THE STUDY OF ASSOCIATION OF UROGENITAL INFECTIONS AS A RISK FACTOR FOR SPONTANEOUS PRETERM LABOUR

A CASE CONTROL STUDY

Dissertation submitted to

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

In partial fulfilment of the requirement

for the award of

M.S.DEGREE – BRANCH – II

OBSTETRICS AND GYNAECOLOGY

GOVT.KILPAUK MEDICAL COLLEGE

KILPAUK, CHENNAI.

APRIL 2017

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled **"THE STUDY OF ASSOCIATION OF UROGENITAL INFECTIONS AS A RISK FACTOR FOR SPONTANEOUS PRETERM LABOUR"** is the bonafide original work of **Dr.AGILARATHTHI.N** under the guidance of **Dr.M.S.SORNAM MD., DGO.,** Professor of Department of Obstetrics and Gynaecology, KMCH, Chennai in Partial fulfilment of the requirements for MS Obstetrics and Gynaecology branch II examination of the Tamilnadu Dr.MGR Medical university to be held in April 2017 The period of Postgraduate study and training is from June 2015to April 2017.

Prof.Dr.M.S.SORNAM, MD., DGO.,
Professor,
Department of Obstetric and Gynaecology,
Kilpauk Medical College and Hospital
Chennai – 600 010

Prof.Dr.T.K.SHAANTHY GUNASINGH, M.D., DGO.,
Professor,
Department of Obstetrics and Gynaecology,
Kilpauk Medical College and Hospital,
Chennai – 600 010.

Prof.Dr.R.NARAYANA BABU, M.D., DCH.,
THE DEAN
Government Kilpauk Medical College and Hospital
Chennai-600010

DECLARATION

I solemnly declare that this dissertation "**THE STUDY OF ASSOCIATION OF UROGENITAL INFECTIONS AS A RISK FACTOR FOR SPONTANEOUS PRETERM LABOUR – A CASE CONTROL STUDY"** was prepared by me at Government Kilpauk Medical College and Hospital, Chennai, under the guidance and supervision of **Dr.M.S.SORNAM, MD., DGO.** Professor, Department of Obstetrics and Gynaecology, Government Kilpauk Medical College and Hospital, Chennai. This dissertation is submitted to **The Tamil Nadu Dr.M.G.R. Medical University, Chennai** in partial fulfillment of the University regulations for the award of the degree of **M.S. (Obstetrics and Gynaecology).**

Place: Chennai

Date: **(Dr.AGILA RATHTHI.N)**

ACKNOWLEDGEMENT

I start this thesis in the name of Almighty God, the most beneficent and forgiving. I thank God for giving me the privilege to learn from the able teachers in my department.

I express my sincere thanks to **Prof.Dr.R.NARAYANA BABU M.D., DCH.,** Dean, Government Kilpauk Medical College for allowing me to conduct the study using the available facilities.

I convey my heartfelt gratitude and sincere thanks to our **HOD Dr.T.K.SHAANTHY GUNASINGH M.D., DGO,** Department of Obstetrics and Gynaecology, Kilpauk Medical College for her constant support and guidance throughout the course of my study and preparation of the dissertation.

I convey my heartfelt gratitude and sincere thanks to my guide **Dr.M.S.SORNAM, MD., DGO.,** Professor, Department of Obstetrics and Gynaecology, Kilpauk Medical College who with her exhaustive knowledge and Professional expertise has provided able guidance and constant encouragement throughout the preparation of this dissertation.

I am grateful to my Assistant Professors, colleagues a and my friends for their advice and suggestions.

My heartful thanks to my family and friends, who have been a constant source of encouragement and immense help, for instilling in me a sense of commitment and for their belief in me.

Last but not the least I thank all **my Patients**, who formed the backbone of this study without whom this study would not have been possible.

(Dr.N.AGILA RATHTHI)

ABBREVATIONS

ACOG	-	American College Of Obstetrics and Gynaecology
ART	-	Artificial reproduction technique
BMI	-	Body mass index
BV	-	Bacterial vaginosis
CI	-	Confidence interval
GA	-	Gestational age
HIV	-	Human immunodeficiency virus
IL	-	Interleukins
MMP	-	Matrix metalloprotinases
PGE2	-	Prostaglandin E2
PPROM	-	Preterm prelabour rupture of membranes
PTB	-	Preterm birth
RCOG	-	Royal college of obstetrics and gynaecology
RR	-	Risk ratio
TIMP	-	Tissue inhibitor of matrix metalloprotinases
TNF	-	Tumour necrosis factor
UTI	-	Urinary tract infections
WHO	-	World Health Organisation

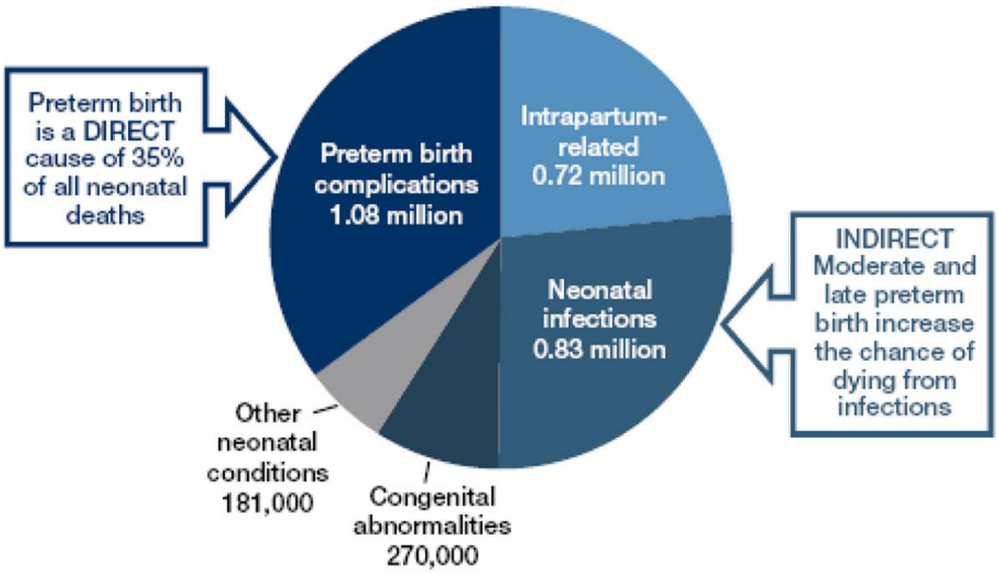
CONTENTS

INTRODUCTION

Prematurity is the condition where the fetus enters the extrauterine life with biological immaturity. Maturation is defined as the process of completing full development or growth[1]. The embryo and fetus matures intrauterine until organ systems supports the extrauterine life. Thus the degree of maturity is the foremost and main determinant for morbidity and mortality of the neonate. Born too soon babies are more prone for neurological disability, learning disabilities, injury to organs, death, chances of chronic illness and lifetime disability than the term newborns. Since there is no good direct measure for degree of maturity, gestational age calculated during pregnancy is used as a proxy measure of it[1].

SIGNIFICANCE OF FOCUSSING ON PRETERM BIRTH

Preterm birth is a main cause of important long term loss of human potential among survivors world wide. Complication of prematurity is the single major direct cause of neonatal negative sequel. Prematurity is the second mostcommon aetiology of under-5 mortality, the first being pneumonia. Being born too soon also increases the baby's risk of mortality due to other reasons, mainly from neonatal sepsis. Prematurity is found to be a risk factor in at least half of all neonatal deaths.



Preterm birth is a risk factor for neonatal and postneonatal deaths
At least 50% of all neonatal deaths are preterm

Published in Liu L, et al., 2012

Compared with children born at term, children who are born prematurely have higher rates of cerebral palsy, sensory deficits, learning disabilities and respiratory illness **(Petrou, 2005**).

The most obvious health impact in both developed and developing countries is that PTB is one of the leading causes of neonatal mortality. Globally it is estimated that 11.1% of births are preterm and being born preterm is the direct cause of 27% of the neonatal deaths. Data from the United States in 2002 shows similar findings with PTB responsible for 34% of all infant deaths. The likely difference in these figures is the lower rates of mortality due to various types of infections in the United States. Preterm Neonates have their organ systems poorly developed. So they are at risk for many life-threatening conditions like hypothermia because they cannot produce and retain enough heat to maintain their

body temperatures, respiratory distress syndrome (RDS) from deficiency in surfactant production and lung development, bronchopulmonary dysplasia (BPD), cardiovascular abnormalities including patent ductus arteriosus (PDA) and low blood pressure, intraventricular hemorrhage (IVH),ineffective glucose regulation, necrotizing enterocolitis (NEC), infection and retinopathy of prematurity (ROP) greater the prematurity, greater is the risk of morbidity and death. Even borderline preterm infants have a risk for poor feeding and hyperbilirubinemia. Exponential relationship exists between mortality and immaturity. Births that occur before 34 weeks of gestation though contribute to about 3 -4 % of all preterm birth, they account for the majority of neonatal deaths.

Survival of the first crucial months of life after PTB does not mean that they are free from lasting adverse health effects. Disability is the biggest and the most obvious long-term health effect. It can be characterized into three major domains; mental (neuro-developmental impairment, NDI), physical (neuro-motor development) and sensory (vision, hearing). There are indices and testing time periods, thus comparison of studies is difficult. However, they are all uniform in indicating the severity of the problem. To illustrate, one cohort of neonates born at <26 weeks GA in England found that 30% of the 283 tested infants had scores 2 standard deviations below the population mean at 30 months post expected delivery date using Bayley Mental and Psychomotor Development Indexes. In addition almost half (49%) were

classified as disabled and almost a quarter (24%) as severely disabled. When these same children were followed up at 6 years of age, 86%of those originally classified as disabled still had moderate to severe disability. Of the remaining cohort 46% had either moderate or severe disability compared to their classmates with only 20% classified as no disability. When these same children were followed up at 11 years of age 46% were still seriously functionally disabled compared to their peers. These data all come from the EPI Cure Study and indicate that PTB puts children at serious risk of disability throughout their formative years. There has been no solid evidence that disability outcomes are improving. This means that a steadily higher proportion of children will have disability needs in the future.

While the above studies focus on very preterm GAs, those born at later GA are not exempted from the risk. A study in the Netherlands comparing 8 year old school children showed that those born late preterm (32-36 weeks, with no intensive care needed) were more than twice as likely as their term peers to need special education and to be held back in school. In addition the preterm group had slightly lower IQ scores and more difficulty with sustained attention tasks. These studies indicate that even seemingly mildly truncated pregnancies have significant impact on future life for infants. Cognitive and neuro-motor functioning are not the only organ systems that are affected by being born preterm. Preterm neonates face many other challenges that can extend lifelong. Lung

development is often compromised into late childhood (11 years) with those born <26 weeks having high rates of chest deformities (17%) and asthma diagnoses (25%). These rates were significantly higher than their classmates and those born early also had worse spirometry scores in all tested areas.

Asthma rates may be more similar to peers as these children age because their asthma rates in their classmates increase but those born preterm still have higher rates of chronic conditions. Overall growth in childhood can also be affected by early PTB.

In the EPI Cure study discussed above children born <26 weeks GA were more likely to have lower weight, shorter height, lower BMI and smaller head circumference at 6 years of age. However, these children had slightly caught-up with previous measurements at 30 months of age.

Underlying these differences in growth are the metabolic implications of being born preterm. When comparing those born preterm to those born at term, preterm individuals tend to have lower insulin sensitivity and higher blood pressures, even into their 20s. Associations between being born preterm and subsequent diabetes and cardiovascular disease have also been identified. These findings seemed to be related to catch-up growth, which means that correcting slow growth may not be without consequences.

Of all the health outcomes affected by being born preterm , he most striking example of the risk comes from a recent study on long term mortality risk for these infants. Following a cohort in Sweden of births occurring between 1973-1979, the authors found that not only were patients born preterm more likely to die in early childhood (age 1-5 years) but that this risk is resurfaced at 18-36 years of age. Deaths in early adulthood were most often from respiratory, endocrine and cardiovascular disorders. This was independent of fetal growth and maternal risk factors with the adjusted hazard ratio of 0.96 for each additional increased week of gestation. Even late preterm infants were at risk with those born 34-36 weeks GA having a hazard ratio of 1.31 compared to those born at term (37-42 weeks). This suggests the potential importance of any extension in GA at birth that can be achieved through preventative measures.

