UCA to predict spontaneous preterm birth before 34 and 37 weeks of gestation. A prospective cohort study with singleton pregnancies between 19.0 and 22.6 weeks of gestation. Mean UCA in the second trimester was wider in the preterm group compared with the control group.

Likewise, Lynch and colleagues[19] aimed to determine if there is an association between UCA and sPTB < 37 weeks. Retrospective cohort study from 2014 to 2017 of pregnancies with cervical length (CL) screening between 15 and 24 weeks was conducted. The mean UCA was significantly lower for delivery ≥37 weeks compared to delivery

Sur and colleagues[20] performed a prospective observational study to evaluate the UCA of the uterus by transvaginal sonography and to determine the feasibility to predict spontaneous PTB. The duration of the study was from December 2014 to December 2016. The participants included 100 pregnant women with singleton pregnancy who were asymptomatic. The difference of mean cervical angle in women who delivered preterm and that of those who delivered at term in the 1st trimester (preterm group 114.2° vs term group 93.0°) Vielba and colleagues assessed the ability of UCA compared with cervical length to predict the risk of spontaneous PTB. The authors conducted a retrospective cohort study of twin pregnancies undergoing transvaginal ultrasound between 19-21 weeks. A total of 177 women were included. ROC curves showed a better area under the curve (AUC) for UCA at all gestational ages compared with cervical length.

Llobet and colleagues aimed to determine whether the UCA correlates with the risk of spontaneous PTB and assess its inter-observer variability. Case control study of 275 women including 34 who started labor spontaneously and gave birth before 34 weeks of gestation (preterm group) and 241 who gave birth at term (control group). Mean UCA in the second trimester was wider in the preterm group (105.16°) compared with the control group (94.53°), p=.01

On the contrary, Gründler and colleagues compared the test properties of CL and UCA on patients at risk for preterm birth. 109 patients with at least one of the following signs of threatening preterm birth between 20 and 31 weeks were included in a prospective cohort analysis. The UCA was on average 103° and the mean UCA in preterm and term groups did not differ significantly (P =. 924). The UCA was not predictive for threatened preterm birth, even if only singletons were considered.

Likewise, Lynch and colleagues aimed to determine if change in UCA is associated with an increased rate of preterm birth (less than 37 weeks) for women with a short cervix. A retrospective study was performed from January 2013 to March 2016 of singleton pregnancies undergoing universal cervical length screening. A total of 176 women met the inclusion criteria. There was no difference in the rate of preterm birth at < 34 weeks or at < 37 weeks based on a change in UCA (i.e., decreased/ no change or increased UCA). However, women with a final UCA >105 degrees had an increased risk of preterm birth at less than 34 weeks

To summarize ,CL has been extensively studied for the prediction of preterm birth, especially when measured during the mid trimester in high risk population (CL<2.5cm) or in patients with previous history of preterm labour.

However ,in some studies , it has been seen that the sensitivity of CL for predicting preterm labour is less, but its negative predictive value is still good. So another marker, UCA with good sensitivity and negative predictive value is now being studied and used for risk prediction and showed better results than CL for prediction of spontaneous preterm birth in low risk populations.

MATERIALS AND METHODS:

The present study was conducted on antenatal patients in the DEPARTMENT OF OBSTETRICS AND GYNECOLOGY of GOVERNMENT RSRM LYING IN HOSPITAL CHENNAI between the period of November 2020 -November 2021.

Patients attending the antenatal opd were enrolled ,who satisfied the inclusion criteria. Written informed consent was taken from the patients after explaining the nature of the study.

STUDY DESIGN:

Descriptive study.

SAMPLE SIZE:

We recruited 110 patients for our study

STUDY CENTER:

GOVERNMENT RSRM LYING IN HOSPITAL

DURATION OF STUDY: November 2020 to October 2021

ETHICAL ISSUES:

There was no unethical interventions in the study. Ethical clearance was taken from ethical committee before the commencement of study.

INCLUSION CRITERIA:

- Singleton antenatal patients in 2nd trimester(20-24 wks)of gestation at the time of enrollment
- 18-40years of age
- Primigravida without any high risk factors requiring preterm delivery
- Multigravida without any history of preterm birth

EXCLUSION CRITERIA:

- patient who refused to give valid consent
- Congenital malformation of uterus and fetus
- Any placental abnormality
- Patient with cervical length <2.5cm
- IVF/IUI conceived pregnancy
- Previous history of preterm labour, any cervical surgery, unexplained IUD
- Psychiatric ,medical illness

METHODOLOGY:

The patients were educated about the study on their own language. A written informed consent was obtained from all the patients in their own language and an information sheet was provided for their queries.

A complete history was noted. The following points were noted for the purpose of the study.

1.Age of the patient

2.obstetric history with parity

3.details of previous pregnancy

4.Gestational age of the patient

5.General information: personal history, family history ,socioeconomic status.

EXAMINATION:

General physical examination and obstetric examination were carried out in antenatal opd and following also noted

ANTHROPOMETRIC MEASUREMENTS:

1. Maternal height

2.Maternal weight

3.BMI

RADIOLOGICAL EXAMINATION:

For our study transvaginal ultrasound was done along with the routine anomaly scan and growth scan. Utero-cervical angle was measured twice on every enrolled patients during our study

PRE REQUISITES;

Before the evaluation of the cervix with transvaginal ultrasonography, the patient was asked to empty the bladder because distended bladder will alter the shape of the cervix and compress the cervical canal in some cases preventing the detection of cervical incompetence[22-25].Patient was asked to lie down in lie down position with hips elevated on cushion.

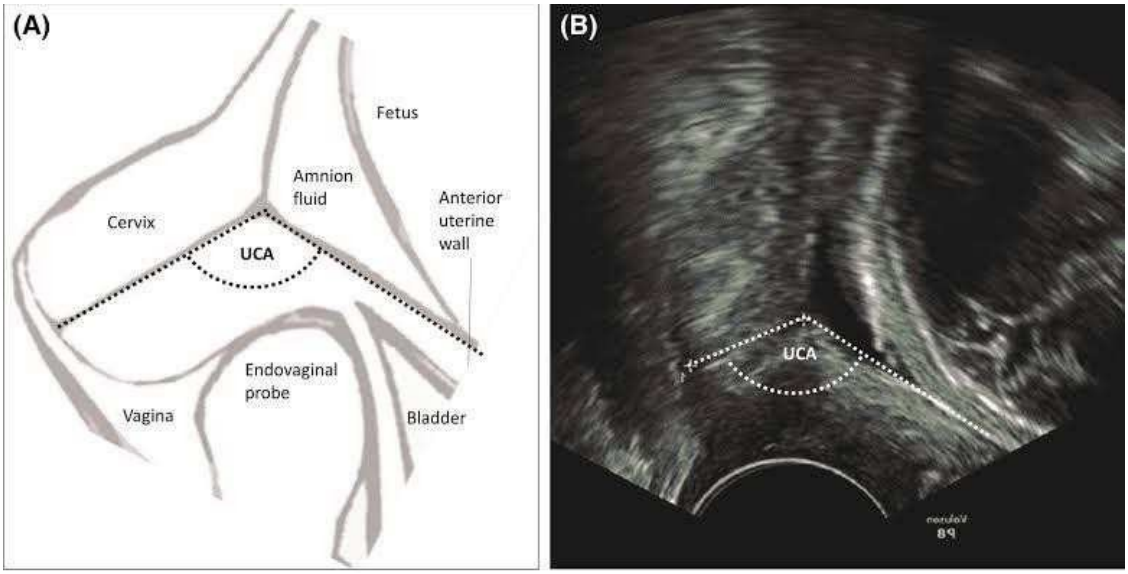
The vaginal probe was covered in a cover and sterile gel was poured over it as coupling agent and then placed in the anterior fornix without much pressure. If the probe is pressed too hard against the cervix, it can obscure the incompetence of cervix. Initial orientation of the cervix was established by locating the sagittal view of the cervix as it may differ from the maternal longitudinal axis. The cervical canal will appear as a hypoechoic groove. In order to avoid inclusion of the isthmus into the cervical length measurement, we should be carefully identify internal as well as the external os. The external os should be identify as the point at which the anterior as well as posterior lip of cervix come together.

The internal os should be identified by the cervical mucosa which was usually hypoechoic as compared to the surrounding stroma. A thin line of demarcation between the stroma and the cervical mucosa can generally be identified on ultrasound. The Point at which the cervical mucosa ends is considered to be the internal os.

The image should sufficiently magnified so that the morphology of cervix was easily identifiable. The cervix should occupy 50-75% of the image.

If the cervical canal is curved, the CL can be measured either as the sum of two straight lines that essentially follow the curve or by straight line between external and internal os.

A short CL is usually straight, and the presence of the curved cervix generally signifies the CL greater than 25mm and therefore , it is reassuring finding. If a normal appearing cervix could not be visualized , the cervix should be reassessed to further determine whether funneling was present or not[26]



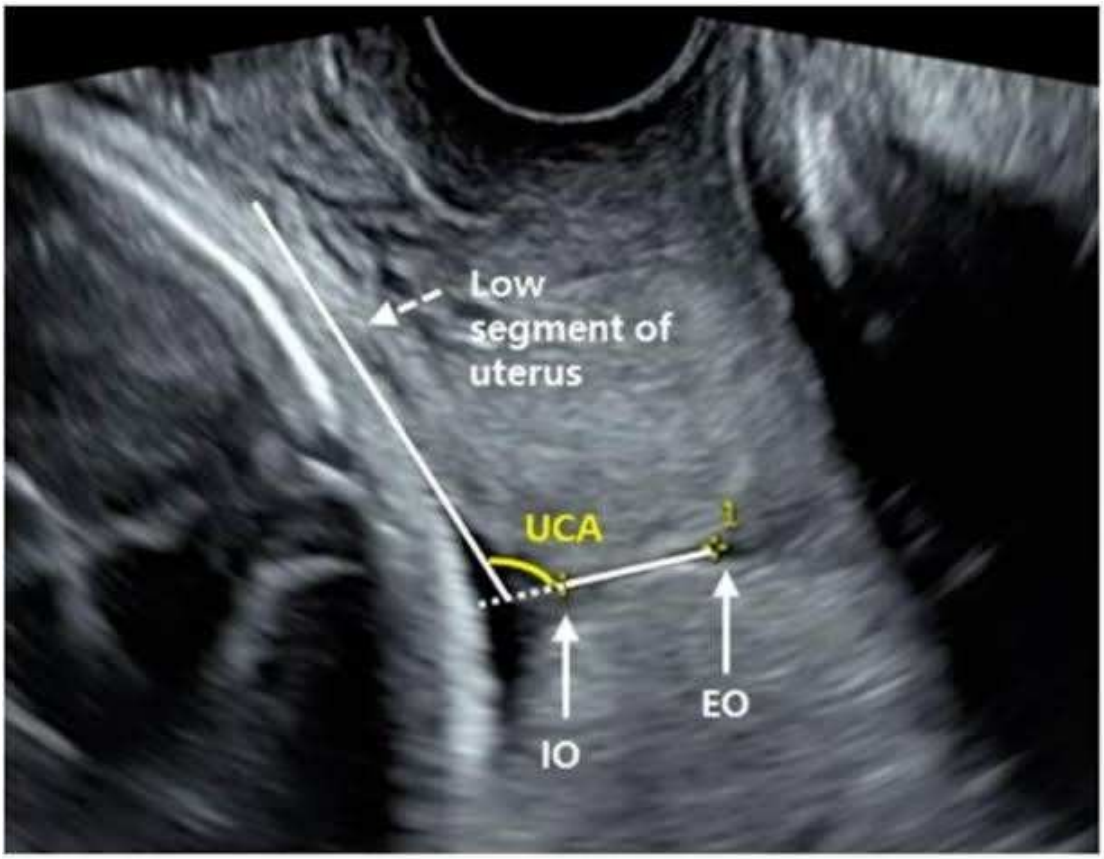
A] PICTORIAL REPRESENTATION OF MEASUREMENT OF UCA

B] TRANSVAGINAL ULTRASONOGRAPHY OF UCA

The cervix is not a static structure and the length can vary due to contraction of uterus or different position of the patients. Therefore, sufficient time should be allotted for the examination of cervix.