These health effects can extend to the next generation. Individuals born preterm are less likely to reproduce and of the women that do, they are more likely to have preterm infants who are at a greater risk of dying during infancy. This fact is especially poignant when considering the current racial disparities in birth outcomes.

The rate of preterm birth is much different for minority populations in the US. In 2007 the rates of PTB for black infants was 18.3, for Hispanic 12.3 and for white 11.5. This is accompanied by a higher mortality rate for preterm infants in minority populations.

AIM OF THE STUDY

To find out the association of urogenital infection as a risk factor for spontaneous preterm delivery

DEFINITION OF PRETERM LABOUR

Preterm labour may be defined as onset of regular uterine contractions associated with cervical changes i.e. cervical effacement and dilatation between the period of fetal viability and before 37 completed weeks of gestation (**WHO, 2003; ACOG , 2012**).

INCIDENCE

Incidence of preterm birth was 12% of all deliveries and accounts for majority of neonatal deaths and nearly half of all cases of congenital neurological disability, including cerebral palsy (**Ross and Eden , 2009).**

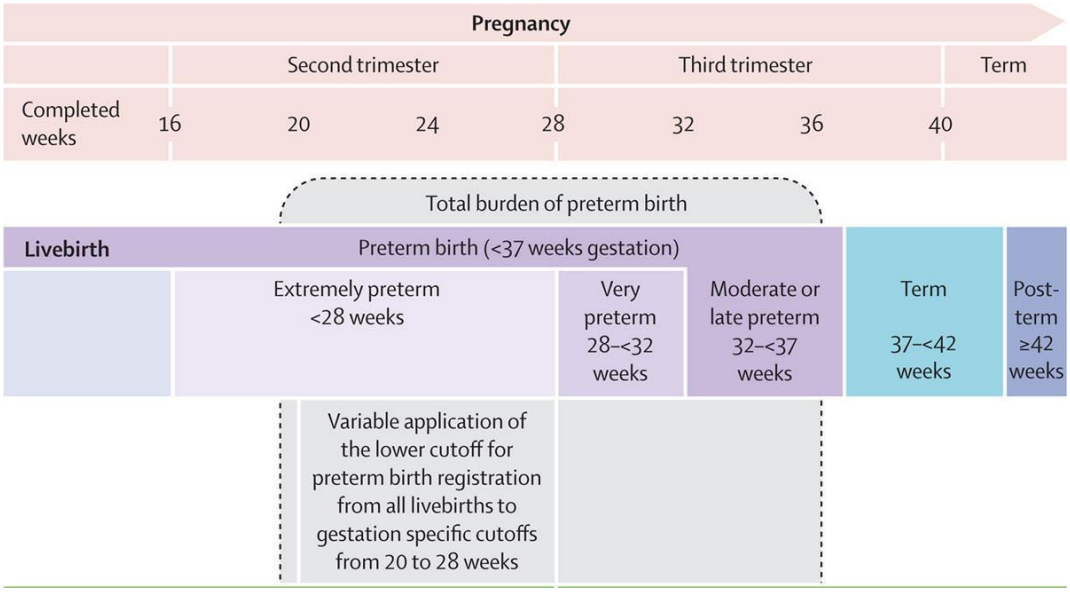
Of all preterm births that occur, 40 - 45% result from onset of labour, 25-30% result from PPROM and 30 - 35% are medical decisions to terminate pregnancy.

PTBs resulting from labour or PPROM are referred to as spontaneous PTB.[2]

SUB CATEGORIES OF PRETERM

There are two sub-categories of preterm

Based on gestational age:



PTBs are divided into different categories . These categories are

1. Late preterm (34-36 weeks),
2. Moderate preterm (32-33 wks),
3. Very preterm (28-31 wks) and
4. Extreme preterm (< 28 wks) (**Draper et al., 1999)**

The period of viability varies in different countries. It varies from 20 weeks to 28 weeks. In India the period of viability is 28 weeks. Hence its categorised as

* Late preterm (34-36 weeks)
* Moderate preterm (32-33 wks)
* Very preterm (28-31 wks)

Based on causes and risk factors

(1) Spontaneous preterm delivery which means spontaneous onset of labour. It also denotes onset of labour following preterm prelabour rupture of membranes (PPROM)

(2) Provider-initiated premature delivery which means planning for induction of labour or planning elective lower segment caesarean delivery before 37 completed weeks of gestation for maternal or fetal indications. It may be emergency or elective for either as a life saving for mother or fetus, or for any other non-medical reasons.

RISK FACTORS

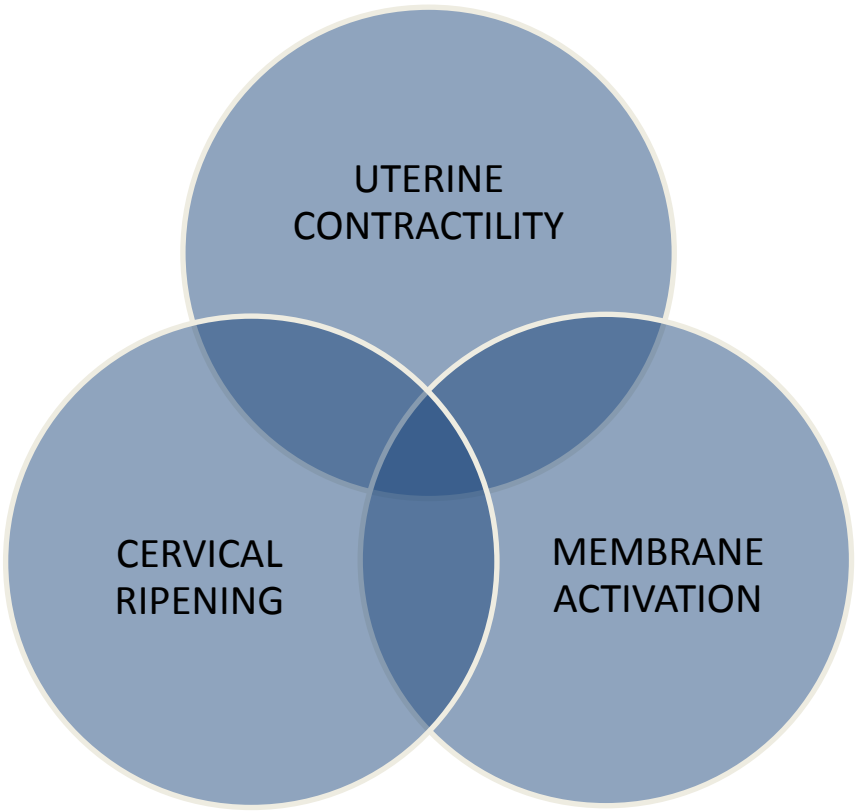
Type:	Risk Factors:	Examples:
Spontaneous preterm birth:	Age at pregnancy and pregnancy spacing	Adolescent pregnancy, advanced maternal age, or short inter-pregnancy interval
	Multiple pregnancy	Increased rates of twin and higher order pregnancies with assisted reproduction
	Infection	Urinary tract infections, asymptomatic bactiuria, malaria, HIV, syphilis, chorioamnionitis, bacterial vaginosis

Type:	Risk Factors:	Examples:
	Underlying maternal chronic medical conditions	Diabetes, hypertension, anaemia, asthma, thyroid disease
	Nutritional	Undernutrition, micronutrient deficiencies
	Lifestyle/work related	Smoking, excess alcohol consumption, recreational drug use, excess physical work/activity
	Maternal psychological health	Depression, violence against women
	Genetic and other	Genetic risk, e.g., family history Cervical incompetence Intra-uterine growth restriction Congenital abnormality
Provider-initiated preterm birth:	Medical induction or cesarean birth for:	Prior classical cesarean section, Placenta accreta.
	obstetric indication Fetal indication	There is an overlap for indicated provider-initiated preterm birth with the risk factors for spontaneous preterm birth
	Other - Not medically indicated	

PATHOGENESIS

Preterm birth is multifactorial in origin. The risk factors like ischemia and infection cause the stimulation of fetal hypothalamic pituitary axis and it plays a major role in prematurity in addition to interaction of all three immune, paracrine, and endocrine systems .

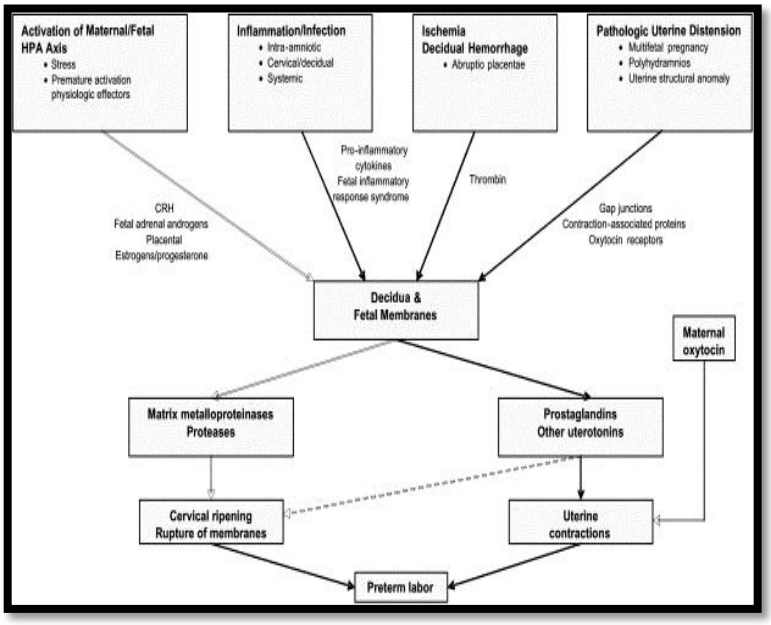
Premature labour occurs as a result of three natural processes occurring concurrently prior to 37 weeks of gestation. These 3 natural processes start in a cyclical manner resulting in an increased uterine contraction, fetal membrane activation and cervical ripening .



CYTOKINES INVOLVED

Cytokine	Action	Effect
IL-6,IL-8,IL-1, TNF-alpha	Degradation of collagen fibres	Cervical ripening
IL-1,TNF-alpha	Induce matrix metalloproteinases	Membrane rupture
IL-1,IL-2,IL-6,TNF-alpha	Increases PGE2 ,PGF2 alpha	Uterine contraction

The sequence of order of these processes will differ in various circumstances. But in overall uterine contraction is common to be initiated at first which leads to preterm activation of the other two processes.

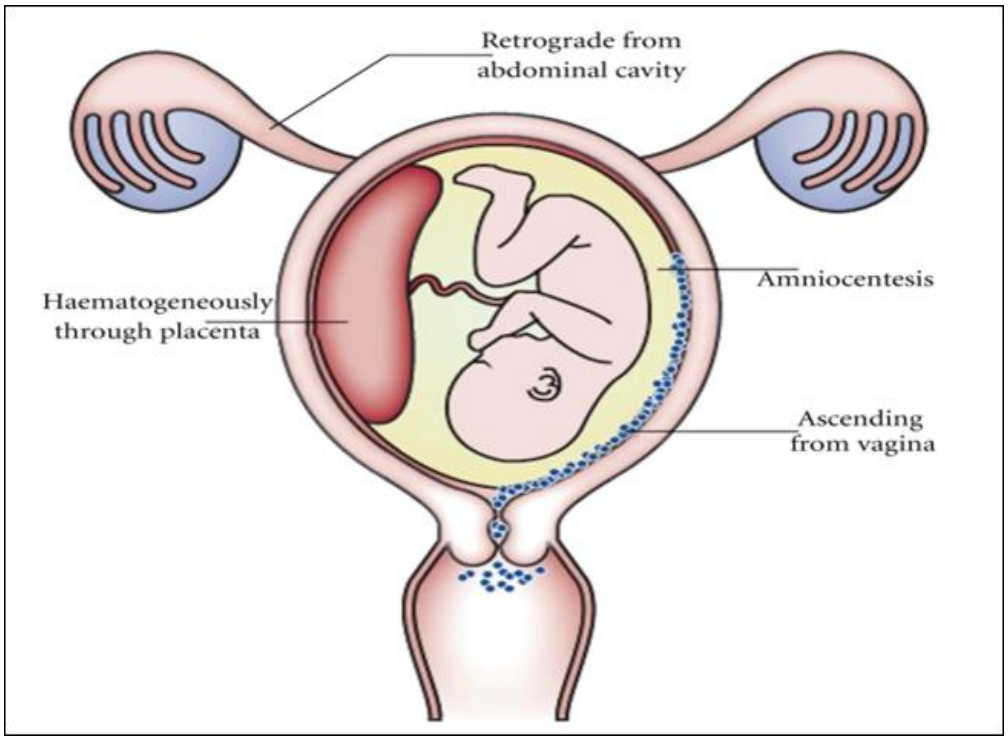


INFECTIONS

Infections and its related inflammation are found to be the initiators of preterm birth. It was found to have high positive bacterial cultures from the placenta and the fetal membranes of a high number of patients with prematurity. (Salafia et al, 1991).One fourth of all premature births occurs in patients with bacterial invasion of the uterine tissues (Romero, et al., 2007). The bacteria which cause placental infection produce prostaglandins, which disturbs the uterine silence and causes cervical ripening and softening and premature labour (Bejar, 1981). Moreover genital infection and its inflammatory process, will cause release of cytokines, which in turn causes a further rise in prostaglandin levels (Srinivasan, et al., 2009)

The infections that are related to premature birth are as follows

1. Urinary tract infections
2. Lower genital tract infections
3. Intrauterine infections
4. Systemic maternal infections
5. Maternal periodontitis



The infection enters into the uterus and amniotic fluid through various means. It can enter into the amniotic cavity hematogenously, incidentally by diagnostic and or therapeutic procedures like amniocentesis or through retrograde route it can spread from the abdominal cavity through the fallopian tubes[20]. Of all infections, ascending infection has high risk factor for preterm labour. Urogenital infections are the one that are mostly related to premature labor. These are the bacterial infections that are seen to ascend from the lower genital tract.[21]

ASCENDING INFECTION IS CONSIDERED TO HAVE FOUR STAGES

Four steps are involved in ascending infection of vagina which are cervicovaginal infection, choriodecidual infection, infection of amniotic cavity and infection of fetus.

- The first stage: Change in the vaginal and cervical microbial flora or the presence of pathologic microbes
- Second stage: Deciduitis.
- Third stage : Choriovasculitis or Amnionitis
- Fourth stage: Once in the amniotic cavity, the bacteria may gain access to the fetus by different ports of entry

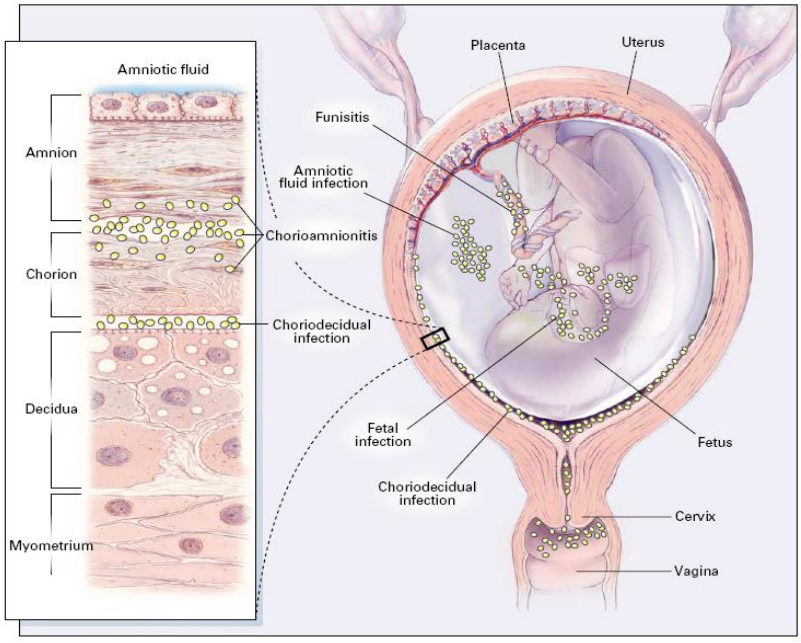


Figure 1. Potential Sites of Bacterial Infection within the Uterus.

URINARY TRACT INFECTIONS

The urinary tract infection poses a major preventable cause of preterm labor. It includes asymptomatic bacteriuria, acute cystitis and pyelonephritis.

In pregnancy, urinary tract infections are common because:

1. Difficulty in maintaining proper hygiene due to a distended pregnant abdomen
2. Immuno compromised condition of pregnancy
3. Hormonal and mechanical changes causing urinary stasis and vesicoureteral reflux

- ✓ Stasis of urine as a result of ureteral smooth muscle relaxation by progesterone
- ✓ Urinary retention as a result of the weight of the enlarging uterus
- ✓ Loss of ureteral tone along with increased urinary tract volume which in turn leads to stasis of urine and ureteric dialation of renal pelvis and calyces
- ✓ It is more common on right side (86% of cases)

The pressure is more pronounced on right (15 mm vs 5 mm). It begins at 10 weeks and worsens throughout pregnancy.

4. Glycosuria and aminoaciduria

- ✓ There occurs an impaired renal resorption of glucose in the collecting duct and Loop of Henle.
- ✓ Selective aminoaciduria {for reason unknown} which favours urothelial adherence in Escherichia coli infection.

Infective agents

E coli: Most common cause of UTI, 80-90%

It originates from fecal flora colonizing the periurethral area and is an ascending infection.

- Other pathogens that contributes are:
  - ❖ Klebsiella pneumoniae (5%)
  - ❖ Proteus mirabilis (5%)
  - ❖ Enterobacter species (3%)
  - ❖ Staphylococcus saprophyticus (2%)
  - ❖ Group B beta-hemolytic Streptococcus (GBS; 1%)
  - ❖ Chlamydial infections
- Proteus species and S saprophyticus, are very aggressive causes of UTI either persistent or recurrent .

Proteus, Klebsiella, Pseudomonas and coagulase negative Staphylococcus alkalinize the urine and are more prone to result in renal stones.

ASYMPTOMATIC BACTERIURIA

Asymptomatic bacteriuria is defined as a condition where single species of bacteria is isolated from 1 ml of urine which shows > 100,000 colonies. Midstream sample, is used for the culture. Prevalance is 2 to 7 percent of pregnancy. Bacteria that is most commonly isolated is E.coli. Untreated asymptomatic bacteriuria may develop into pyelonephritis in 20 to 40 % of pregnant women.[22,23,26]

Risk factors for asymptomatic bacteriuria : Increasing age (1% increase / decade of life), higher parity, higher sexual activity, infection with chlamydia in the past, lower socioeconomic status, recurrence of UTI in the past, diabetes mellitus, sickle cell disease , anatomical defect and / or physiological genitourinary tract defects. Prematurity, low birth weight infants, fetal mortality, increased risk for anemia, thrombocytopenia and transient renal disorder are all common in pyelonephritis. There is a reduction in the rate of subsequent genitourinary tract infections, perterm birth with the treatment of asymptomatic bacteriuria.

SCREENING OF BACTERIURIA

ACOG recommends that the urine culture should be done at the first prenatal visit for all women and the urine culture is recommended to be done again at third trimester, because there is a chance for the urine of treated patients not to remain sterile during all trimesters of pregnancy.

At the first visit clean midstream catch sample is done (best if 12-16 weeks).It identifies nearly 80% of women; if these cultures of urine if done monthly it would find out an additional 2% of cases but is not recommended routinely

ACUTE CYSTITIS

Acute cystitis is characterized by inflammation of the urinary bladder as a result of bacterial or nonbacterial causes .The signs and symptoms of acute cystitis include hematuria, dysuria, suprapubic discomfort, frequency, urgency, and nocturia. Acute cystitis is complicated by upper urinary tract disease (ie, pyelonephritis) in 15-50% of cases.

ACUTE PYELONEPHRITIS

Pyelonephritis is the most common urinary tract complication in pregnant women, occurring in approximately 2% of all pregnancies. Acute pyelonephritis is characterized by fever, flank pain, and tenderness in addition to significant bacteriuria. Other symptoms may include nausea, vomiting, frequency, urgency, and dysuria. Furthermore, women

with additional risk factors (eg immunosuppression, diabetes, sickle cell anemia, neurogenic bladder, recurrent or persistent UTIs before pregnancy) are at an increased risk for complicated UTI.

DIAGNOSIS OF URINARY TRACT INFECTIONS

* Urine examination

It includes urine analysis and culture

All pregnant patients should undergo urinalysis and culture (Screening) in 1st prenatal visit or at 12-16weeks to identify asymptomatic bacteriuria, as well as those with other associated findings like glucosuria and proteinuria.

* Urine sample collection advisory

Sample advised is midstream clean catch urine. With the first hand, spread the labia. Wipe the uretheral meatus with the second hand downwards towards the rectum using a soap–moistened towel and discard the towelette. The initial portion of the bladder contents are voided into the toilet. The middle portion of the bladder contents are held in the sterile container, while keeping the labia spread with the first hand . If sample is not transported immediately then refrigerate the specimen at 4°C

* Culture of urine

✓ It is the standard method to evaluate UTI .

- ✓ It is Indicated for :
  - UTI that are recurrent
  - Pyelonephritis
  - History of recent instrumentation
  - failure to respond to initial treatment
  - If patient is admitted at hospital
- ✓ The cultures said to be positive if two consecutive voided specimens with isolation of the same bacterial strain, at a colony count of 100,000 colony-forming units (CFUs) per milliliter or higher

OR

A single catheterized specimen yielding a colony count of at least 100 CFU/mL

- ✓ Contamination is said to occur if

Counts lower than 100,000 CFU/mL, with 2 or more organisms

- ✓ WBC casts is usually present in pyelonephritis
- ✓ Culture results give an idea of the bacterial species and antibiotic sensitivity
- ✓ If the cultures show significant mixed organisms growth, then renal calculi should be suspected

- **Urinalysis**

✓ In urinary tract infections there will be a positive result for nitrites, glucose, leukocyte esterase, WBCs, RBCs, and protein

- **Blood investigations**
  - Complete hemogram
  - Blood urea nitrogen (BUN)
  - Serum creatinine
  - Serum electrolytes

GENITAL INFECTIONS

Bacterial Vaginosis

The female vaginal flora consists of multiple organisms. The Lactobacillus-Gram-positive facultative anaerobic organisms most commonly seen in postpubertal females[28,29]. There are nearly 107 different lactobacilli microorganisms per gram of vaginal secretion. More than 1 type of species are seen in any one individual

- It is a clinical syndrome caused by excessive growth of bacteria that may normally be present in the vagina.
- Vagina is normally colonized with gram-positive, gram-negative, aerobic, and anaerobic bacteria.
- Lactobacillus is the predominant commensal found in the vagina
- Local pH changes causes the alteration of vaginal ecosystem.

- It is not an infection
- H2O2-producing *Lactobacillus* strains (eg, *L jensenii*) are reduced in number, while there are multilog population which increases in a characteristic set of microflora including Gardnerella vaginalis, genital anaerobes, and mycoplasmas.

Microbes involved

- G.vaginalis (coccobacilli, surface pathogen),
- Anaerobic bacteria (Bacteroids, Mobiluncus, Prevotella) &
- Mycoplasma hominis.

There is a synergistic relationship between the acquired organisms.

These organisms replace lactobacilli .These organisms produce amines that are volatile and some of the organic acids and lactic acids which lead to odour and increasing vaginal pH. Trimethylamine is produced by Mobiluncus that gives the odour of rotting fish. Succinate is synthesised by Mobiluncus & Bacteroids .

The above products reduce the chemotactic response of neutrophils and reduce their ability to kill the microbes. This explains the absence of cellular inflammatory response.

The most common symptoms include:

- Vaginal discharge and itching which is usually thin and greyish white.
- Vaginal odour (foul-smelling or unpleasant fishy odour)
- The vaginal discharge and odour are often more noticeable after sexual intercourse.
- The amount of vaginal discharge that is considered normal varies from woman to woman. Therefore, any degree of vaginal discharge that is abnormal for a particular woman should be evaluated.

Additional issues that might indicate the presence of a more serious condition include:

- Fever
- Pelvic pain
- Unbalanced pH of vagina leads to the reduced acidity which in turn reduces the growth of good bacteria and thus resulting in the attack from bad bacteria. This then increases the risk of any form of vaginal infections.