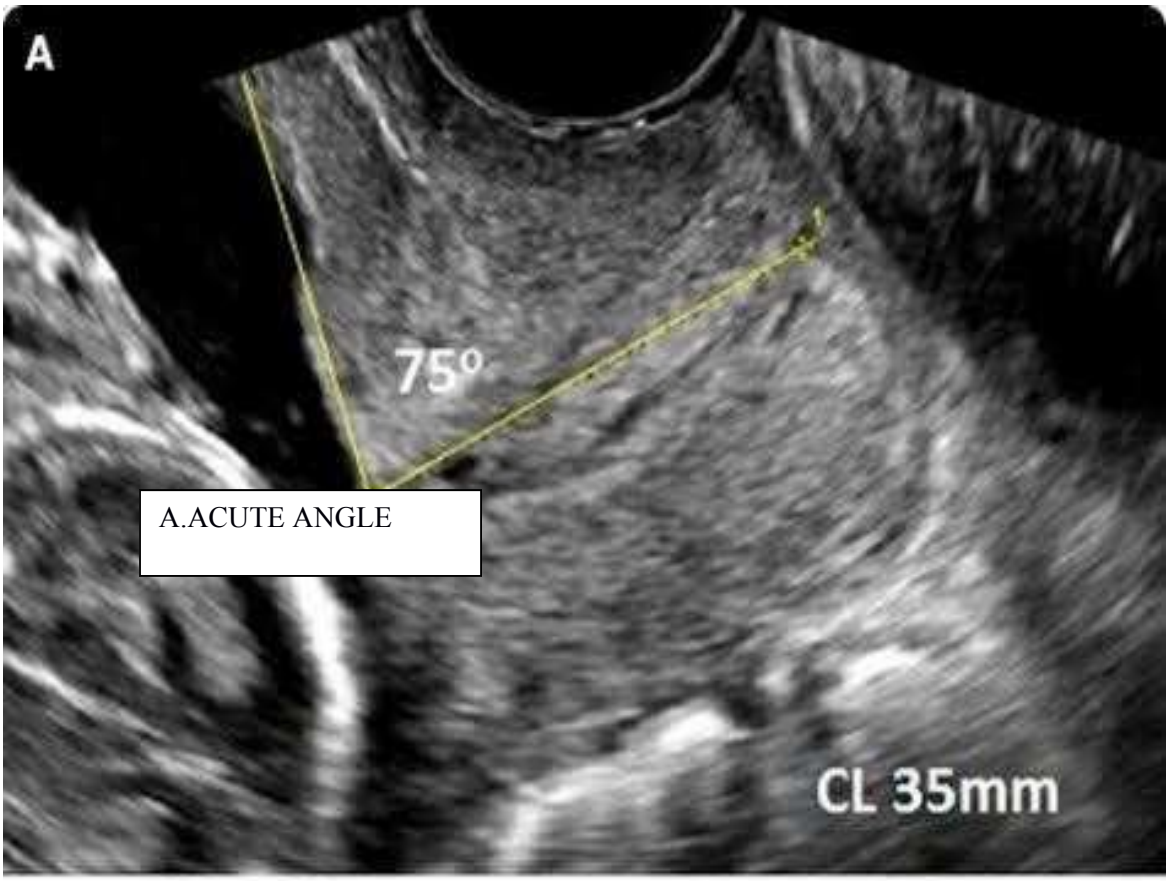
In our study two measurements were obtained in each patients during the course of examination and shortest measurement was used for reporting and counseling.

For the measurement of UCA , the probe was slowly withdrawn until the image become blurred and then the insertion pressure was increased enough to restore the clear cervical image. The electronic markers were placed at the farthest points between the external to internal os as a straight line. The first angle caliper was placed from the external to internal os and the second caliper was extended along the the length of lower uterine segment. A second ray was then drawn to delineate the lower uterine segment. This ray was then traced up the anterior uterine segment to a distance of upto 3cm of the lower uterine segment in order to establish an adequate measurement. The anterior angle in between the two rays was measured.

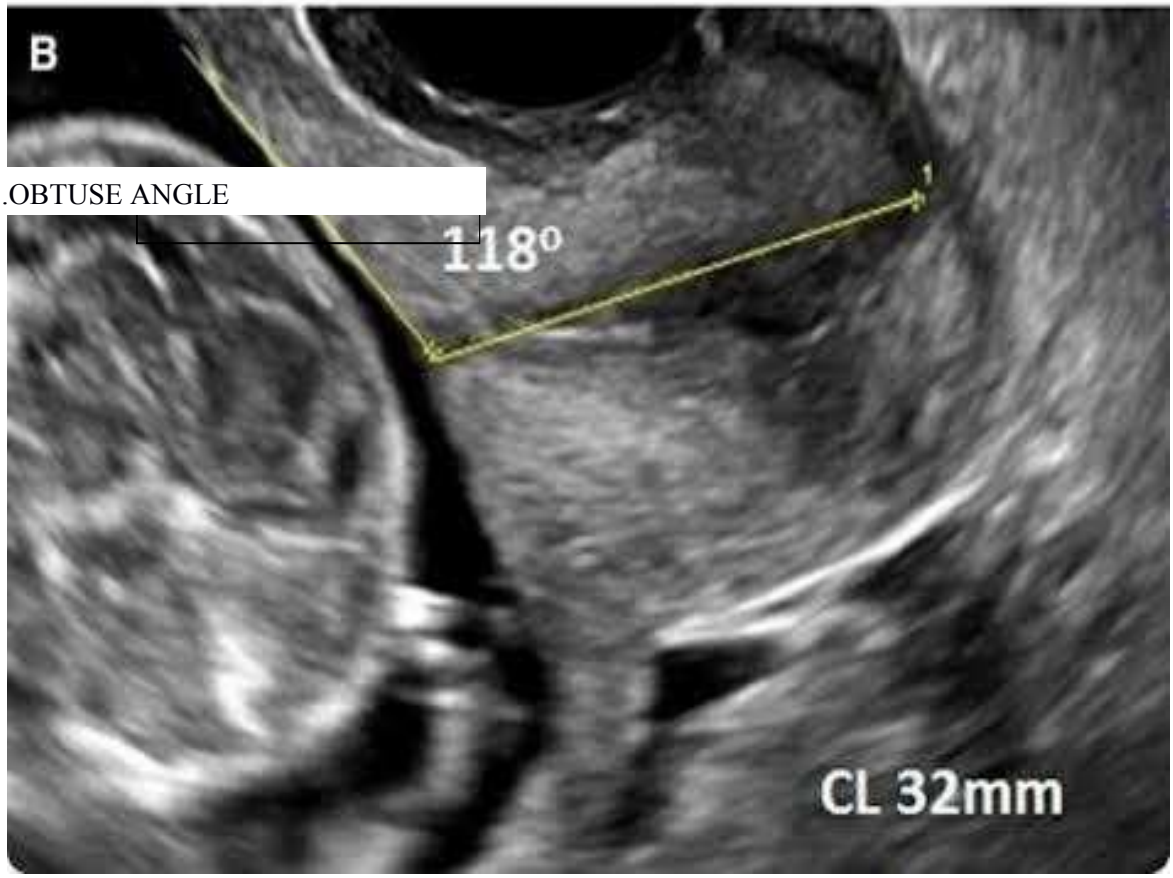


The image shows measurement of utero-cervical angle by,

- The first angle caliper was placed from the external to internal os
- The second caliper was extended along the the length of lower uterine segment



A.ACUTE ANGLE



B.OBTUSE ANGLE

If uterocervical cervical angle was more than 95 degree at any time of examination, I will treat the patient accordingly.

After that all women were followed- both normal angle and abnormal angle patient with intervention {tocolytics, cervical encirclage, progesterone etc) throughout the course of gestation and delivered in our hospital

After delivery POG,weight of newborn,sex,APGAR,need for icu were noted and analysed

STATISTICAL ANALYSIS: Descriptive analysis was used to process the analysis outcome. Collected data was checked for accuracy and completeness

Formula used:

According to the previous studies, sensitivity of the uterocervical angle to study for the impact of preterm birth was 80%. For the purpose of calculating the sample size, we have made sensitivity of 70%.

$n=Z^2P(1-P)/E^2$

where,

n= sample size

Z= Z statistic for a level of confidence of 95%, which is conventional, Z value is 1.96

P=sensitivity of the test

(in proportion of one; if 70%, P=0.70), and

E= margin of error (in proportion of one; if 10%, d=0.10)

Calculations:

Z=1.96 P=0.7 E=0.1

$n=1.96x1.96x0.7x0.3/(0.1)^2=80.6$

Sample size was required to get results near perfection was 110..so we recruited 110 patients for our study.

STATISTICAL METHODS:

Categorical variables were presented in number and percentage and continues variables were presented as ±SD and median.

A p value of <0.05 was considered statistically significant.

OBSERVATION AND RESULTS

5.1 Age Distribution of Patients

The mean age distribution of patients and their standard deviation were calculated given in Table 5.1 and graphically represented in Figure 5.1. The mean UCA <95 = 27.518±3.986 and the mean UCA ≥95 = 27.167± 3.457. Both conditions having equal effects were observed. The probability value was also calculated; p-value is 0.623 > 0.05 statistically not significant

Table 5.1 Age Distribution of Patients

Age	UCA <95	UCA ≥95
< 25	17	14
26 - 30	35	20
> 30	12	12
Total	64	46
Mean	27.518	27.167
SD	3.986	3.457
P'value	0.623 Not significant	

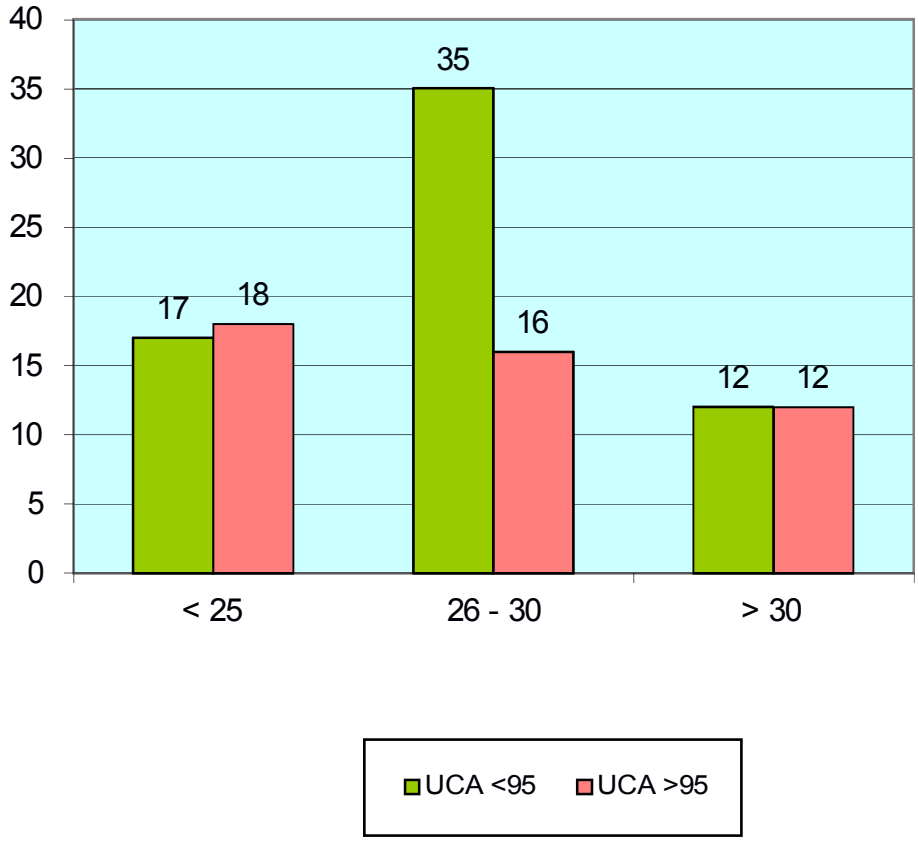


figure 5.1Mean age distribution of patients

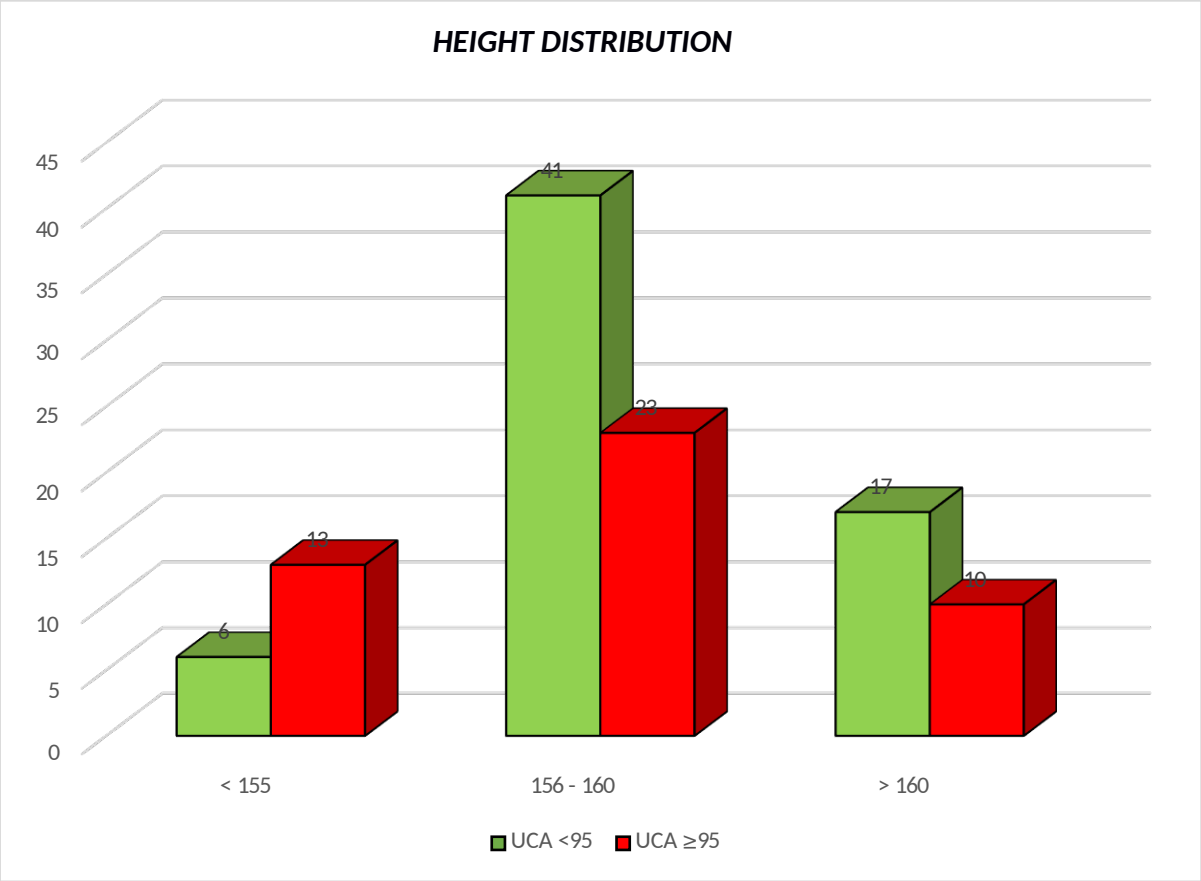
5.2 Height Distribution of Patients

The mean height distribution of patients and their standard deviation were calculated and represented in Table 5.2. The mean UCA <95 = 158.893 ± 3.409 and the mean UCA ≥95 = 157.963 ± 3.539. Most of the patients having in the height group of 156 – 160. The probability value of height distribution of patients was also calculated; p-value is 0.163 > 0.05 statistically not significant.It is represented in figure 5.2