- Soaps which are a bit alkaline are not advised to be used in intimate parts)
- Improper hygiene (not maintaining the Vaginal pH balance)

- Synthetic garments for intimate parts
- Tightly fitting dresses
- Sexual activity which is unprotected. (semen is alkaline and affects the vaginal acidity)
- Use of perfumed soap or wash.

Bacterial vaginosis can be diagnosed based on few criteria. The Amsel criteria is routinely used. Also Nugent criteria is based on a numerical scoring system (0–10). The score reflects the relative abundance of curved gram-variable rods (Mobiluncus), large gram-positive rods (Lactobacillus) and lastly the small gram-variable rods (G. vaginalis / Bacteroides spp.)

Amsel's Criteria*	**Hay/Ison's Criteria**	**Nugent Criteria**
1) Clue cells. 2) Fishy odor after adding 10% potassium hydroxide (KOH) solution. 3) Homogeneous discharge - thin, white or yellow. 4) pH of vaginal fluid >4.5 Requires three of the following four signs or symptoms	- Grade 1(Normal): Mainly Lactobacillus. - Grade 2 (Intermediate): Lactobacilli present, but Gardnerella or Mobiluncus morphotypes also present. - Grade 3 (Bacterial Vaginosis): Predominantly Mobiluncus / Gardnerella Reduced amount of Lactobacilli.	0–3 Negative 4–6 Intermediate 7+ Positive for BV

Should we treat the asymptomatic bacterial vaginosis during pregnancy?

Bacterial vaginosis is associated with premature labour due to its association with intrauterine infection.

It is recommended that only patients at high risk for preterm delivery should be treated with antibiotics and also if they are found to have bacterial vaginosis. These include pregnant cases with a previous history of a spontaneous preterm delivery.

As per the Centers for Disease Control and Prevention (CDC), advice for the treatment of Bacterial Vaginosis during pregnancy are listed. Patients should be reevaluated after one month of treatment.

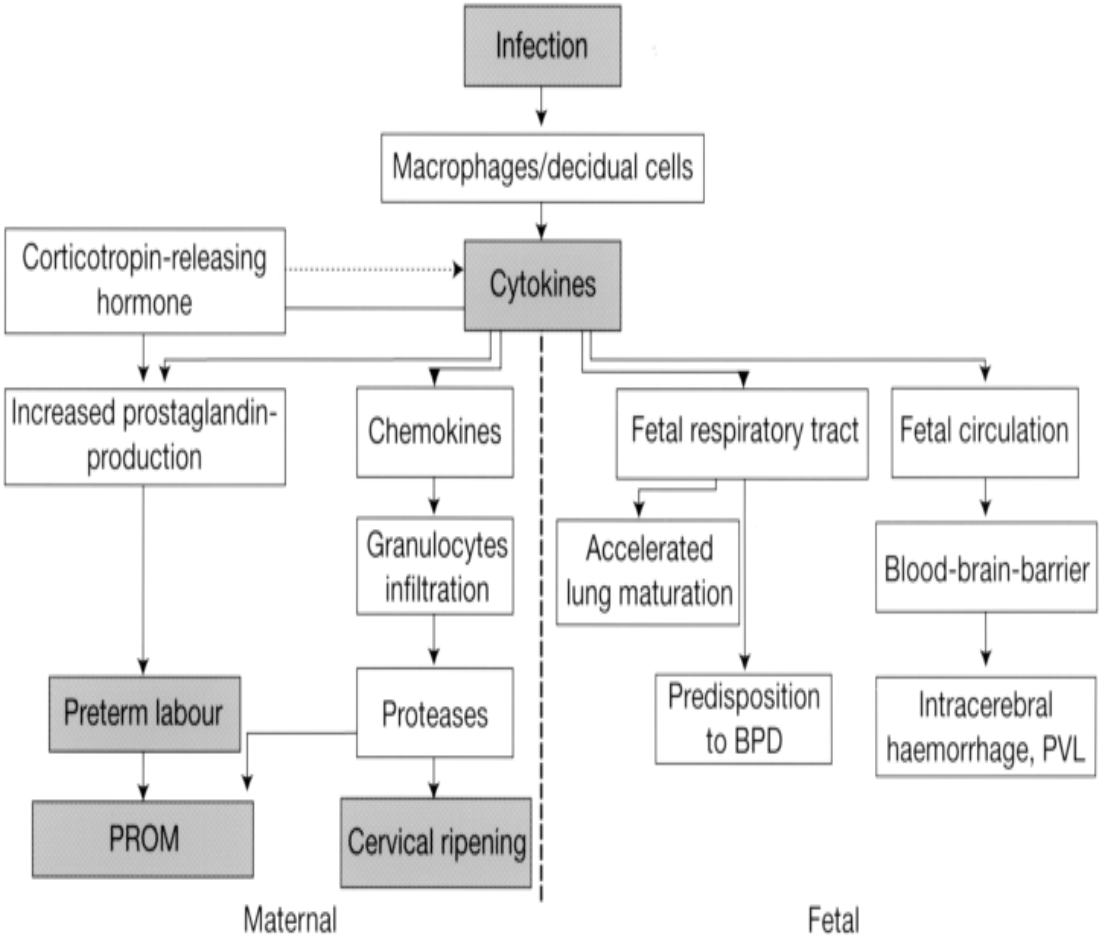
Metronidazole	500 mg twice daily for seven days
Metronidazole	250 mg three times daily for seven days
Clindamycin	300 mg twice daily for seven days

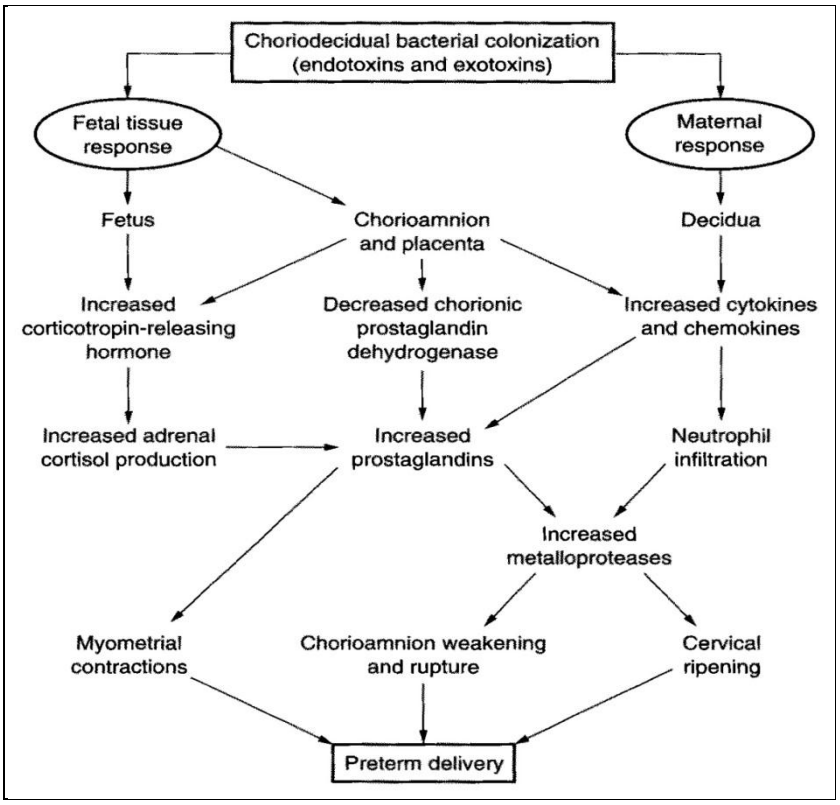
INTRAUTERINE INFECTIONS

Intrauterine infections contributes to preterm labour and is a preventable. Cause of preterm labour. Overall it occurs in 60 percent of patients with preterm delivery. For intrauterine infection to cause preterm birth two conditions are described. The bacteria must gain entry into the amniotic cavity[12]. It will be recognized as a foreign matter. The second

process involves a bacteria triggering an inflammatory response which induces preterm labour.

The cytokine - prostaglandin cascade is another key player in the pathogenesis of preterm birth due to infection[16]. Bacteria weakens the amnion and chorion due to the inflammatory response by producing the inflammatory mediators. This leads to preterm prelabour rupture of membranes (PPROM).





As explained in the above chart the key role of infection associated with preterm is the proinflammatory cytokine prostaglandin cascade. These inflammatory mediators are produced in response to bacteria or bacterial products by macrophages, decidual cells, and fetal membranes. The patients with intraamniotic infection produce high concentrations of cytokines and prostaglandins in liquor. The production of prostaglandins by the amnion and the decidua is induced by these cytokines.

PERIODONTAL INFECTION

In oral cavity the anaerobes which are gram negative causes periodontitis secondary to the release of endotoxins (lipopolysaccharides). Those endotoxins lead to increased release of cytokines and prostaglandins. Periodontitis caused by oral pathogens

enter the systemic circulation leading intrauterine infection. Thus periodontitis increases the risk of preterm labour .It also plays a role in causation of preeclampsia and fetal loss.

MATERNAL STRESS

Chronic stress, in a variety of forms, has also been proposed to be a risk factor for PTB. Several chronically stressful conditions have been linked to PTB and those studied most are depression, domestic violence, low socioeconomic status and working conditions[8]. Several prospective cohort studies have demonstrated that women who are depressed or anxious have increased risks of delivery before term.

Risk ratios for depression and anxiety are modest typically less than two.

Similarly women who were emotionally, physically or sexually abused during pregnancy have increased risk for delivering before term as well. Again, the largest of the studies typically estimate the risk ratio around two. Evidence for working conditions affecting pregnancy outcome has been less consistent due to the different populations and lack of similarity between study conditions. Two working conditions that have shown some replicable association with PTB, and are consistent with the chronic stress etiology, are women required to stand for several hours per day and those working night shifts. As with the other chronic stress pathways the risk ratios for these factors are small, <1.5. Contrary to

chronic occupational stress, exercise programs have had either no or positive impact on GA at birth. How physical exertion affects a pregnancy may depend on duration and intensity in which it is encountered, but these variables are difficult to quantify. Though chronic stress is an important pathway for contributing to PTB, it is one that is difficult to quantify for any individual, and thus has not been used to predict PTB risk.

UTERINE OVERDISTENSION

Uterine over distension leads to onset of preterm labour . Causes of uterine distention includes multiple gestations, polyhydramnios, and macrosomia. Uterine stretch causes overexpression of gap junction proteins, those gap junctions are CX-43 and CX-26 (Ou et al., 1997),also the oxytocin receptors (Terzidoo et al., 2005). Stretch of the lower uterine segment increases the levels of IL-8 and collagenase production. This causes ripening of cervix. (Loudon et al., 2004; Maradny et al., 1996). An interaction between endocrine and mechanical signals leads to myometrial activation and contraction.

CERVICAL AND UTERINE MALFORMATION

Underlying abnormalities of the uterine cervix also increase the risk for PTB.

These can be both congenital and iatrogenic. Women with arcuate uteri, canalization defects or unification defects are all at double the risk

for PTB as women with normal uteri. Cervical insufficiency is also a risk factor for PTB although whether this is an underlying cause or the result of other pathological processes is difficult to differentiate. Additionally, women who have undergone uterine procedures have nearly double the risk for PTB.

MULTIPLE PREGNANCIES

Having a multiple pregnancy puts women at significantly increased risk of delivering preterm. This risk is increased with an increasing number of fetuses.

While preventing naturally occurring multiple pregnancies seems unlikely, avoiding PTB from multiple pregnancies with assisted reproductive therapy (ART) is definitely possible. It has been proposed that increased use of ART contributed to the rise in PTB rates. This however is changing. The rates of twins have been rising but higher order multiple births has been decreasing from a peak in 1998.This may be related to updated guidelines to reduce the number of transferred embryos.

UTEROPLACENTAL THROMBOSIS AND HEMORRHAGE

The placenta with vascular lesions contributes to 30% of preterm delivery and 30% of PPROM, (Arias et al., 1993). Physiological transformation of the spiral arteries, atherosis, fails to occur The proposed

mechanism is uteroplacental ischemia and the key role is due to thrombin[17].

Thrombin

- Is a protease that is multifunctional
- causes smooth muscle contraction (vascular, and myometrial smooth muscle).
- activates protease-activated receptor 1, 3, and 4
- it causes to conformational change and production of phospholipase C, activation and G protein coupling. The uterine contraction is caused by sequential changes leading to activation of calmodulin, MLCK, actin, and myosin
- there is a increase in levels of MMP-1, 3, and 9 protein expression in decidual cells and fetal membranes ,which breaks the extracellular matrix of fetal membranes leading to PPROM
- The measurement of thrombin-antithrombin III (TAT) complexes is an indirect measurement of thrombin.

MATERNAL AGE

Age of the mother is one of the minor influencing factor for prematurity. Maternal age > 30 and teenage pregnancy are said to be at risk for preterm labour.

MEDICAL ILLNESS

Maternal medical conditions are also a risk factor for indicated preterm birth. Examples are chronic hypertension, prepregnancy diabetes mellitus alters or reduces the oxygen delivery to placenta and it also reduces the nutrients to the developing fetus, which results in fetal growth restriction. Preeclampsia, gestational diabetes mellitus has the risk of indicated preterm birth. Preterm birth is also caused by any acute medical conditions of the mother. Examples include severe trauma and shock which are acute conditions that could lower the placental blood flow and leading to non reassuring fetal status or placental abruption. This can be managed by terminating the pregnancy leading to premature birth. The progressive medical illnesses could warrant indicated preterm birth to preserve the health and well-being of the mother. Examples are cardiac diseases that are functional or structural by significant, fetal red cell alloimmunisation or a twin-to-twin transfusion sequence,

GENETICS

There is evidence to suggest that genetic risk factors play a role nPredisposing the women to PTB. This genetic risk appears to be primarily of maternal Origin[3].

Women who have had a PTB and change of partners remain at increased risk (RR ~ 5) for PTB but men show no increased risk with subsequent offspring. Also, having a close maternal relative with a past

PTB significantly increased a woman's risk of having a PTB (RR ~1.5).The maternal genetic component is further highlighted by twin studies in which monozygotic twins show greater concordance between gestational length of their offspring than dizygotic twins. This has led to estimates of the heritability of PTB of 25-40%.

While the heritability of PTB has been confirmed in numerous epidemiological studies finding replicable individual genetic risk factors has proved elusive. Many candidate gene studies have reported significant association with common polymorphisms, the majority of which are related to inflammatory processes (IL-1, IL-6, IL-8, TNF-alpha, etc.). To date only four polymorphisms have remained significant after multiple studies and meta-analysis. All increase the odds of PTB by a factor of <2. Only one polymorphism was found to also be significant in neonates.

To date, genome-wide association studies have been unsuccessful and no studies have been done to prospectively determine risk of different genetic polymorphisms.

Typically, genetic studies have been performed using linkage, resequencing or association approaches. While these have all proven useful in the past they each have drawbacks. Linkage is best at identifying loci for monogenic Mendelian disorders, with high penetrance but is not as successful for common diseases with multiple contributing risks with lower effect sizes. Both candidate gene resequencing and

association studies rely on predicting the correct genes to study based on their theoretical potential to be related to disease. While this approach may highlight disease related polymorphisms in known pathways, it is unlikely to identify novel disease-related variants. To this end an ideal genetic study takes a location-agnostic approach with dense coverage to identifying disease risk. The first attempts at such investigations are known as Genome Wide Association Studies (GWAS). They use up to one million common variants, known as single nucleotide polymorphisms (SNPs), spread across the genome to achieve greater ability to detect potential risk. Hundreds of thousands to over a million SNPs are generally genotyped in a typical GWAS.

SNPs can be chosen based on their location in haplotype blocks, regions of the genome that tend to be inherited together, so that any particular SNP acts as a surrogate, or "tag" SNP, for other polymorphisms within the block. The non-random, tendency for regions of the genome to be inherited together is known as linkage disequilibrium. GWAS has been very successful in identifying genetic risks in many common, heterogeneous diseases such as diabetes mellitus and breast cancer and common traits such as height. GWAS depends on the common disease, common variant hypothesis (CD-CV) which states that common diseases will have disease-predisposing variants that many people in the population will share. Currently, GWAS is the most cost effective way of examining large portions of the genome for genetic risk,

but they still are unlikely to find rare variants (minor allele frequency < 1%) or those of only modest impact. However, as the cost of sequencing technology continues to decrease, whole exome and whole genome sequencing may become more readily performed. The rate limiting step in identifying genetic predisposition then becomes achieving adequate sample sizes and harnessing the necessary analytical power; not the amount of genetic information that can be obtained.

PREVIOUS PRETERM BIRTH

Previous preterm birth is the strongest risk factor for repeated preterm delivery. It occurs recurrent at a similar gestational age, with around 70% delivering within 2 weeks of the gestational age of their first preterm delivery (Bloom, et al., 2001). Term births decrease the risk of PTB in subsequent pregnancies[14].

First Birth	Second Birth	Subsequent Preterm Birth (%)
Not preterm		4.4
Preterm		17.2
Not Preterm	Not Preterm	2.6
Preterm	Not Preterm	5.7
Not preterm	Preterm	11.1
Preterm	Preterm	28.4

OBESITY, DIABETES AND METABOLIC SYNDROME

Many lifestyle factors influence a woman's risk for PTB, including body mass index (BMI). There is a somewhat non-intuitive relationship between maternal BMI and PTB. First, women who are underweight are prone to deliver early. A recent metaanalysis found that women classified as underweight (typically BMI < 18.5 or 20) had a significantly increased risk of PTB (RR=1.21). Also, convincingly, in this metaanalysis when considering only the largest included studies, all showed increased risk, with somewhat higher risk ratios. The increased risk was true of both spontaneous and induced PTBs. At the other end of the BMI spectrum a higher BMI may be protective of PTB. In a meta-analysis examining higher BMI and its association to PTB, BMIs between 25-30 and 30-35 were found to be protective for PTB with risk ratios of 0.85 and 0.83. However, risk for PTB between 32-36 weeks was increased in these groups. This apparent protective effect disappeared above a BMI of 35 as women with a BMI between 35-40 and >40 were at increased risk of PTB (RR=1.33 and 2.27). Obesity especially increased the risk for induced PTB.

Metabolic disorders such as diabetes are often co-existent with high BMI and can have their own risk for PTB. Women with pre-existing diabetes mellitus have been found to be at risk for spontaneous PTB and especially for induced PTB. A similar condition, metabolic syndrome, can also produce ill effects on birth outcomes. A cohort study found that

women classified with metabolic syndrome in early pregnancy had nearly 3 times the risk of delivering preterm. Again, the risk was especially strong for induced PTB(RR>5)

PRETERM PRELABOUR RUPTURE OF MEMBRANES (PPROM)

A woman is described as having P-PROM if she has ruptured membranes before 37^{+0} weeks of pregnancy but is not in established labour. **(NICE GUIDELINES 2015)**

Premature labour is usually preceeded by preterm prelabour rupture of membranes. Inspite of any etiology and mechanism leading to preterm labour is PPROM. It accounts for nearly 40 percent of preterm births (Shubert et al., 1992) and finds a place in final common pathway to preterm delivery[17]. It is also associated with intraamniotic infection, use of tobacco, placental abruption, multiple pregnancy, previous history of PPROM, previous cervical amputation or any surgery or any laceration leading to a short cervix as detected by ultrasonogram, genetic disorders, nutrient deficiency, connective tissue disorders, and deficiency of vitamin C.

Mechanism

The type 2 and 4 are the collagen, over which amnion and chorion abut the decidua and rest on a basement membrane. Underneath this layer there is a fibrous layer that has collagen I, III, V, and VI types. The

major structural strength for the membranes is provided by the collagen[25]. Rupture of membranes is a process like that of a wound healing, in which degradation of collagen occurs (Malak and Bell, 1994). Collagen is lysed by Matrix metalloprotinases (MMP). Tissue remodelling is also caused by it. Degradation of collagen 1,2 and 3 occurs with MMP 1 and MMP8. Collagen types IV and V are degraded by MMP-2 and MMP-9 which are gelatinases.

The MMPs actions are under the control of their tissue inhibitors (TIMPs). A balance between of its activators and tissue inhibitors is needed for the control of its activity. The tensile strength of the fetal membranes are reduced with increased ratio of MMP-9 to TIMP type 1 .In amnion and chorion mRNA of MMP type 1 to 3, 8, 9, and 14; and their levels high in the liquor in PPROM (Menon and Fortunato, 2004). In PPROM MMP-9 levels are high in the liquor and to a lesser extent in patients with preterm birth (Fortunato et al., 2000a). Increased levels of pro-MMP-9 is found overlying the cervix in term gestation.

Many studies shows that infection and inflammation change in fetal membrane synthesis of MMP (reviewed by Menon and Fortunato [2004]). Few studies show when amnion and chorion are exposed to bacterial products there is an rise in MMP levels and a reduction in TIMP levels (Fortunato et al., 1999). Collagenase is synthesised by bacteria and it reduce the bursting load and elasticity and leading to PPROM. (MacGregor et al., 1987). In intrauterine infection MMP-9 levels are high

in the amniotic fluid (Fortunato et al., 1999). When membranes are exposed to lipopolysaccharide MMP-2 levels are high in membranes (Fortunato et al., 2000b).

The mechanisms causing PPROM (due to infection) are likely multifactorial. Proteases secreted by bacteria degrades collagen (MacGregor et al., 1987). Phospholipase A_2increases the levels of arachidonic acid, a prostaglandin precursor (Bejar et al., 1981).

In fetal membranes PGE2 decreases collagen synthesis. MMP-1 and MMP-3 levels are increased by prostaglandins in fibroblasts. MMP levels are increased, TIMP levels are decreased due to proinflammatory cytokines, those are interleukin -1 and TNF-α in cultured amniocytes (So, 1993).

Immune cell signals results in reactive oxygen species leads to an increase in MMP levels (Woods, 2001). Risk factors for PPROM, are found to be, increase reactive oxygen species levels smoking, cocaine use, and intra-amniotic infection vaginal bleeding by a various mechanisms. MMP-9 action is increased by exposure to superoxides and it induces the release of arachidonic acid, a precursor to PGE2.

Multiple pregnancy polyhydroamnios causes Stretching of the membranes and causes PPROM. This is said to occur due to increased PGE2, IL-8, and MMP-1 activities (Maradny et al., 1996).

PROVIDER INITIATED PRETERM LABOUR

Iatrogenic premature birth contributes 30% of all premature deliveries. Iatrogenic premature birth also can occur with the elective delivery of a baby which was thought to be term due to errors in gestational age assessment. Medically-indicated preterm birth can be categorised into maternal and fetal cause of which severe preeclampsia, abruption of placenta, rupture of uterus, fetal distress and restriction of fetal growth with abnormal cardiotocograph are important direct causes Underlying maternal conditions like renal disorders, systemic hypertension, obesity and diabetes milletus increase the risk of maternal complications like, preeclampsia and medically warranted preterm delivery. Pre-eclampsia and abruptio placenta affects approximately 7% and 1% of all pregnancies respectively. Along with restriction of fetal growth and premature rupture of the membranes, they pose the most common reasons for indicated preterm birth (Goldenberg, 2008, Plunket, 2008).Multiple gestations constitutes 10% of all preterm delivery, the majority of which, (50%), are delivered premature due to medical indications (Moutquin, 2003). It is the responsibility of the obstetrician to weigh up the benefits of prolonging the pregnancy against delivering the baby too soon considering the health and medical status of mother and the fetus with a balance of the fetus perinatal outcome

PREDICTORS OF PRETERM BIRTH

1. Risk factor assessment
2. Cervical ultrasonography (Cervix Length assessment)
3. Salivary estriol
4. Screening for infections
5. Screening for fetal fibronectin

RISK FACTOR ASSESSMENT

Detailed history of patients past history, medical history, race ehinicity, previous labour details should be elicited

CERVICAL LENGTH ASSESSMENT

Ultrasound is done to identify the length of cervix as the risk of preterm labor is inversely related to cervical length .Trans abdominal scan is not so preferred as: {full bladder, false lengthening and can obliterate gross funneling}[13]. Transvaginal scan is preferred as it is more accurate than digital measurements. In asymptomatic women length of cervix and its risk for preterm labour is given below.