Table 5.2 Mean height distribution of patients

Height	UCA <95	UCA ≥95
< 155	6	13
156 - 160	41	23
> 160	17	10
Total	64	46
Mean	158.893	157.963
SD	3.409	3.539
P'value	0.163 Not significant	

FIGURE 5.2 mean height distribution



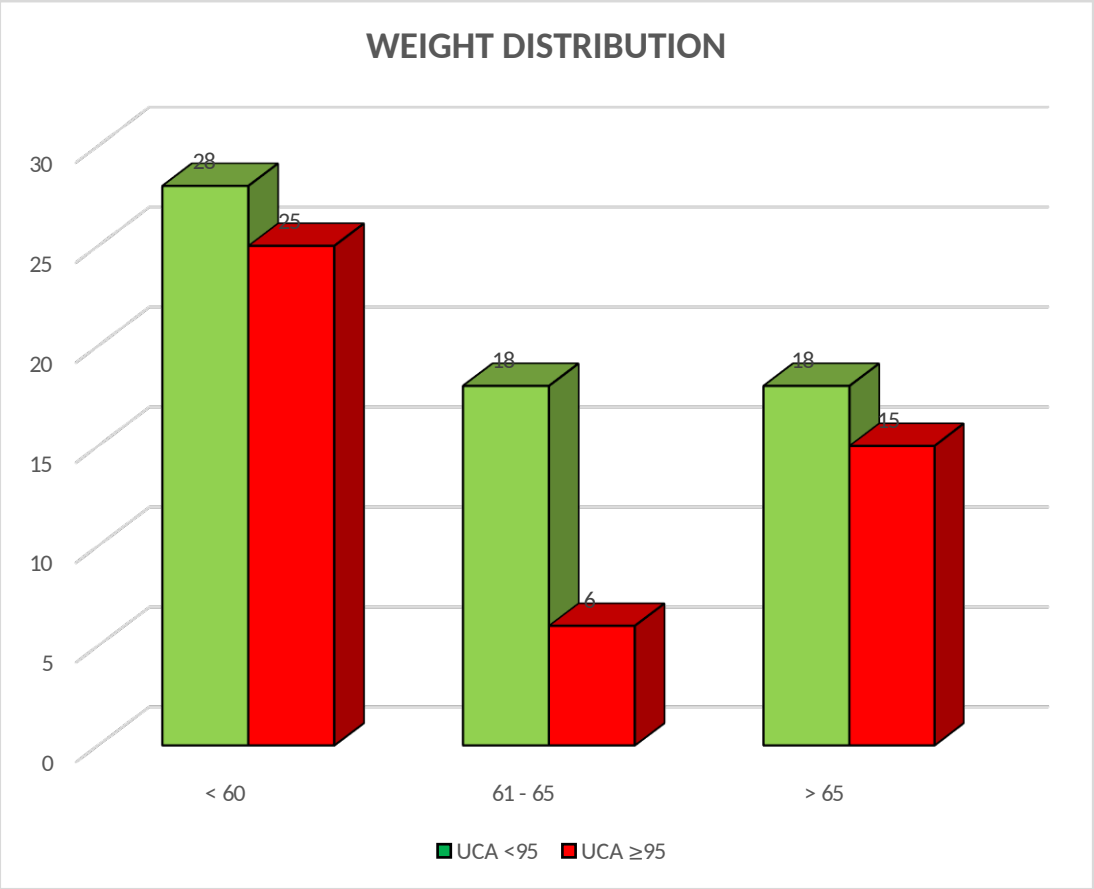
5.3 Weight Distribution of Patients

The mean weight distribution of patients and their standard deviation were calculated . The mean UCA <95 = 61.714 ± 5.733 and the mean UCA ≥95 = 60.5± 7.147. Most of the patients having in the weight group of < 60. The probability value of weight distribution of patients was also calculated; p-value is 0.327 > 0.05 statistically not significant. It is represented in figure 5.3

Table 5.3 Mean weight distribution of patients

Weight	UCA <95	UCA ≥95
< 60	28	25
61 - 65	18	6
> 65	18	15
Total	64	46
Mean	61.714	60.5
SD	5.733	7.147
P'value	0.327 Not significant	

Figure 5.3.Mean weight distribution



5.4 BMI value of patients

The BMI value of patients and their standard deviation were calculated and tabulated in Table 5.4. The BMI value of UCA <95 = 24.379± 2.259 and the mean UCA ≥95 = 24.263 ± 2.781. Most of the patients having in the BMI value of < 23.1 - 26.0. The probability value of BMI of patients was also calculated; p-value is 0.811 > 0.05 statistically not significant. It is represented in figure 5.4

Table 5.4 BMI value of patients

BMI	UCA <95	UCA ≥95
< 23.0	25	15
23.1 - 26.0	27	18
> 26.0	12	13
Total	64	46
Mean	24.379	24.263
SD	2.259	2.781
P'value	0.811 Not significant	

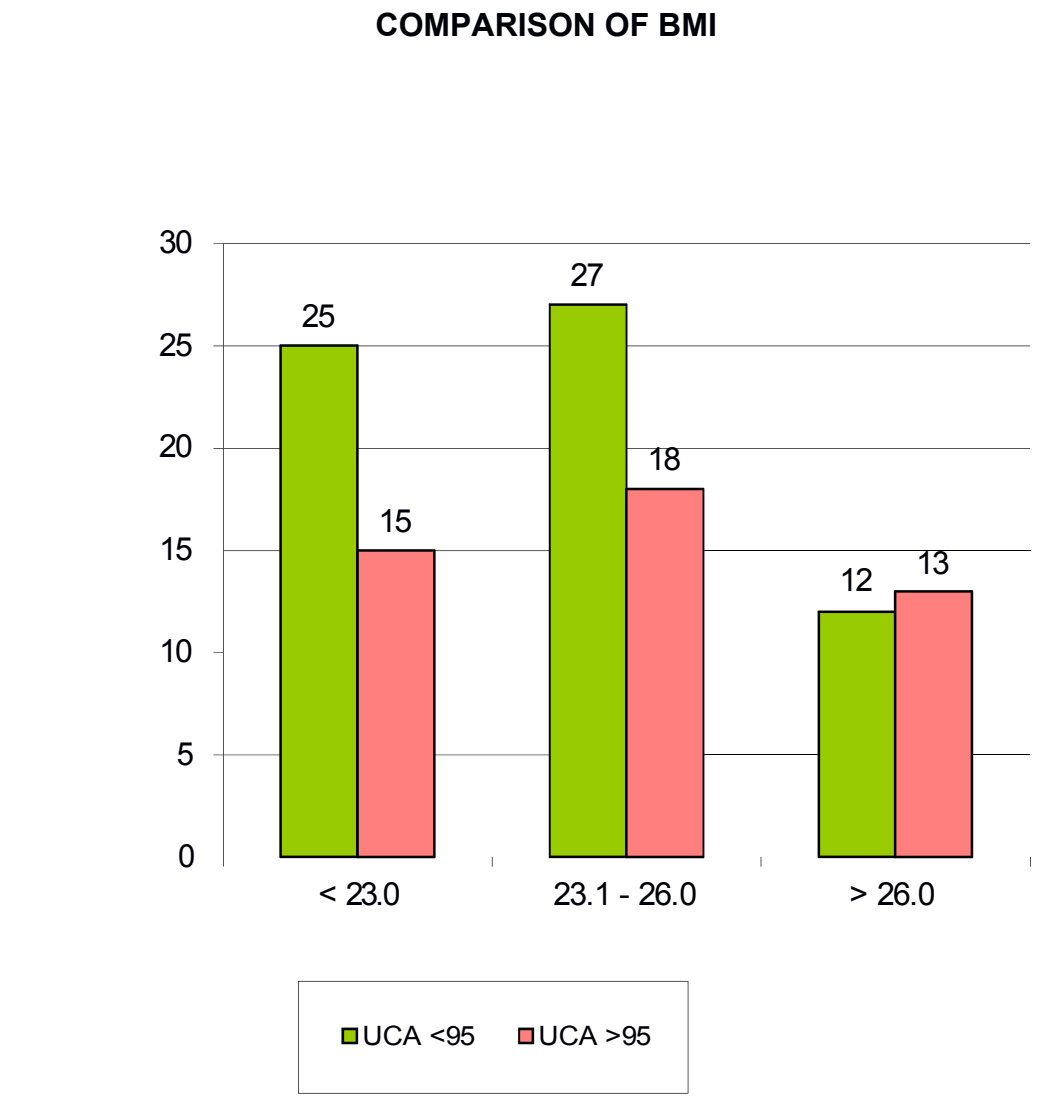


Figure 5.4 BMI value vs UCA

5.5 Comparison of Parity

Table 5.5 Comparison of Parity value

Parity	UCA <95	UCA ≥95
Primi	33	25
Multi	31	21
Total	64	46
P'value	0.256 Not significant	

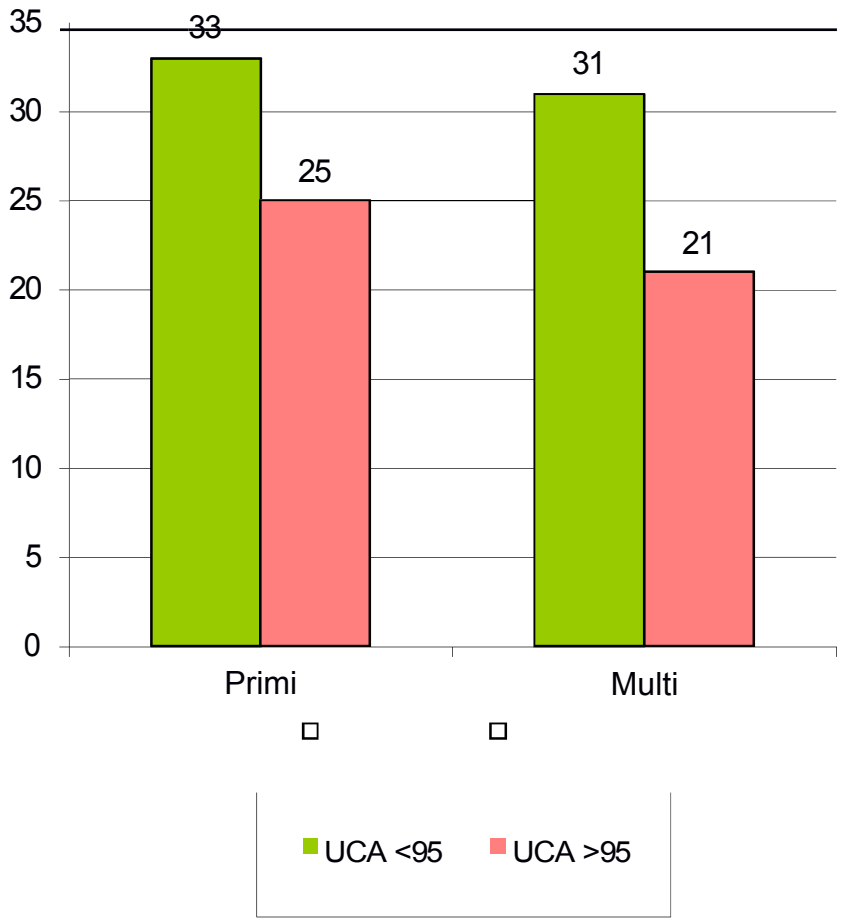


Figure 5.5 Comparison of Parity. It was observed from our study that there was no significant association between parity and UCA value

5.6 Intervention of patients

In our study we intervene all the 46 patients who had angle more than or equal to 95 which was diagnosed during our course of study.