- 11-20 mm: 4% risk
- 10 mm: 15% risk
- <10 mm high risk

It is not screened routinely but done for high risk asymptomatic women at 22 – 24 weeks

FETAL FIBRONECTIN

It is a Glycoprotein produced by the chorion. Normally present in cervical secretion in early gestation and just before term labor. Its presence after >24 weeks is a marker for the disruption of the chorioamnion and underlying decidua due to inflammation with or without infection [13].

- If test is negative , then< 1% will deliver in next week or two and
- False positive occurs in cases of bleeding, ruptured membranes and digital cervical examination
- False negative occurs in use of lubricant soap
- Screenig of asymptomatic women at low risk is not recommended
- Useful in women when symptoms occurs between 24-34 weeks
- When membranes are intact and cervical dilatation is <3 cm
- It is used for short term prediction (7-14 days)then risk of PTD on next week or two is 20%.

SALIVARY ESTRIOL

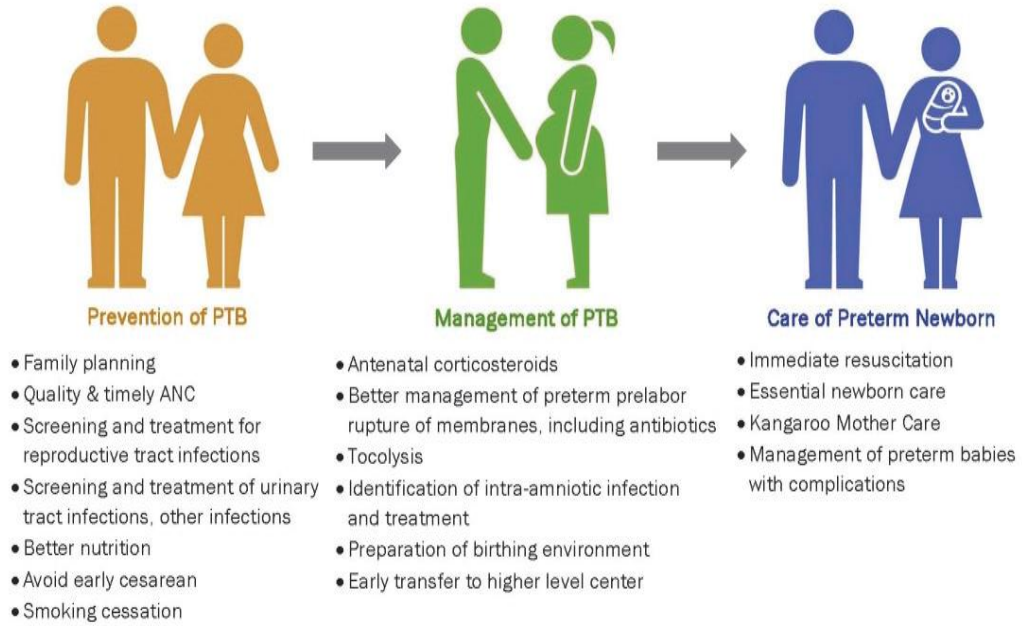
Maternal levels of serum estradiol and salivary estriol increases before onset of term and preterm labour

A cut off >2.1 ng/dl yielded a sensitivity of 40%, specificity of 93%.

Its levels are influenced by diurnal pattern (lowest during day, highest in night), and corticosteroids suppresses estriol value.

MANAGEMENT OF PRETERM LABOUR

- Prevention of preterm labour if possible
- To arrest preterm labour if not contraindicated
- Appropriate management of labour
- Effective neonatal care



PRIMARY PREVENTION

Public Educational Interventions:

- Greater awareness should be created of the increased risk of preterm delivery in higher order births in ART could affect attitudes and choices made in fertility care.
- To reduce the prevalence of smoking[18].
- Awareness should be created for the use of condoms to prevent sexualy transmitted diseases.
- Recognition and early treatment of psychological factors like depression stress factors and other risk factor.

Public and professional policies:

- Policies promulgated by fertility specialists intended to reduce the risk of higher order have been successful in Europe.
- Policies to protect pregnant women include minimum paid pregnancy leave, time off for prenatal visits, exemption from night shifts and protection from work place hazards
- Promotion of long acting reversible contraceptives

SECONDARY PREVENTION

Before pregnancy : Interventions include correction of mullerian anomalies, Preconceptional abdominal circlage, modification of maternal activities

Nutritional supplements, enhanced prenatal care and periodontal care

1. Wipe front-to-back after urinating or defecating
2. Wash hands before using the toilet
3. Use washcloths to clean the perineum
4. Use liquid soap to prevent colonization from bar soap
5. Clean the urethral meatus first when bathing
6. Changes in coital patterns (eg, position, frequency, postcoital antibiotics) can offset recurrence in at-risk individuals.
7. Non pharmacological factors that may help prevent recurrent infection in those women troubled by UTIs in pregnancy include:
    * Increased fluid intake.
    * Frequent voiding and a high-volume dilute urine, all of which reduce the risk of symptomatic infection

* The bladder to be emptied following sexual intercourse. Organisms at the urethera will be 'washed away' without being massaged up the urethra from the perineum.

* Double voiding (to ensure no residual urine is left in the bladder following micturition) To avoid the risk of bowel organisms getting into urethera perineum should be cleaned from 'front to back' following defecation.

PROGESTERONE THERAPY AND PROPHYLACTIC CERVICAL CIRCLAGE TO PREVENT PRETERM LABOUR

There is a decrease in myometrial progesterone receptor in preterm labour compared to term labor. It has anti inflammatory response, and causes immunosuppression so it suppresses cytokine pathways thus preventing rejection of fetus in utero.17 alpha hydroxyprogesterone caproate given weekly I.M.to women at high risk for PTL results in lower rates of PTB.

Cervical Circlage

RCOG study concluded that 96% of elective circlages were unnecessary, with no perinatal improvement .

In a post-hoc analysis those with three or more pregnancy losses seemed to have improved outcome

NICE GUIDELINES PROPHYLACTIC VAGINAL PROGESTERONE AND PROPHYLACTIC CERVICAL CIRCLAGE (GUIDELINES PUBLISHED: 20 NOVEMBER 2015)

Offer a choice of either prophylactic vaginal progesterone or prophylactic cervical cerclage to women:

- With a history of spontaneous preterm birth or mid-trimester loss between 16^{+0} and 34^{+0} weeks of pregnancy.
- In whom a transvaginal ultrasound scan has been carried out between 16^{+0} and 24^{+0} weeks of pregnancy that reveals a cervical length of less than 25 mm. Discuss the benefits and risks of prophylactic progesterone and cervical circlage with the woman and take her preferences into account.

➢ Offer prophylactic vaginal progesterone to women with no history of spontaneous preterm birth or mid-trimester loss in whom a transvaginal ultrasound scan has been carried out between 16^{+0} and 24^{+0} weeks of pregnancy that reveals a cervical length of less than 25 mm.

➢ Consider prophylactic cervical cerclage for women in whom a transvaginal ultrasound scan has been carried out between 16^{+0} and 24^{+0} weeks of pregnancy that reveals a cervical length of less than 25 mm and who have either:

- Had preterm prelabour rupture of membranes (PPROM) in a previous pregnancy.
- A history of cervical trauma.

Infection and preterm birth

50% of PTB associated with ascending genital tract infection eg. intrauterine, lower genital tract infection, distant infection like periodontitis polymicrobial ureaplasma urealyticum, Mycoplasma hominis, anaerobes, group B streptococci, Gardnerella vaginalis, E. coli, peptostreptococci, Bacteroides .

Antibiotics should not be given routinely in PTL with intact membranes for prolonging pregnancy. Definitely diagnosed intra-amniotic infection either by clinical criteria (fever, uterine tenderness, maternal or fetal tachycardia), give i.v. antibiotics and deliver regardless of gestation

TOCOLYSIS

It is not associated with a clear reduction in perinatal or neonatal mortality, or neonatal morbidity. Most authorities do not recommend use of tocolytics at or after 34 weeks. There is no consensus on a lower gestational age limit for the use of tocolytic agents as per RCOG Guideline Grade A recommendation 2011

COTRAINDICATIONS TO TOCOLYSIS

* Gestation more than 34 weeks
* Significant vaginal bleeding
* Suspected fetal asphyxia
* Intra amniotic infection
* IUD or lethal anomaly
* Maternal indication
* Uncontrolled diabetes
* Severe anaemia
* Cardiac disease
* Severe preeclampsia or eclampsia
* Imminent delivery
* Maternal hypotension systolic <90 mmhg

Drugs used as tocolytics are

* MgSO4
* Beta agonist
* Calcium channel blockers
* Prostaglandin synthase inhibitors

* Nitroglycerine

* Diazoxide

* Oxytocin receptor antagonist

* Ethyl alcohol.

ANTIBIOTICS

All patients in preterm labor are considered at high risk for neonatal GBS sepsis and should receive prophylactic antibiotics regardless of culture status.

CDC Advises Screening All Pregnant Women for Group B Strep 35-37weeks.

The goal of this strategy is to prevent neonatal sepsis, and not to prevent preterm birth.

In cases of subclinical chorioamnionitis, determination of CRP is useful.

Value < 0.9 mg/dl- continue expectant management.

Value between 0.9-1.6- repeat in 12-24 hrs depending on clinical situation.

Value of 3-4 mg/dl-almost certainly indicative of infection.

WHO PRETERM BIRTH GUIDELINES (AUG 2015) MANAGEMENT OF WOMEN IN PRETERM LABOUR AND MANAGEMENT OF PRETERM NEWBORN

Recommendation for mother:

* Use of antenatal corticosteroids
* Use of tocolytics
* Use of magnesium sulfate for neuroprotection
* Antibiotic prophylaxis
* Plan optimal mode of birth

Strong recommendation for dose of antenatal corticosteroid indicated for women at risk of preterm labour from 24 weeks to 34 weeks of gestation when the following conditions are met:

* Accurately calculated gestational age
* Where preterm delivery is found to be imminent
* There should be no clinical evidence of maternal infection
* Adequate neonatal care is available

OTHER RECOMMENDATIONS

Conditional Recommendation

- Tocolysis (acute and maintenance treatments) are not advised for the purpose of improving newborn outcomes
- Routine mode of delivery by lower segment caesarean section is not advised, regardless of cephalic or breech presentation

Strong Recommendation

- As a neuroprotection magnesium sulfate is recommended before 32 weeks of gestation for prevention of cerebral palsy in the infant and child
- Antibiotic administration is advised for women with preterm prelabour rupture of membranes
- Antibiotic administration is not recommended for women in preterm labour with intact amniotic membranes and no clinical signs of infection .

MAGNESIUM SULFATE FOR NEUROPROTECTION (NICE **GUIDELINES PUBLISHED: 20 NOVEMBER 2015**)

- Offer intravenous magnesium sulfate for neuroprotection of the baby to women between 24 and 29 weeks of pregnancy who are : in established preterm labour or having a planned preterm birth within 24 hours consider intravenous magnesium sulfate for

neuroprotection of the baby for women between 30 and 33 weeks of pregnancy who are: in established preterm labour or having a planned preterm birth within 24 hours. Give a 4 g intravenous bolus of magnesium sulfate over 15 minutes, followed by an intravenous infusion of 1g per hour until the birth or for 24 hours. For women on magnesium sulfate, monitor for clinical signs of magnesium toxicity at least every 4 hours by recording pulse, blood pressure, respiratory rate and deep tendon (for example, patellar) reflexes. If a woman has or develops oliguria or other signs of renal failure: monitor more frequently for magnesium toxicity think about reducing the dose of magnesium sulfate.

REVIEW OF LITERATURE

1. Andrews et al., Goldenberg et al., 2000

They conducted a study which showed that asymptomatic upper genital tract infection plays a major role in the pathophysiology of early spontaneous preterm births, but a minority of near term preterm births showed relationship between genital tract microbial infection and spontaneous preterm birth. The study also showed that the availability and usefulness of markers to identify women with microbial genital infections, and the results of recent prospective clinical trials of antibiotic therapy to prevent preterm birth.