Table 5.6 Intervention of patients

Intervention	UCA <95	UCA ≥95
Yes	1	46
No	63	0
Total	0	0
P'value	<0.001 Significant	

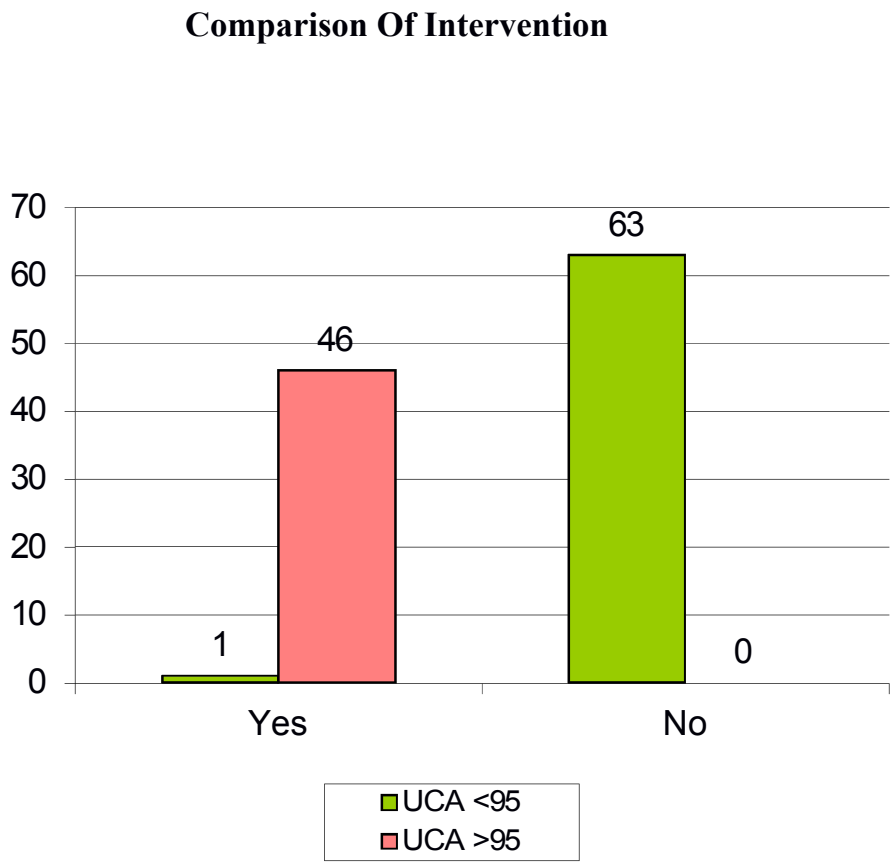


Figure 5.6: comparison of intervention

5.7 H/O Threatened Preterm

Table 5.7 The H/O Threatened Preterm

H/O Threatened Preterm	UCA <95	UCA ≥95
Yes	1	7
No	63	39
Total	0	0
P'value	0.017 Significant	

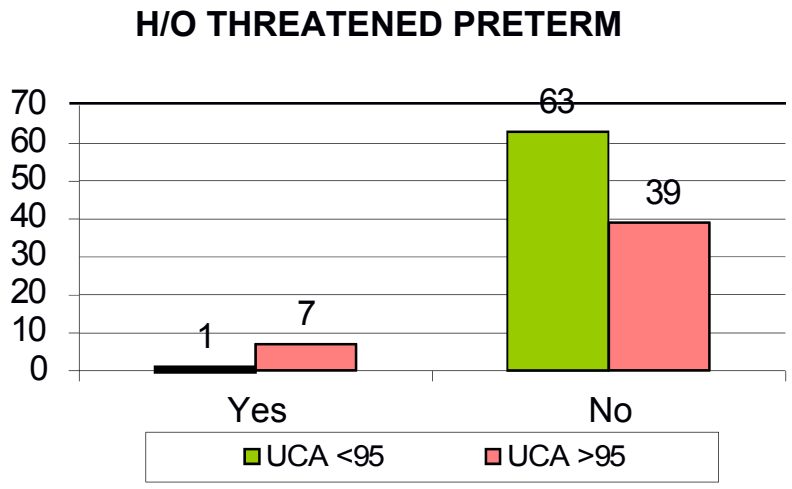


Figure 5.7 H/o threatened preterm

History of Threatened Preterm were also calculated for this study and mentioned in Table 5.7..Out of 46 patients who have angle more than 95 ,7 patients had a history of threatened preterm labour ,5 patients among them delivered preterm and 2 patient delivered at term who responds to conservative management. The majority of patients with H/O Threatened Preterm have angle $\geq$95 .The probabilty value of H/O Threatened Preterm have been calculated; p-value is $0.017 < 0.05$ statistically significant.

5.8 Mode of Delivery

Table 5.8 Modeof Delivery

MODE OF DELIVERY	UCA <95		UCA>95	
	PRETERM	TERM	PRETERM	TERM
LSCS	2	32	17	7
NVD	2	28	14	8
Total	4	60	31	15

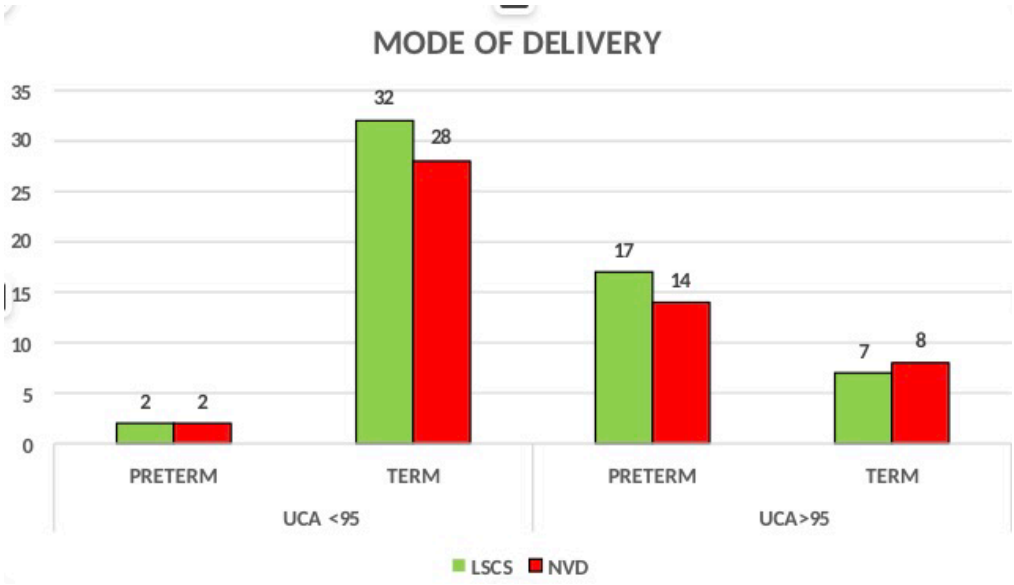


Figure 5.8 Mode of Delivery

The mode of delivery and their procedure have been calculated and given in Table 5.8 and graphically represented in Figure 5.8. In LSCS procedure having UCA <95 = 34, UCA ≥95 = 24; in NVD having UCA <95 = 30, UCA ≥95 = 22. Probability value is 0.258 > 0.05 statistically not significant.

5.9 Comparison of Birth weight

BIRTH WT in Kgs	UCA <95	UCA >95
Mean	2.85	2.55

Table 5.9 comparison of birth weigh

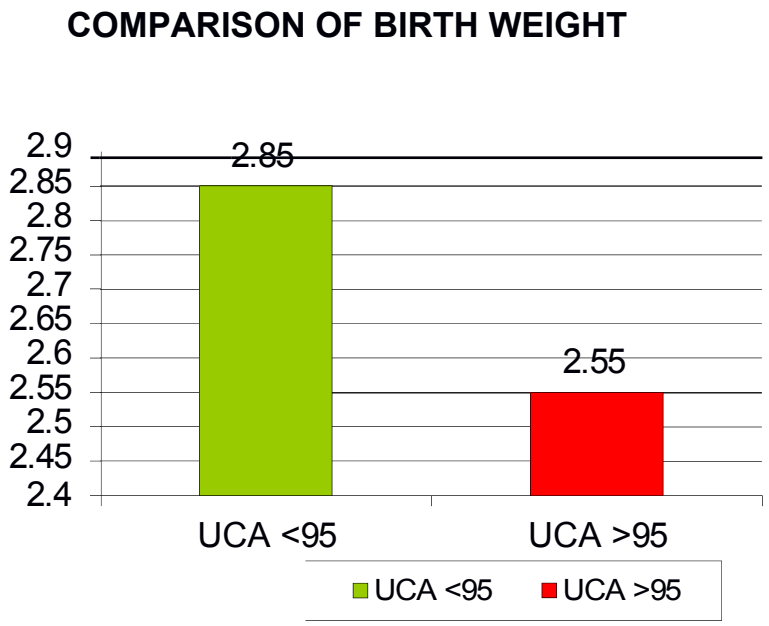


Figure 5.9 Comparison of Birth weight

Comparison of birth weight have been calculated and graphically represented in Figure 5.9. UCA<95 = 2.85 having higher weight compare to other.

5.10 UCA Vs NICU Admission

Table 5.10 UCA-2nd TRIMESTER Vs NICU Admission

NICU ADMISSION	UCA <95		UCA>95	
	PRETERM	TERM	PRETERM	TERM
YES	2	12	20	3
NO	2	48	11	12
Total	4	60	31	15

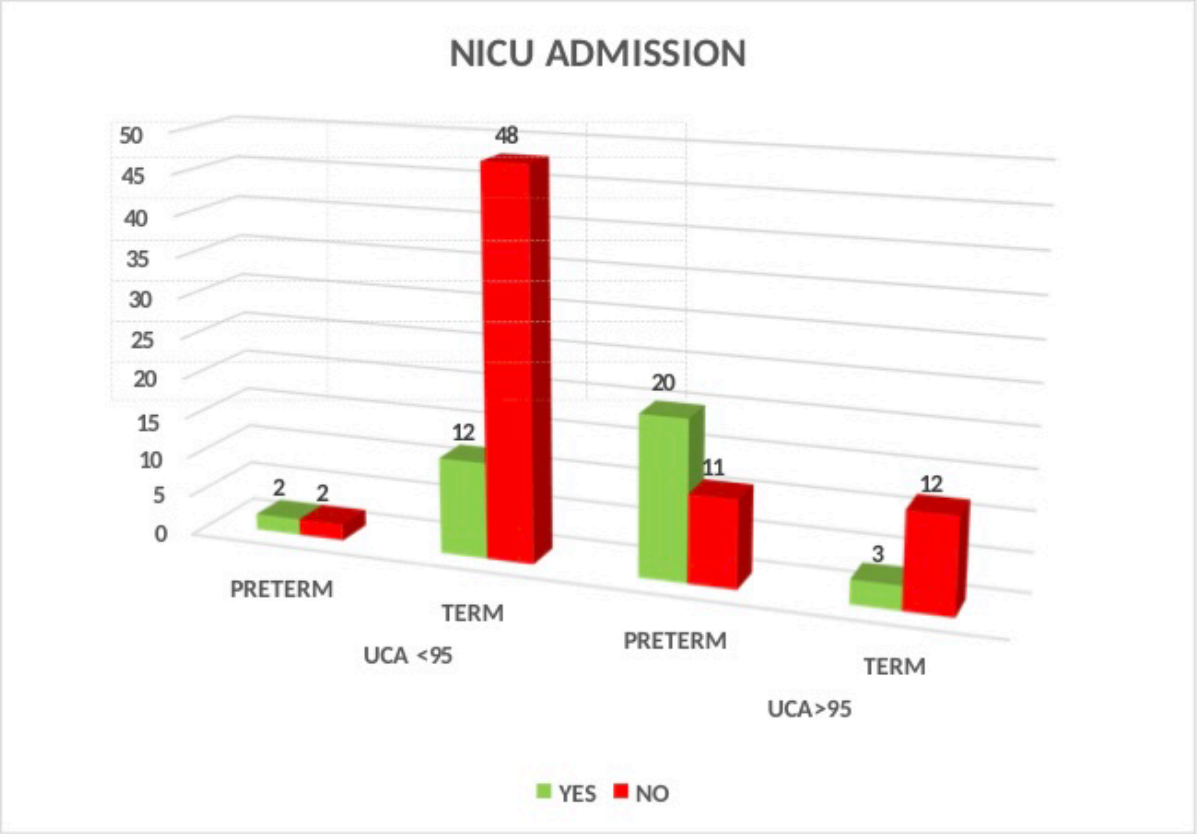


Figure 5.10: UCA Vs NICU Admission

NICU admission was significantly more for the patients delivered for angle more than 95 who delivered preterm when compared to angle less than 95 who predominantly delivered at term.so it was concluded that if UCA angle is wider which was prone to preterm delivery and more chance of admission in NICU.

5.11 POG at Delivery vs 2nd Trimester UCA Table

5.11 POG at Delivery vs 2nd Trimester UCA

POG at Delivery	UCA		
	<95	95 - 105	> 105
< 34 (4)	0	0	4
34 - 37 (31)	4	18	9
> 37 (75)	60	13	2
Total	64	31	15
P'value	<0.001 Significant		

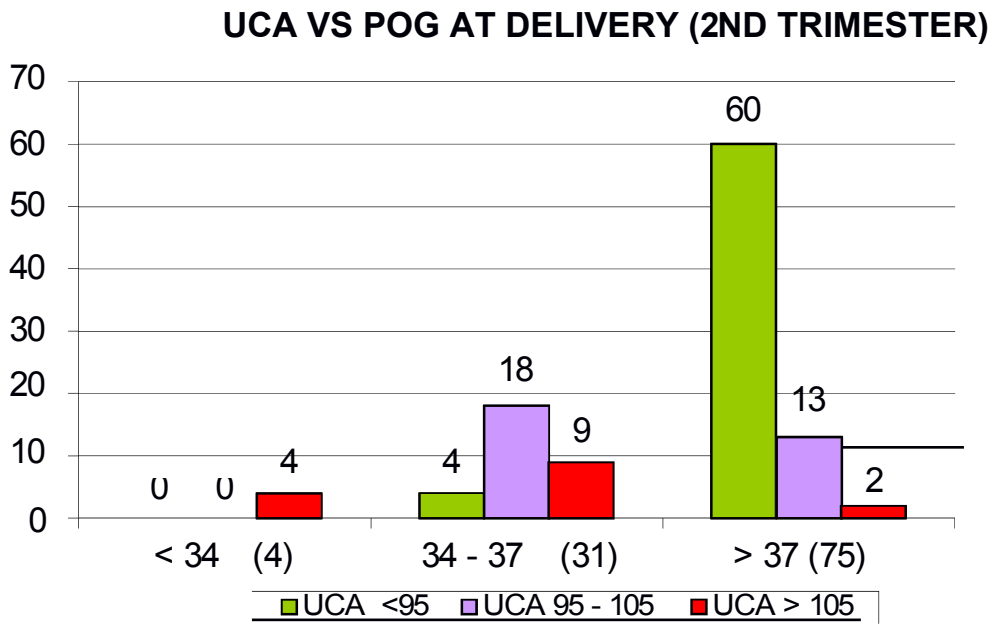


Figure 5.11 : UCA VS POG AT DELIVERY (2ND TRIMESTER). Among 110 patients 64 patients have angle less than 95,In that 60 patients delivered at term and 4 patients were delivered preterm.46 patients have angle more than 95 ,In that 31 patients were delivered preterm and 15 patients were delivered term.so we concluded that acute angle delivered at term and wider the angle more prone for preterm delivery even if we intervene if the angle is wider.It is represented in table 5.11 and figure 5.11.

5.12 POG at Delivery vs 3rd Trimester UCA

Table 5.12 POG vs UCA 3rd Trimester

POG at Delivery	UCA		
	<95	95 - 105	> 105
< 34 (4)	0	0	4
34 - 37 (33)	4	19	10
> 37 (73)	60	12	1
Total	64	31	15

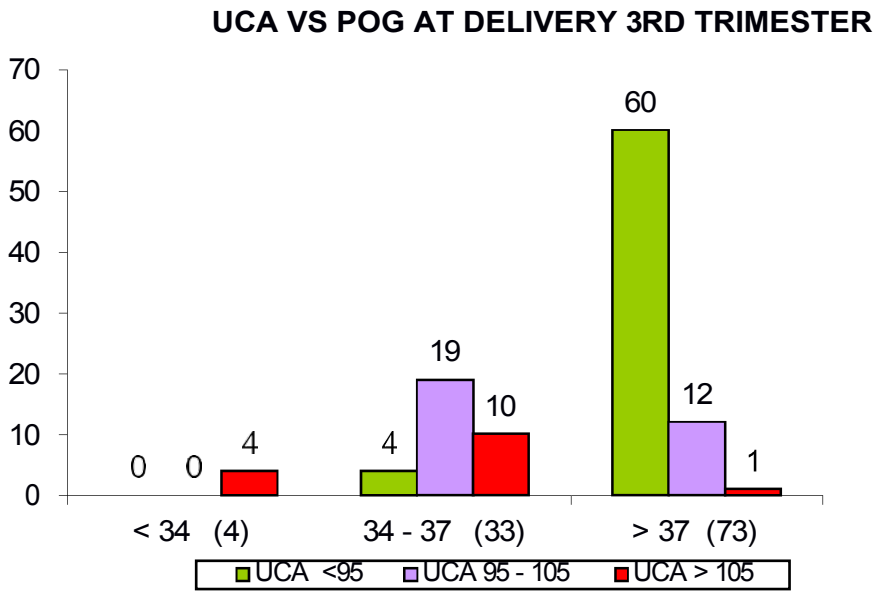


Figure 5.12 POG vs UCA for Trimester 3rd Trimester. Among 110 patients 64 patients have angle less than 95,In that 60 patients delivered at term and 4 patients were delivered preterm.46 patients have angle more than 95 ,In that 33 patients were delivered preterm and 13 patients were were delivered term.so we concluded that acute angle delivered at term and wider the angle more prone for preterm delivery even if we intervene if the angle is wider

5.13 POG at Delivery vs 2nd Trimester UCA Mean Table

5.13 POG at Delivery vs 2nd Trimester UCA Mean

	UCA	
POG AT DELIVERY	Mean	SD
< 34 (4)	118.25	6.238
34 - 37 (31)	96.71	13.317
> 37 (75)	91.23	7.889
p value	< 0.001 Significant	

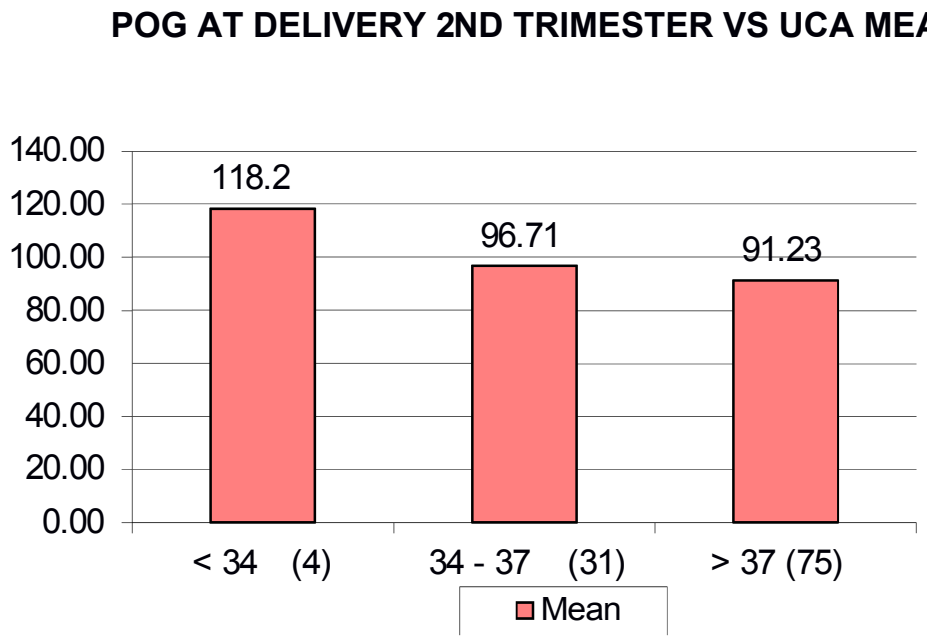


Figure 5.13: POG AT DELIVERY 2ND TRIMESTER VS UCA MEAN. Mean UCA at second trimester preterm delivered patients was 118˚ for less than 34 weeks,96 for 34-37weeks which was significantly higher as compared to the patients with term delivered group 91˚.so it was concluded that patients with greater UCA in 2nd trimester had significantly higher chances of preterm delivery even after the intervention made if the angle is higher.

5.14 POG AT delivery vs 3rd TRIMESTER UCA Mean

Table 5.14 POG at delivery vs 3rd Trimester Vs UCA Mean

	UCA	
POG AT DELIVERY	UCA Mean	SD
< 34 (4)	122.75	6.602
34 - 37 (33)	100.52	13.959
> 37 (73)	94.10	7.463
p value	< 0.001 Significant	

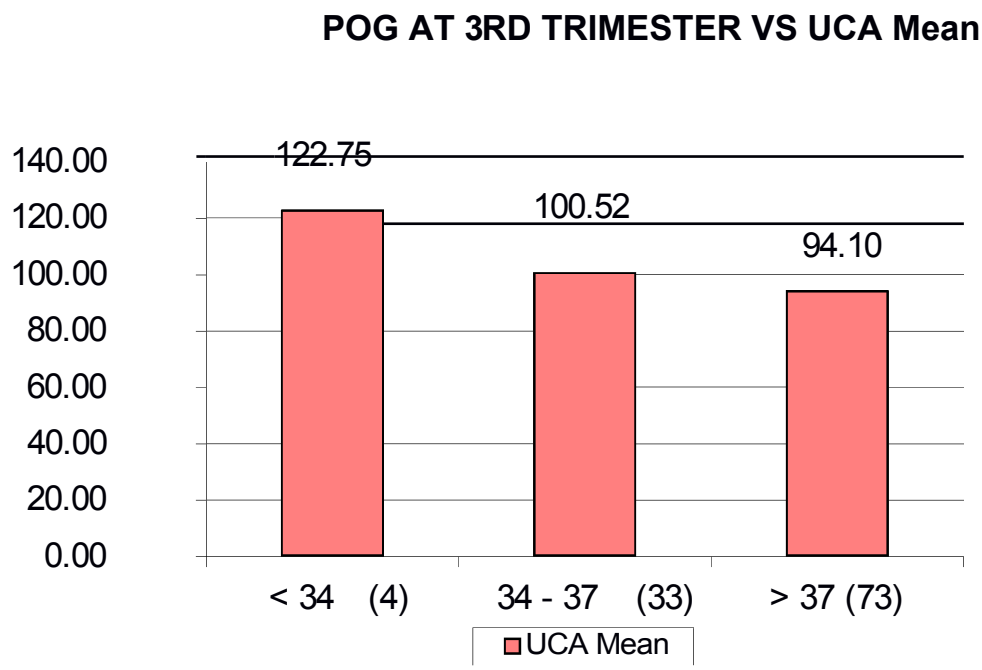


Figure 5.14 POG AT 3rd Trimester Vs UCA Mean

Mean UCA value at third trimester of preterm delivered patients was 122 for those who delivered less than 34 weeks,100 for those who delivered between 34-37 weeks which was significantly higher as compared to term delivered patients which was 94.

So it is concluded that patients with greater UCA 3RD TRIMESTER had significantly higher chances of preterm delivery even after the intervention made if the angle is high and it was also seen in our study UCA value keeps on increasing with gestational age and mean UCA at every trimester predicts spontaneous preterm birth with equal predictive value and efficacy. Howeve early prediction is always good to timely do the necessary interventions for the prevention of complication

DISCUSSION

Preterm birth is defined as delivery before 37 weeks of gestation. According to WHO(2018) across 184 countries, the rate of preterm birth ranges from 5% to 18% of all births. Globally, it is estimated that 11.1% of births are preterm and prematurity is the direct cause of 27% neonatal death.

In developing countries like india, the major causes of perinatal morbidity is preterm birth .Although there have been important developments in the prognosis of preterm newborns with the newborn intensive care techniques developed in the last decades, no decrease has been achieved in the preterm birth rates.

At our institution ,incidence of preterm births was 24% during one year of study and incidence of preterm births in our study population was also 24%.

This is study to find the impact of uterocervical angle on preterm birth and to study the impact of uterocervical angle by transvaginal ultrasonography on preterm birth

The mean age UCA <95 = 27.518±3.986 and the mean UCA ≥95 = 27.167± 3.457.The mean height UCA <95 = 158.893 ± 3.409 and the mean UCA ≥95 = 157.963 ± 3.539. Most of the patients having in the height group of 156 – 160. The mean weight UCA <95 = 61.714 ± 5.733 and the mean UCA ≥95 = 60.5± 7.147. Most of the patients having in the weight group of < 60.

The BMI value of UCA <95 = 24.379± 2.259 and the mean UCA ≥95 = 24.263 ± 2.781. Most of the patients having in the BMI value of < 23.1 - 26.0. the demographical datas were comparable. It was observed from our study that there was no significant association between parity and UCA value .

In our study we intervene all the 46 patients who had angle more than or equal to 95 which was diagnosed during our course of study.