2. **Goldenberg et al 2002**

He showed that of all births of United States 11 percent were of preterm and the resultant neonates are responsible for the majority of perinatal mortality and morbidity. There is recent evidence suggesting that the major part of these preterm births are caused by bacterial infections of the chorioamnion, with the ascending infection of the vagina. The mechanism leading to preterm labour and membrane rupture involves an inflammatory response leading to increased production of cytokines, prostaglandins, and metalloproteases..

3. Romero et al 2002

A study was conducted by Romero et al in which he showed the role of infection in premature birth. He had discussed about the pathways

of ascending infection, microbiology, and the frequency of intra-amniotic infection in leading to premature delivery, the effect of antibiotic administration and the perinatal outcome in patients with preterm labour and intact membranes, preterm premature rupture of membranes, , Group B streptococcus and genital mycoplasmas of the lower genital tract, asymptomatic bacteriuria and bacterial vaginosis was discussed in his study.

4. Baldwinea et al 2015

Showed that the leading cause of preterm labour is in prelabour Premature Rupture of Membranes (PPROM) that too due to subclinical infection, since a huge proportion of PPROM patients are with chorioamnionitis. Dysbiosis facilitates the subclinical infections. The vaginal microbes in amniotic fluid was characterised in PPROM.

5. **Veleminsky et al 2008**

He conducted a study in 152 women and he has showed that infections are one of the most frequent causes of preterm delivery and premature rupture of membranes and showed that the ecosystem of vagina contributes to preterm delivery. Intra – amniotic infection was found to be a risk factor for Premature rupture of membranes (PROM) and preterm premature rupture of membranes (PPROM) and also contributes to the perinatal morbidity and mortality of newborn.

6. Donate et al 2010

He performed a study for the knowledge of vaginal microbiology. He studied that the vaginal microflora of a healthy asymptomatic woman consists of a wide variety of anaerobic and aerobic bacteria. It was dominated by the facultative, microaerophilic, anaerobic genus Lactobacillus. The Lactobacillus is needed to protect women from genital infections and to maintain the pH balance of the vaginal flora. He made evident that associate abnormalities in vaginal flora lead to preterm labour and the neonates born too soon were with potential neonatal sequelae and poor perinatal outcome.

7. Varma et al 2006

Varma et al had performed a study and has showed that there is an association between genital tract infections, such as bacterial vaginosis (BV), and preterm delivery (PTD) with premature delivery but meta-analyses have been performed to show that screening and treating bacterial vaginosis in pregnancy does not prevent premature delivery. So it caused doubt on the cause and effect relationship between the both. However, the analyses gave reports of significant clinical heterogeneity, methodological heterogeneity and statistical heterogeneity of the included studies. So again he undertook a repeat meta-analysis, included published his trials, and applied strict criteria on data extraction. His meta-analysis report was that found that screening and treating genital infections in low risk pregnancies produced a statistically significant reduction in

spontaneous preterm birth (RR 0.73; 95% CI 0.55-0.98). But this beneficial effect was not seen in high-risk groups. There was a difference in antibiotic sensitivity between high and low risk groups and it suggested different causes of the infectious process to preterm labour. This evidence, and with the prior knowledge of different predisposing factors and prognosis between these risk groups, supports the fact that Preterm labour in high and low risk pregnant women are different entities and related to infectious cause .

8. Petit et al 2012

He performed a trial to show the relationship of infection with preterm labour.. The ascending route of infection is the foremost route .The ascending rout of infection showed four stages : cervical and vaginal infection, chorio-decidual infection, intra-amniotic infection, fetal infection. The intrauterine infection is usual in case of early preterm birth leading to an increase in neurological and pulmonary morbidity. Mycoplasma is commonly seen, Escherichia coli, Gardnerella vaginalis and streptococcus B were also isolated. He has given few markers of the infection a maternal leucocytosis greater than 15,000/mm,, a C-Reactive Protein greater than 20mg/l, raised fibronectin levels and/or Interleukin-6 , short cervix particularly before 32 weeks of gestation, leucocytosis of liquor, and/or raised interleukin levels in liquor. The major marker for the newborn is the CRP, but interleukin 6 can also be used for an early diagnosis of an infection.

9. Goncalves et al 2002

In his study he had showed that the intrauterine infections are contributing as a cause of premature labour the microbial products induce inflammatory response in fetus and has elicited that it leads to the impending onset of preterm labor and higher rate of perinatal morbidity. The most common microorganisms involved in the intra amniotic infections are Ureaplasma urealyticum, Fusobacterium species and Mycoplasma hominis.

10. Paulo cesar giraldo et al 2012

He and his peers in his trials showed genitourinary infections in pregnancy are an important cause of preterm labour so preventative measures must be considered during the prenatal period. In his study, the highest rate of vaginal infection was observed in the the preterm group was 53.0%.The full term group showed 49.3%; the rate of infection. Trichomoniasis was also associated with genital infection; however, in the present study, its presence was insignificant, and only one (01) case was identified in each group.

MATERIALS AND METHODS

TYPE OF STUDY

Case control study

PERIOD OF STUDY

APRIL 2016- SEPTEMBER 2016

PLACE OF STUDY

AN OPD, Labour ward &AN Ward

Dept of Obstetrics & Gynaecology

Govt Kilpauk Medical College &Hospital, Chennai

SAMPLE SIZE

Sample size was determined based on a case control study on correlation between genitourinary infection and preterm labour authored by Udaykumar M Patel et al, published in NJMR │Volume 5 │Issue 1 │Jan – March 2015

DESCRIPTION

* The confidence level is estimated at 95%

* with a z value of 1.96

* the confidence interval or margin of error is estimated at +/-10

* Assuming that 40 percent of the sample will have the specified attribute p% =40.00 and q%=60.00

$$n = p\% \times q\% \times [z/e\%]^2$$

$$n = 40 \times 60 \times [1.96/5]^2$$

$$n = 92.19$$

ASSUMING THAT 80 PERCENT AS POWER OF THE STUDY, MINIMUM SAMPLE SIZE REQUIRED FOR THE STUDY WAS CALCULATED TO BE 92

In our study we have taken 100 as sample size (n=50 in preterm group and n=50 in term group)

METHODOLOGY

After clearance from the hospital ethics committee, this case–control study was undertaken in the Department of Obstetrics and Gynaecology at Kilpauk Medical College and Hospital Chennai from April 2016 to September 2016. Written informed consent was obtained from the women explaining it to them in their language they best understand. Minimum sample size of women with 7 % prevalence of genito urinary infections among antenatal cases not having preterm labor and 30 % prevalence of genito urinary infections among antenatal cases in preterm labor, with a confidence limit of 95 % and a power of 80 was

calculated to be 52 in each group using SPS statistical software package (version 17).

Inclusion criteria: Only women with singleton pregnancy were included in this study. Case group I included the antenatal patients who was admitted in the labor ward with threatened preterm labor and in preterm labor with or without rupture of membranes after 28 weeks and before 37 completed weeks of gestation. Control group II consisted of antenatal women visiting antenatal Outpatient department of the hospital for routine antenatal check-up at completed or more than 37 weeks of gestation with or without history of preterm labor and matched to the case group with respect to age(teenage pregnancy, pregnancy at 20–30 years, and pregnancy after 30 years) and parity (primigravida or multigravida).

Exclusion criteria: Women with twin pregnancy or higher-order pregnancy, and women with antepartum hemorrhage were excluded from the study. Preterm labor was documented according to ACOG criteria (1997) as four uterine contractions in 20 min or eight in 60 min plus progressive change in the cervix; cervical dilatation greater than 1 cm; and cervical effacement 80 % or greater at gestation 37 completed weeks. Threatened preterm labor was described as four uterine contractions in 20 min or eight in 60 min plus cervical dilatation less than 1 cm; and cervical effacement less than 80%. Leaking, i.e., rupture of membranes was diagnosed by per speculum examination and confirmed by litmus paper

(change of colour from red to blue). All women were evaluated by detailed history compiled with special emphasis on previous history of preterm labor, previous bad obstetric history and urogenital infections. Gestational age was calculated from date of last menstrual period using Naegeles formula or by first ultrasound in the first trimester of pregnancy. All women underwent general physical, systemic, and obstetrical examinations. Samples from posterior fornix of vagina were taken with two sterilized swabs under direct vision using Cusco/Sims speculum before first vaginal examination and were studied for gram stain characteristics and culture-sensitivity by standard methods. Mid stream urine sample was sent for cytology and culture-sensitivity. Sample for aerobic culture sensitivity was sent immediately to the Microbiology Department of the hospital and taking all aseptic precautions; these samples were inoculated on blood agar and MacConkey's agar using semi-quantitative method of inoculation. The culture plates were incubated at 37 degree Celcius for a duration ranging from 24 to 48 hours. Isolates were identified by standard methods.

Women admitted with preterm labor were put on tocolytics (where required), or steroids therapy (\34 weeks of gestation), and antibiotics (cephalosporins) were started in women with ruptured membranes. Reports of the urine and high vaginal swab cultures were collected and recorded. Antibiotic therapy was started or changed according to the sensitivity reports. Data collected were tabulated and analysed,

Groups

Groups	Definition of Subjects	Number
Cases	Women with preterm labor i.e. Uterine contractions occurring at a frequency of 4 in 20 min or 8 in 60 min with cervical changes effacement more than or equal to 80% and cervical dilatation > 1 cm in women with intact membranes or with rupture of membranes	50
controls	Healthy pregnant women of gestational age completed or at 37 weeks with no history of preterm labour and matched to cases group with respect to age and parity	50

Null Hypothesis

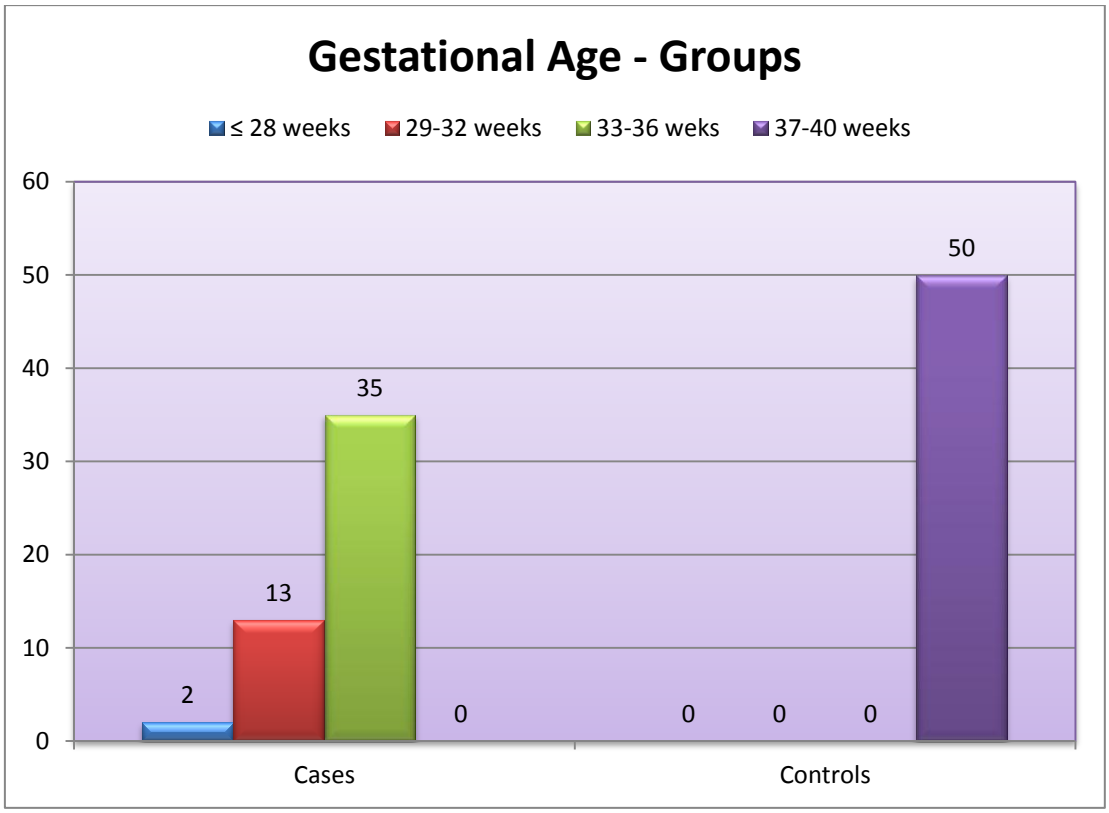
Null Hypothesis : H0	Cases group equal in effect compared to Control group
Alternate Hypothesis : H1	Cases group hazardous in effect compared to Control group

DATA ANALYSIS

Descriptive statistics was done for all data and were reported in terms of mean values and percentages. Suitable statistical tests of comparison were done. Continuous variables were analysed with the unpaired t test... Categorical variables were analysed with the Chi-Square Test and Fisher Exact Test. Statistical significance was taken as $P < 0.05$. The data was analysed using SPSS version 16 and Microsoft Excel 2007.