NICU admission was significantly more for the patients delivered for angle more than 95 who delivered preterm when compared to angle less than 95 who predominantly delivered at term.so it was concluded that if UCA angle is wider which was prone to preterm delivery and more chance of admission in NICU.

In LSCS procedure having UCA <95 = 34, UCA ≥95 = 24; in NVD having UCA <95 = 30, UCA ≥95 = 22. Probability value is 0.258 > 0.05 statistically not significant for mode of delivery

Out of 46 patients who have angle more than 95 ,7 patients had a history of threatened preterm labour ,5 patients among them delivered preterm and 2 patient delivered at term who responds to conservative management. The majority of patients with H/O Threatened Preterm have angle ≥95 .The probability value of H/O Threatened Preterm have been calculated; p-value is 0.017 < 0.05statistically significant.

Among 110 patients in 2nd trimester 64 patients have angle less than 95,In that 60 patients delivered at term and 4 patients were delivered preterm.46 patients have angle more than 95 ,In that 31 patients were delivered preterm and 15 patients were were delivered term.

Among 110 patients in 3rd trimester, 64 patients have angle less than 95,In that 60 patients delivered at term and 4 patients were delivered preterm.46 patients have angle more than 95 ,In that 33 patients were delivered preterm and 13 patients were were delivered term.so we concluded that acute angle delivered at term and wider the angle more prone for preterm delivery even if we intervene if the angle is wider

Mean UCA at second trimester preterm delivered patients was 118° for less than 34 weeks,96 for 34-37weeks which was significantly higher as compared to the patients with term delivered group 91°.so it was concluded that patients with greater UCA 2nd trimester had significantly higher chances of preterm delivery even after the intervention made if the angle is higher.

Mean UCA value at third trimester of preterm delivered patients was 122° for those who delivered less than 34 weeks,100 ° for those who delivered between 34-37 weeks which was significantly higher as compared to term delivered patients which was 94°

So it is concluded that patients with greater UCA 3RD TRIMESTER had significantaly higher chances of preterm delivery even after the intervention made if the angle is high and it was also seen in our study UCA value keeps on increasing with gestational age and mean UCA at every trimester predicts spontaneous preterm birth with equal predictive value and efficacy.Howeve early prediction is always good to timely do the necessary interventions for the prevention of .complication

Bafali O et al.[21] in 2018 studied 82 singleton pregnant women between 24 and 34 weeks of gestation. Bishop scores were calculated, and cervical length and UCA measurements were performed by transvaginal ultrasound. Among the etiological factors, only multiparity and abortion history were found significantly high in pregnant woman who had preterm delivery. The cut-off value for UCA measurements was determined to be 80.5%. the prevalence of UCA >80.5degree in women who delivered before 37 weeks of gestation was found to be 75% and it was significantly higher than the term cases (p=0.007).For this value, it was found that UCA sensitivity was 75 %, specificity was 58% ,positive predictive value was 53% and negative predictive value was 77%. In our study also UCA has better predictive value.

Sochacki-Wojcicks et al.[18] in 2015, revealed the detection rates of UCA for spontaneous PTB of 61.1% in the first trimester and 66.7% in the second trimester which were superior to cervical length (CL) in their study. Like this in our study also measuring UCA length has positive predictive value.

- **PRINCIPLE FINDINGS**:

  Our data indicates that UCA measurement is significantly associated with risk of preterm birth in women with singleton gestation and it is used to differentiate between true and false labour for diagnosis of threatened preterm.

- **CLINICAL IMPLICATIONS:**

  In our study, negative likelihood ratio of UCA was good at every trimester for the prediction of spontaneous preterm birth. This data implies that when a patient dose not screen positive with an obtuse UCA measurement, it is highly unlikely that she will go on to have a spontaneous preterm birth and may not require additional cervical length monitoring. The results suggest that the uterocervical angle has a potential to be a reliable predictor of spontaneous preterm birth especially when measured in early trimester for early interventions .Detection rates may be improved if combined with other parameters such as maternal characteristics and obstetric history.

  In our study, screening of transvaginal UCA measurement at every trimester yields approximately equal sensitivity, specificity, NPV and PPV. When measured along with routine ultrasound, UCA may serve as a better screening tool. When TVS UCA measurement is combined with CL measurement, stronger prediction of risk for spontaneous preterm birth can result.

A number of interventions have been proposed in an attempt to prevent preterm birth in women at high risk of preterm birth. Bed rest and hydration are often recommended, but there is no consistent evidence indicating that they are able to delay delivery.

Similarly, tocolytic medications are often prescribed ,but again there are no reliable and consistent data to suggest that any tocolytic agent can delay delivery for longer than24-48 hrs. Recent guidelines recommend tocolytic use for 48 hours i.e only till administration of antenatal corticosteroids. Hence ,only short-term use of tocolytic drugs is recommended in order to prolong pregnancy long enough for effective antenatal corticosteroids and other therapies to be administered. Various tocolytics available are calcium channel blockers like NIFEDIPINE, OXYTOCIN INHIBITOR LIKE ATOSIBAN,MAGNESIUM SULPHATE AND BETA 2 AGONISTS LIKE RITODRINE,ISOXUPRINE.

Cervical cerclage may be performed prophylactically in the first trimester when clinical history suggests a high risk for PTB, or when cervical resistance studies confirm low cervical resistance. Ultrasound indicated cerclage seems to be associated with a reduction in PTB in women with a previous PTB who are carrying singleton gestations and develop a short cervical length in the second trimester.

Progesterone is considered a key hormone for pregnancy maintenance and a decline of progesterone action is implicated in the onset of labour. If such a decline occurs, cervical shortening may occur, and this would predispose to preterm delivery.

Studies by Fonseca et al in 2009, Hassan et al in 2011 and Romero et al in 2012 all found that administration of vaginal progesterone in women with a sonographic shortened cervical length was associated with a significant reduction in the rate of spontaneous preterm birth. Previous evidence supports the recommendation of cerclage in patients with a prior preterm delivery and a short cervix and in high risk group. The use of progesterone in patients with a short cervix appears promising ,but consensus recommendation awaits further evidence and analysis.

Control of infections during pregnancy also played a great role in the prevention of preterm birth, as infections are responsible for 25-30% of preterm birth. Especially, urogenital infections were found to increase the risk of preterm birth.

CONCLUSION

Preterm birth continues to be the one of the most serious reason for neonatal morbidity and mortality and may lead to disabilities in later life. The cause of preterm birth is multifactorial. It encompasses maternal risk factors such as race and parity that are not modifiable. However, it also includes clinical conditions, such as cervical insufficiency ,for which we may screen, intervene and initiate treatment.so, its prediction during antenatal period is very important for clinicians to plan monitoring and treatment.

Transvaginal ultrasonographic cervical length measurement in the second trimester is a safe and effective technique to predict increased risk of preterm delivery in high risk population.

Uterocervical angle have major impact on preterm birth and it was concluded that a wide uterocervical angle ≥95 and ≥105 degrees detected during any trimester was associated with an increased risk for spontaneous preterm birth <37 and

<34weeks,respectively.

The advantage of uterocervical angle is that its measurement in each trimester has also shown very good results in prediction of preterm labour. It can be measured at the time of routine antenatal ultrasound(ANOMALY SCAN,GROWTH SCAN) thus obviating the need for additional ultrasounds. This can lead to its application for the prediction of spontaneous preterm labour both in low and high risk population. Thus, it helps for early intervention and prevention of complications in preterm birth.

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ANNEXURES PROFORMA

IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH

NAME: AGE: Op/Ip nbr: S.NO:

ADDRESS:

CONTACT NO:

SOCIOECONOMIC STATUS : Class I/ II/ III/ IV/ V

EDUCATIONAL STATUS :HEIGHT:

WEIGHT:

BMI:

LMP:

EDD:

PARITY:

TRIMESTER:

MENSTRUAL HISTORY :

OBSTETRIC HISTORY :

PAST HISTORY :

FAMILY HISTORY :

PERSONAL HISTORY :

GENERAL EXAMINATION:

PALLOR :

EDEMA :

TEMPERATURE :

PULSE RATE :

BP :

SYSTEMIC EXAMINATION:

CVS :

RS :

P/A EXAMINATION: **RADIOLOGICAL MEASUREMENT:** UTEROCERVICAL ANGLE:

INTERVENTION IF NEEDED:

GESTATIONAL AGE AT DELIVERY: BABY DETAILS:

Sex: Weight: APGAR:

ABBREVIATIONS

A	ABORTION
BMI	BODY MASS INDEX
B.WT	BIRTHWEIGHT
CL	CERVICAL LENGTH
GDM	GESTATIONAL DIABETES MELLITUS
GHTN	GESTATIONAL HYPERTENSION
GA	GESTATIONAL AGE
IOL	INDUCTION OF LABOR
LSCS	LOWER SEGMENT CESAREAN SECTION
MSAF	MECONIUM STAINED AMNIOTIC FLUID
NVD	NORMAL VAGINAL DELIVERY
PTB	PRETERM BIRTH
PPROM	PREMATURE PRETERM RUPTURE OF MEMBRANE
PROM	PRETERM RUPTURE OF MEMBRANE
TVUS	TRANSVAGINAL ULTRASOUND
UCA	UTEROCERVICAL ANGLE

IEC APPROVAL LETTER

GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL,CHENNAI -01

INSTITUTIONAL ETHICS COMMITTEE

TITLE OF THE WORK	: "IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH"
PRINCIPAL INVESTIGATOR	: DR.R.THILAGA,
DESIGNATION	: PG IN OBSTETRICS AND GYNAECOLOGY,
DEPARTMENT	: DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT. STANLEY MEDICAL COLLEGE.

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 03.11.2020 at the Council Hall, Stanley Medical College, Chennai-1 at 10am.

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

MEMBER SECRETARY,
IEC, SMC, CHENNAI

CONSENT FORM

PATIENT NAME:

IP/OP NO.:

STUDY TITLE: **IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH**

I agree to participate in the study entitled and have been informed about the details of the study in my own language.

I have completely understood the details of the study.

I am aware of the possible risks and benefits, while taking part in the study.

I understand that I can withdraw from the study at any point of time and even then, I can receive the medical treatment as usual.

I understand that I will not get any money for taking part in the study.

I will not object if the results of this study are getting published in any medical journal, provided my personal identity is not revealed.

I know what I am supposed to do by taking part in this study and I assure that I would extend my full cooperation for this study

Name of the participant : Signature / Left thumb print:

Date :

Name of the investigator: Dr R.THILAGA

Signature of investigator :

Date :

PATIENT INFORMATION SHEET:

Title of the study:

STUDY THE IMPACT OF UTEROCERVICAL ANGLE ON PRETERM BIRTH.

we are conducting a study among patients attending DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY,Stanley medical college.The purpose of this study to know the impact of uterocervical angle on preterm birth.

We are selecting all singleton antenatal patient in second trimester and transvaginal ultrasonography was done to measure uterocervical angle and followed up in third trimester and throughout course of gestation,period of gestation at the time of delivery,neonatal outcome was measured.The privacy of the patients in the research will be maintained throughout the study.In the event of any publication or presentation resulting from the research,no personally identifiable information will be shared.

Taking part in this study is voluntary.You are free to decide whether to participate in this study or withdraw at any time;your decision will not results in any loss of benefits to which you are otherwise entitled

Confidentiality:

Utmost priority will be given to protect the privacy and confidentiality of your personal information. The collected information will not be shared with anyone not involved in the study and reporting will be done in aggregate form only

Voluntary participation:

Your participation in this study is voluntary and you have the right to withdraw your participation at any time during the interview without any explanation. Refusal to participate will not involve any penalty or loss of benefits to which you are otherwise entitled. There might be certain questions which you may not wish to answer. You can choose to decline answering these questions

MASTER CHART

S. NO	NAME	AGE	Ht	wt	BMI	LMP	PARITY	UCA(2ND TRIMESTER)	UCA(3RD TRIMESTER)	INTERVENTION	H/O THREATENED PRETERM	PRESENTING COMPLAINTS	INDICATION OF DELIVERY	DELIVERY DATE	MODE OF DELIVERY	POG AT DELIVERY	BIRTH WT	SEX	APGAR	NICU ADMISSION
1	MAHALAKSHMI	18	156	65	26.7	8.10.2020	PRIMI	94	98	YES	NO	DRAINING	FETAL DISTRESS	28.6.2021	LSCS	38WKS	3.02KG	F	1'7/10 5'8/10	NO
2	KALAIVANI	35	162	67	25.5	6.10.2020	G2P1L1	88	89	YNO	NO	PAIN ABDOMEN	LABOUR PAIN	4.7.2021	NVD	39WKS	3.1KG	F	1'7/10 5'8/10	NO
3	REXA	25	166	70	25.5	5.10.2020	G3P1L1A1	97	101	YES	NO	ELECTIVE LSCS	PREV LSCS	28.6.2021	LSCS	38WKS	3.62KG	F	1'7/10 5'8/10	NO
4	THOULATH	22	160	60	23.4	9.10.2020	PRIMI	95	95	NO	NO	GHTN	GHTN	10.7.2021	NVD	39WKS	2.8KKG	M	1'7/10 5'8/10	NO
5	PAVITHRA	20	156	58	23.8	15.10.2020	PRIMI	84	89	NO	NO	DRAINING	FETAL DISTRESS	23.7.2021	LSCS	39WKS	3.3KG	M	1'6/10 5'7/10	YES
6	BARGATH NISHA	19	158	59	23.6	9.10.2020	PRIMI	100	101	YES	NO	GDM	FETAL DISTRESS	5.7.2021	LSCS	38WKS	2.9KG	F	1'7/10 5'8/10	NO
7	USHA	23	155	54	22.5	10.10.2020	PRIMI	80	82	NO	NO	PAIN ABDOMEN	MSAF	9.7.2021	LSCS	37WKS	3.1KG	M	1'7/10 5'8/10	YES
8	SUJIPRIYA	33	154	50	21	3.7.2020	G2P1L1	118	120	YES	YES	PRETERM LABOUR	PRETERM LABOUR	13.1.2021	NVD	25WKS	880GMS	F	1'4/10 5'5/10	YES
9	MEENAKSHI	32	161	55	21.2	10.10.2020	PRIMI	88	88	NO	NO	PAIN ABDOMEN	LABOUR PAIN	10.7.2021	NVD	39WKS	3.1KG	M	1'7/10 5'8/10	NO
10	BHAVANA	28	155	54	22.5	29.9.2020	G2A1	96	96	YES	NO	TERM	CPD	6.7.2021	LSCS	40WKS	3.3KG	F	1'7/10 5'8/20	NO
11	ANITHA	28	162	64	24.4	12.10.2020	G3P1L1A1	100	103	YES	NO	PAIN ABDOMEN	BREECH	19.7.2021	LSCS	40WKS	2.4KG	F	1'7/10 5'8/10	NO
12	AFRIN	26	156	61	24	14.10.2020	PRIMI	81	91	NO	NO	PROM	LABOUR PAIN	14.7.2021	NVD	39WKS	3.1KG	M	1'7/10 5'8/10	NO
13	MENAKA	37	157	71	28.8	19.10.2020	G3A1	93	94	NO	NO	PROM	FETAL DISTRESS	5.7.2021	LSCS	37WKS	2.7KG	F	1'7/10 5'8/10	YES
14	KANCHANA	24	162	67	25.5	17.10.2020	PRIMI	77	87	NO	NO	PAIN ABDOMEN	LABOUR PAIN	12.7.2021	NVD	38WKS	2.8KG	M	1'7/10 5'8/10	NO
15	RAKSHANA	26	158	65	26	28.9.2020	G3P2L2	93	94	NO	NO	PAIN ABDOMEN	LABOUR PAIN	24.6.2021	NVD	39WKS	2.6KG	F	1'7/10 5'8/10	NO
16	SATHYA	32	155	53	22.1	20.10.2020	G4P3L2D1	88	89	NO	NO	PPROM	PRETERM LABOUR	20.6.2021	NVD	36WKS	3.1KG	M	1,6/10 5'8/10	YES
17	RANI	23	161	60	23.1	19.10.2020	PRIMI	90	92	NO	NO	GHTN	GHTN	22.7.2021	NVD	38WKS	2.7.KG	F	1'7/10 5'8/10	NO
18	SHANTHI	31	160	65	25.4	22.10.2020	PRIMI	112	120	YES	NO	PRETERM LABOUR	PRETERM LABOUR	15.6.2021	NVD	35WKS	2.2KG	M	1'7/10 5'8/10	NO
19	KOWSALYA	25	161	69	26.6	24.10.2020	G2P1L1	98	103	YES	NO	ELECTIVE LSCS	PREV LSCS	20.7.2021	LSCS	38WKS	3.2KG	M	1'7/10 5'8/10	NO
20	KRISHNA	30	156	63	25.9	21.9.2020	G2A1	89	90	NO	NO	PAIN ABDOMEN	POST DATED	28.6.2021	NVD	40WKS	3.1KG	F	1'7/10 5'8/30	NO
21	PADMINI	28	158	66	26.4	26.10.2020	PRIMI	90	92	NO	NO	DECREASED PFM	FETAL DISTRESS	29.7.2021	LSCS	39WKS	2.8KG	M	1'7/10 5'8/10	NO
22	UMA	34	160	56	21.9	27.10.2020	G5A4	88	92	NO	NO	PRE ECLAMPSIA	PRE ECLAMPSIA	12.7.21	LSCS	37WKS	2.4KG	F	1'7/10 5'8/10	NO
23	VIJAYA	28	156	58	23	1.11.2020	PRIMI	88	92	NO	NO	DRAINING	MSAF	2.8.2021	LSCS	39WKS	2.7KG	M	1'6/10 5'7/10	YES
24	RENU	32	155	60	25	26.10.2020	G4P1L1A2	120	125	YES	NO	PAIN ABDOMEN	LABOUR PAIN	13.7.2021	NVD	37WKS	3.2KG	F	1'6/10 5'7/10	YES
25	RASHMI	31	156	58	23	2.11.2020	G2P1L1	97	98	YES	NO	ELECTIVE LSCS	PREV LSCS	18.7.2021	LSCS	38WKS	2.6KG	M	1'8/10 5'9/10	NO
26	REKHA	26	158	63	25.2	28.10.2020	G3P1L1A1	82	84	NO	NO	PAIN ABDOMEN	LABOUR PAIN	15.7.2021	NVD	37WKS	3.5KG	M	1'7/10 5'8/10	NO
27	KATTAMAL	22	155	52	22.1	30.10.2020	PRIMI	88	92	NO	NO	PAIN ABDOMEN	MSAF	17.7.2021	LSCS	39WKS	3.6KG	F	1'5/10 5'6/10	YES
28	KANI	28	162	70	27	1.11.2020	G3P1L1A1	100	102	YES	NO	PRETERM LABOUR	FETAL DISTRESS	30.9.2021	LSCS	36WKS	2.4KG	M	1'6/10 5'7/10	YES
29	DHIVYA	31	155	52	21.6	7.11.2020	PRIMI	96	98	YES	NO	PAIN ABDOMEN	LABOUR PAIN	7.8.2021	NVD	39WKS	2.5KG	F	1'7/10 5'8/10	NO
30	SHILPA	27	156	65	26.7	3.11.2020	PRIMI	82	90	NO	NO	PROM	FAILED INDUCTION	31.7.2021	LSCS	39WKS	3.2KG	M	1'7/10 5'8/10	NO
31	PINKY	30	156	53	21.8	5.11.2020	PRIMI	89	92	NO	NO	PAIN ABDOMEN	LABOUR PAIN	12.8.2021	NVD	40WKS	3.1KG	F	1'7/10 5'8/10	NO
32	SHAILAJA	26	158	58	23.2	4.11.2020	G2P1L1	96	97	NO	NO	PAIN ABDOMEN	LABOUR PAIN	25.7.2021	NVD	37WKS	2.7KG	M	1'7/10 5'8/10	NO
33	KANIKA	31	157	64	26	4.11.2020	G2P1L1	104	106	YES	NO	PRETERM LABOUR	LABOUR PAIN	20.7.2021	NVD	36WKS	2.2KG	F	1'6/10 5'7/10	YES
34	ASHA	24	162	58	22.1	6.11.2020	G2P1L1	88	90	NO	NO	PAIN ABDOMEN	PREV LSCS	30.7.2021	LSCS	37WKS	2.8KG	M	1'7/10 5'8/10	NO
35	SUSAN	30	163	59	22	4.11.2020	G3P1L1A1	74	82	NO	NO	PROM	PREV LSCS	26.7.2021	LSCS	37WKS	2.6KG	F	1'7/10 5'8/10	NO
36	PALLAVI	24	157	59	23.9	7.11.2020	PRIMI	96	105	YES	NO	DRAINING	MSAF	8.8.2021	LSCS	39WKS	2.6KG	M	1'5/10 5'6/10	YES
37	JAYA	26	159	55	21.8	9.11.2020	G3A2	113	115	YES	YES	PRETERM LABOUR	PRETERM LABOUR	10.7.2021	NVD	35WKS	2.3KG	F	1'7/10 5'8/10	NO
38	RANI	31	162	61	23	7.11.2020	PRIMI	86	92	NO	NO	GHTN	FAILED INDUCTION	9.8.2021	LSCS	39WKS	2.8KG	M	1'7/10 5'8/10	NO
39	TAULATH	32	158	50	20	10.11.2020	G3P2L2	92	97	NO	NO	PAIN ABDOMEN	LABOUR PAIN	8.8.2021	NVD	39WKS	3.1KG	F	1'7/10 5'8/10	NO
40	NISHA	28	155	54	22.5	8.11.2020	PRIMI	110	116	YES	NO	PRETERM LABOUR	PRETERM LABOUR	19.7.2021	LSCS	36WKS	2.4KG	M	1'7/10 5'8/10	NO
41	RAMA	27	160	58	22.7	12.11.2020	G2A1	94	98	NO	NO	GDM	FETAL DISTRESS	9.8.2021	LSCS	39WKS	3.1KG	F	1'7/10 5'8/10	NO
42	SUJATHA	29	157	66	26.8	10.11.2020	G2P1L1	90	91	NO	NO	PAIN ABDOMEN	PREV LSCS	8.8.2021	LSCS	38WKS	2.6KG	M	1'7/10 5'8/10	NO
43	JOTHI	25	157	57	21.1	14.11.2020	PRIMI	105	110	YES	NO	PRETERM LABOUR	PRETERM LABOUR	24.7.2021	NVD	36WKS	2.5KG	F	1'7/10 5'8/10	NO
44	SURIYA	28	160	56	21.9	17.11.2020	PRIMI	96	99	YES	NO	PREECLAMSIA	PREECLAMPSIA	1.8.2021	LSCS	37WKS	2.7KG	M	1'7/10 5'8/10	NO
45	ASHA	25	160	65	25.4	20.11.2020	PRIMI	70	72	NO	NO	PAIN ABDOMEN	DEEPTRANSVERSE ARREST	27.8.2021	LSCS	40WKS	2.8KG	F	1'6/10 5'7/10	YES
46	BARGATH NISHA	32	156	61	25.1	18.11.2020	PRIMI	87	89	NO	NO	DECREASED PFM	FETAL DISTRESS	8.10.2021	LSCS	37WKS	3.2KG	M	1'8/10 5'9/10	NO
47	SUSILA	28	156	68	27.9	20.11.2020	PRIMI	88	92	NO	NO	HIGH BP	PRE ECLAMPSIA	10.8.2021	NVD	37WKS	2.8KG	M	1'7/10 5'8/10	NO
48	TAMIL	24	160	65	25.4	18.11.2020	G2P1L1	89	92	NO	NO	PAIN ABDOMEN	OBLIQUE LIE	13.8.2021	LSCS	38WKS	2.8KG	F	1'7/10 5'8/10	NO
49	SUNITHA	27	155	58	24.1	15.11.2020	PRIMI	96	97	NO	NO	PAIN ABDOMEN	LABOUR PAIN	23.8.2021	NVD	40WKS	3.1KG	M	1'7/10 5'8/10	NO
50	VENKI	24	156	52	21.4	18.11.2020	G2P1L1	100	103	YES	NO	PRETERM LABOUR	PPROM	21.7.2021	LSCS	36WKS	2.5KG	F	1'7/10 5'8/10	NO

51	SONIA	31	158	62	24.8	20.11.2020	PRIMI	77	79	NO	NO	PREECLAMSIA	PREECLAMPSIA	10.8.2021	LSCS	37WKS	3.3KG	M	1'7/10 5'8/10	NO
52	KANIKA	25	160	54	21.1	23.11.2020	G2P1L1	105	110	YES	NO	PRETERM LABOUR	PRETERM LABOUR	31.7.2021	LSCS	35WKS	2.3KG	M	1'6/10 5'7/10	YES
53	ANJALI	26	158	56	22.4	25.11.2020	G2P1L1	100	103	YES	NO	PAIN ABDOMEN	LABOUR PAIN	13.8.2021	NVD	37WKS	2.6KG	F	1'7/10 5'8/10	NO
54	LAVANYA	22	158	66	25	20.11.2021	G2P1L1	88	89	NO	NO	ELECTIVE LSCS	PREV LSCS	14.8.2021	LSCS	38WKS	3.6KG	M	1'8/10 5'9/10	NO
55	SNEKA	23	160	69	27	27.11.2020	PRIMI	93	95	NO	NO	FGR	IUGR	19.8.2021	LSCS	38WKS	2.3KG	F	1'7/10 5'8/10	YES
56	BARGAVI	27	158	55	22	30.11.2020	G5P1L1A3	113	125	YES	YES	PRETERM LABOUR	PRETERM LABOUR	31.7.2021	NVD	35WKS	1.8KG	M	1,6/10 5'7/10	YES
57	ILAVARASI	24	158	62	24.8	1.12.2020	G3P1L1A1	93	94	NO	NO	HIGH BP	ABNORMAL DOPPLER	9.8.2021	LSCS	37WKS	2.01KG	F	1'5/10 5'6/10	YES
58	RENUKA	26	154	61	25.7	30.11.2020	PRIMI	106	110	YES	NO	PRETERM LABOUR	PRETERM LABOUR	16.8.2021	NVD	36WKS	2.5KG	M	1'7/10 5'8/10	NO
59	SNEKADEVI	25	156	66	27.1	5.11.2020	G2A1	90	92	NO	NO	GDM	GDM	24.7.2021	NVD	37WKS	2.8KG	F	1'7/10 5'8/10	YES
60	LAKSHMI	27	155	52	21.6	18.11.2020	PRIMI	99	98	YES	NO	PAIN ABDOMEN	LABOUR PAIN	18.8.2021	LSCS	39WKS	3KG	M	1'7/10 5'8/10	NO
61	REENA	30	156	54	22.2	9.12.2020	PRIMI	116	125	YES	YES	PRETERM LABOUR	SEVERE OLIGO	7.8.2021	LSCS	34WKS	1.9KG	F	1,5/10 5'6/10	YES
62	POOJA	35	157	59	23.9	15.12.2020	G3P1L1A1	125	130	YES	NO	PPROM	PPROM	20.8.2021	LSCS	33WKS	2KG	F	1'7/10 5'8/10	YES
63	RAJINI DEVI	28	154	50	21.1	10.12.2019	G2P1L1	113	116	YES	NO	PAIN ABDOMEN	PREV LSCS	2.9.2021	LSCS	38WKS	3.2KG	M	1'7/10 5'8/10	NO
64	NADHIYA	32	158	54	21.6	13.12.2020	PRIMI	132	135	YES	NO	PRETERM LABOUR	PRETERM LABOUR	4.9.2021	NVD	35WKS	2.4KG	M	1'7/10 5'8/10	NO
65	MEENAKSHI	27	166	64	23.2	16.12.2020	G3P2L2	78	82	NO	NO	PAIN ABDOMEN	PREV LSCS	3.9.2021	LSCS	37WKS	3.6KG	F	1'7/10 5'8/10	NO
66	RADHA	24	158	66	26.4	17.12.2020	G3P2L2	101	102	YES	NO	PAIN ABDOMEN	LABOUR PAIN	18.9.2021	NVD	39WKS	3.07KG	M	1'7/10 5'8/10	NO
67	SHALINI	25	156	54	22.2	18.12.2020	PRIMI	86	88	NO	NO	ELECTIVE LSCS	OBLIQUE LIE	29.8.2021	LSCS	37WKS	2.5KG	M	1'7/10 5'8/10	NO
68	KARUTHAMMA	28	155	58	24.1	20.12.2020	PRIMI	101	102	YES	NO	DRAINING	FETAL DISTRESS	14.9.2021	NVD	37WKS	2.6KG	F	1'7/10 5'8/10	NO
69	RAGINI	29	161	58	22.4	1.1.2021	G4A3	96	98	YES	NO	PAIN ABDOMEN	GDM	4.10.2021NVD		39WKS	3.1KG	M	1'7/10 5'8/10	NO
70	PRIYANKA	32	158	54	21.6	1.1.2021	PRIMI	77	82	NO	NO	FGR	EMERGENCY LSCS	28.9.2021	LSCS	38WKS	1.8KG	F	1'6/10 5'7/10	YES
71	Roja	34	156	52	21.4	2.1.2021	G2P1L1	80	82	NO	NO	PAIN ABDOMEN	PREV LSCS	27.9.2021	LSCS	38WKS	2.9KG	M	1'7/10 5'8/10	NO
72	AMBIKA	28	158	54	21.6	3.1.2021	G5P1L1A3	98	101	YES	NO	PPROM	PREV LSCS/PPROM	12.9.2021	LSCS	36WKS	2.3KG	F	1'7/10 5'8/10	YES
73	KANIKUTTY	26	158	56	22.4	21.12.2020	PRIMI	118	120	YES	NO	PAIN ABDOMEN	LABOUR PAIN	21.9.2021	NVD	39WKS	2.6KG	M	1'7/10 5'8/10	NO
74	PRAMILA	30	155	61	25.4	8.1.2021	PRIMI	88	87	NO	NO	PAIN ABDOMEN	MSAF	4.10.2021	LSCS	38WKS	3.03KG	F	1'6/10 5'7/10	YES
75	INDHU	26	156	56	26.7	28.12.2020	PRIMI	100	110	YES	NO	PRETERM LABOUR	PRETERM LABOUR	28.8.2021	NVD	35WKS	2KG	M	1'7/10 5'8/10	YES
76	RADHA	35	162	64	24.4	3.1.2021	G3P2L2	77	82	NO	NO	ELECTIVE LSCS	PREV LSCS	28.9.2021	LSCS	38WKS	3KG	F	1'7/10 5'8/10	NO
77	DEEPIKA	29	152	52	21.9	8.1.2021	PRIMI	86	88	NO	NO	PAIN ABDOMEN	LABOUR PAIN	8.10.2021	NVD	39WKS	3.1KG	F	1'7/10 5'8/10	NO
78	SOWMIYA	32	160	59	23	7.1.2021	G2P1L1	90	95	NO	NO	ELECTIVE LSCS	PREV LSCS	1.10.2021	LSCS	38WKS	2.7KG	M	1'7/10 5'8/10	NO
79	NEHA	28	162	68	25.9	10.1.2021	PRIMI	101	104	NO	YES	PROM	PAIN	17.10.2021	NVD	40WKS	3KG	F	1'7/10 5'8/10	NO
80	MEENAKSHI	32	166	74	26.8	9.1.2021	PRIMI	90	95	NO	NO	DECREASED PFM	MSAF	10.10.2021	LSCS	39WKS	3KG	M	1'7/10 5'8/10	YES
81	MENAKA	23	162	67	25.5	8.1.2021	PRIMI	80	86	N0	NO	PPROM	PPROM	22.9.2021	NVD	35WKS	1.9KG	F	1'7/10 5'8/10	YES
82	VANDHANA	30	164	64	24.4	10.1.2021	PRIMI	88	90	NO	NO	POSTDATED	POST DATED	18.10.21	NVD	40WKS2D	3KG	M	1'7/10 5'8/10	NO
83	CHARU	24	165	72	26	18.1.2021	PRIMI	105	106	YES	YES	PRETERM LABOUR	PRETERM LABOUR	30.9.2021	NVD	36WKS	2.4KG	F	1'7/10 5'8/10	NO
84	SUSILA	23	155	72	30	16.1.2021	G2P1L1	118	120	YES	NO	PRETERM LABOUR	PRETERM LABOUR	10.9.2021	NVD	34WKS	1.8KG	M	1'7/10 5'8/10	YES
85	MONIKA	25	145	66	31	20.1.2021	PRIMI	98	101	YES	NO	GHTN	CPD	12.10.2021	LSCS	38WKS	2.8KG	M	1'7/10 5'8/10	NO
86	APSARA	28	158	67	26.8	24.1.2021	G4A3	112	115	YES	NO	PRETERM LABOUR	PRETERM LABOUR	8.10.2021	NVD	36WKS	2.5KG	F	1'7/10 5'8/10	NO
87	PRIYANKA	27	166	54	19.6	25.1.2021	PRIMI	92	92	NO	NO	PAIN ABDOMEN	FETAL DISTRESS	19.10.2021	LSCS	38WKS	3.6KG	M	1'7/10 5'8/10	NO
88	MADHU	28	162	66	25.1	25.1.2021	G2A1	82	90	NO	NO	INDUCTION	OLIGOHYDRAMNIOS	11.10.2021	LSCS	37WKS	3.06KG	M	1'7/10 5'8/10	NO
89	KIRUTHIGA	24	158	51	20.4	28.1.2021	PRIMI	102	105	NO	NO	DECREASED PFM	FETAL DISTRESS	22.10.2021	LSCS	38WKS	3.1KG	F	1'7/10 5'8/10	NO
90	APARNA	26	167	54	19.4	26.1.2021	PRIMI	82	85	NO	NO	ABNORMAL DOPPLER	ABNORMAL DOPPLER	1.10.2021	LSCS	36WKS	2KG	M	1'7/10 5'8/10	YES
91	KRISHNAVENI	30	159	64	25.3	4.2.2021	G5A4	110	115	YES	NO	PRETERM LABOUR	PRETERM LABOUR	27.9.2021	NVD	33WKS	1.4KG	F	1'6/10 5'7/10	YES
92	KANAGA	28	160	48	18.7	4.2.2021	PRIMI	86	88	NO	NO	PAIN ABDOMEN	LABOUR PAIN	4.11.2021	LSCS	39WKS	2.4KG	M	1'7/10 5'8/10	NO
93	NANDHINI	23	156	75	31.4	25.1.2021	PRIMI	97	106	YES	NO	PAIN ABDOMEN	PRETERM LABOUR	28.9.2021	NVD	36WKS	2.5KG	F	1'7/10 5'8/10	YES
94	SNEKA	28	164	71	26.4	5.2.2021	G2A1	120	126	YES	YES	PRETERM LABOUR	PRETERM LABOUR	19.9.2021	NVD	33WKS	1.6KG	F	1'5/10 5'7/10	YES
95	MANJU	31	155	56	23.3	8.2.2021	PRIMI	100	101	YES	NO	PRETERM LABOUR	PRETERM LABOUR	10.10.2021	NVD	35WKS	1.7KG	M	1'7/10 5'8/10	YES
96	NAGAMMA	28	156	66	26.4	9.2.2021	G3P2L2	93	94	NO	NO	PAIN ABDOMEN	FETAL DISTRESS	9.11.2021	LSCS	39WKS	2.8KG	M	1'7/10 5'8/10	NO
97	MEENA	17	160	65	25.4	10.2.2021	PRIMI	89	91	NO	NO	INDUCTION	FAILED INDUCTION	4.11.2021	LSCS	38WKS	3.3KG	F	1'7/10 5'8/10	NO
98	VINNARASI	23	157	70	28.4	13.2.2021	PRIMI	89	94	NO	NO	PAIN ABDOMEN	LABOUR PAIN	13.11.2021	NVD	39WKS	3.1KG	M	1'7/10 5'8/10	NO
99	REVATHY	29	158	66	26.4	13.2.2021	G3P1L1A1	90	91	NO	NO	PAIN ABDOMEN	PREV LSCS	1.11.2021	LSCS	37WKS	2.8KG	M	1'7/10 5'8/10	NO
100	KANCHANA	28	156	66	27.1	15.2.2021	PRIMI	80	87	NO	NO	HIGH BP	SEVERE OLIGO	30.10.2021	LSCS	37WKS	1.8KG	F	1'6/10 5'7/10	YES
101	BHAKIYA	26	156	62	25.5	15.2.2021	PRIMI	80	86	NO	NO	GDM	GDM	15.11.2021	NVD	39WKS	3.4KG	F	1'7/10 5'8/10	NO
102	KUMARI	25	156	75	31.4	28.1.2021	G2P1L1	90	95	NO	NO	ELECTIVE LSCS	PREVIOUS LSCS	22.10.2021	LSCS	38WKS	2.7KG	F	1'7/10 5'8/10	NO
103	KANCHANA	31	164	71	26.4	15.1.2021	G3P1L1A1	93	93	NO	NO	INDUCTION	OLIGOHYDRAMNIOS	18.10.2021	NVD	39WKS	2.6KG	M	1'7/10 5'8/10	NO
104	MAHALAKSHMI	27	160	65	25.4	20.1.2021	PRIMI	90	92	NO	NO	PAIN ABDOMEN	NON REACTIVE CTG	27.10.2021	LSCS	40WKS	2.7KG	F	1'7/10 5'8/10	NO
105	NIRMALA	26	160	69	27	27.1.2021	PRIMI	89	94	NO	NO	PROM	PROM	27.10.2021	NVD	39WKS	2.8KG	M	1'6/10 5'7/10	YES
106	KRISHNA	25	163	68	26	22.1.2021	G3A2	94	95	NO	NO	DECREASED PFM	FETAL ALARM SIGNAL	15.10.2021	LSCS	38WKS	2.6KG	F	1'7/10 5'8/10	NO
107	DHIVYA	24	166	70	25.4	17.1.2021	PRIMI	88	89	NO	NO	GHTN	IUGR	16.10.2021	NVD	39WKS	2.1KG	M	1'7/10 5'8/10	NO
108	SNEHA	30	162	67	25.5	10.1.2021	G3P2L2	90	93	NO	NO	INDUCTION	OLIGOHYDRAMNIOS	24.9.2021	LSCS	37WKS	2.7KG	F	1'7/10 5'8/10	NO
109	BANU	27	158	59	23.6	15.1.2021	G2P1L1	92	94	NO	NO	PROM	PROM	15.10.2021	NVD	39WKS	2.8KG	F	1'7/10 5'8/10	NO
110	RAMYA	23	155	60	25	20.1.2021	PRIMI	93	93	NO	NO	PAIN ABDOMEN	LABOUR PAIN	27.10.2021	NVD	40WKS	2.7KG	F	1'7/10 5'8/10	NO