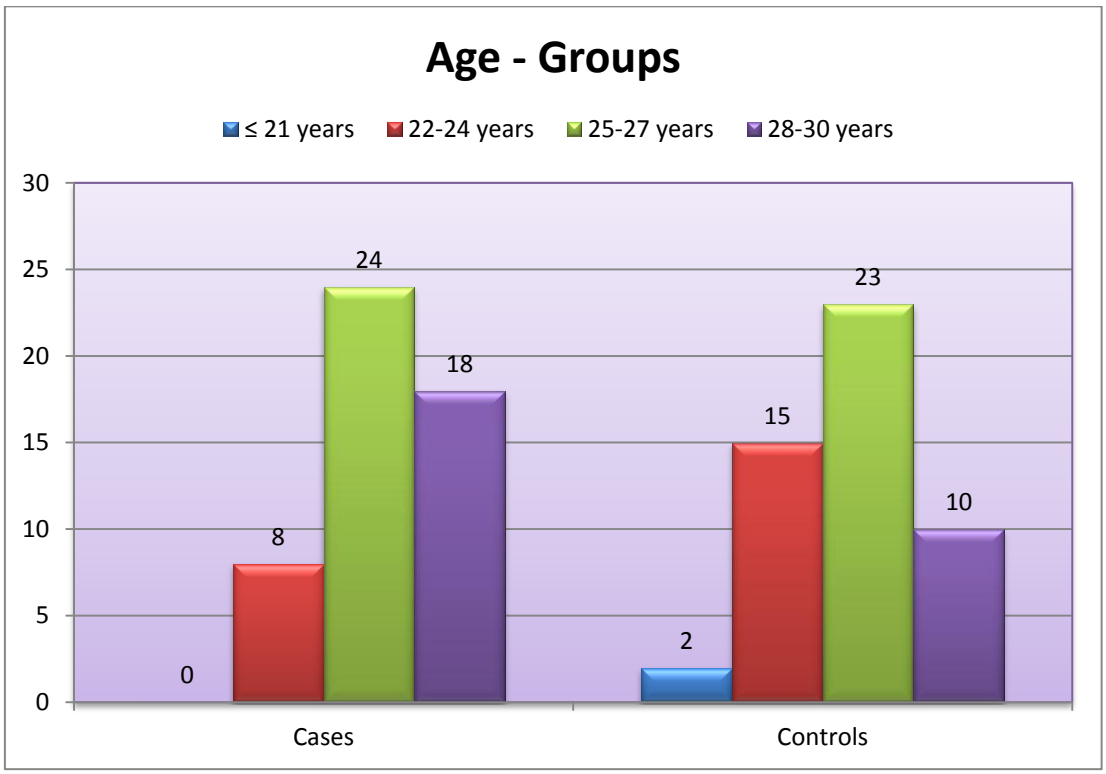
STATISTICS

Gestational Age

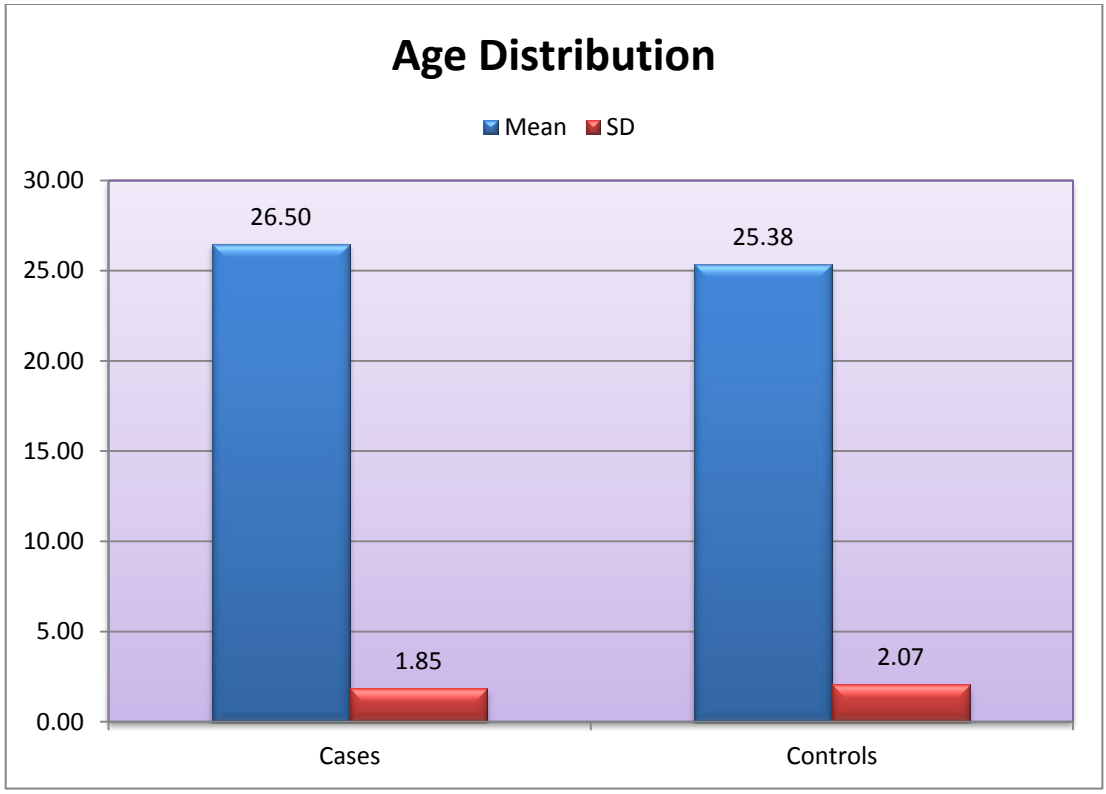


Gestational Age - Groups	Cases	Controls	Cases %	Control %
≤ 28 weeks	2	0	4.00	0.00
29-32 weeks	13	0	26.00	0.00
33-36 weeks	35	0	70.00	0.00
37-40 weeks	0	50	0.00	100.00
Total	50	50	100	100

Age

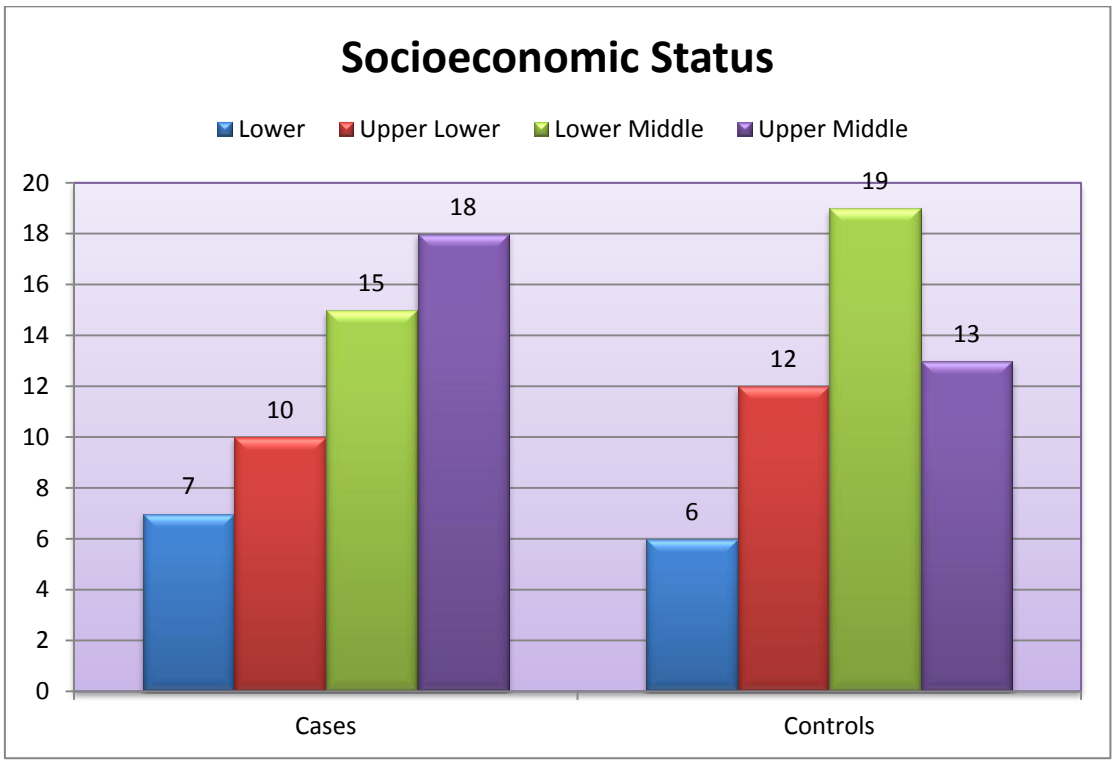


Age - Groups	Cases	Controls	Cases %	Control %
≤ 21 years	0	2	0.00	4.00
22-24 years	8	15	16.00	30.00
25-27 years	24	23	48.00	46.00
28-30 years	18	10	36.00	20.00
Total	50	50	100	100



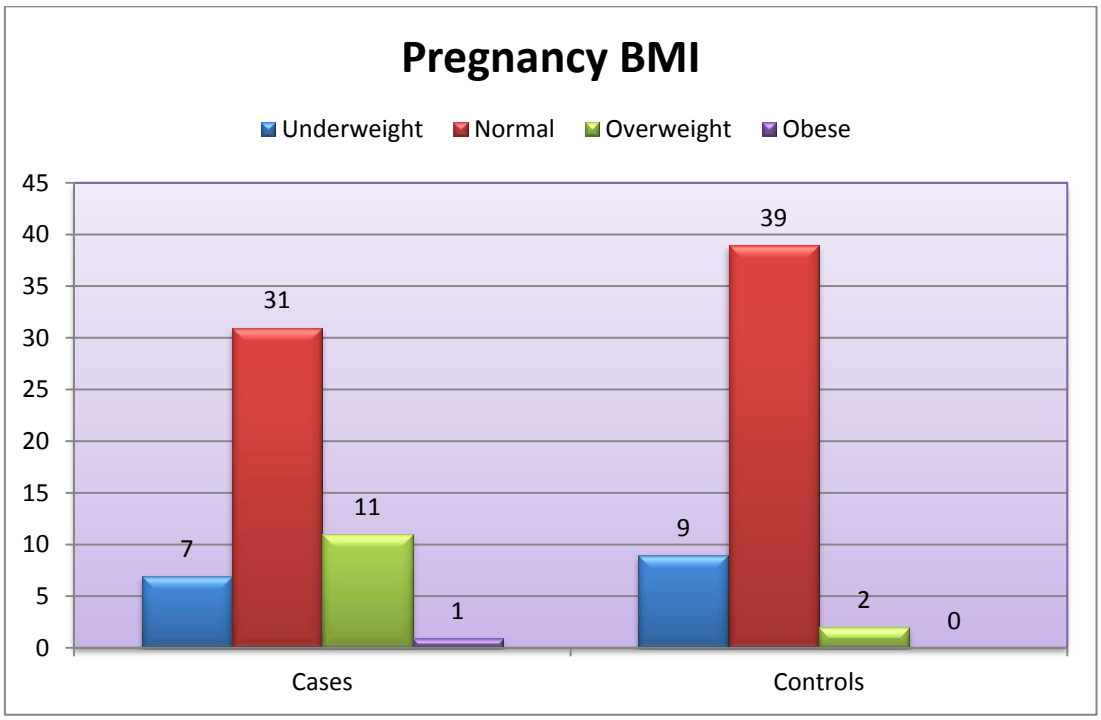
Age Distribution	Cases	Controls
Mean	26.50	25.38
SD	1.85	2.07
P value **Unpaired t Test**		0.1153

Socioeconomic Status



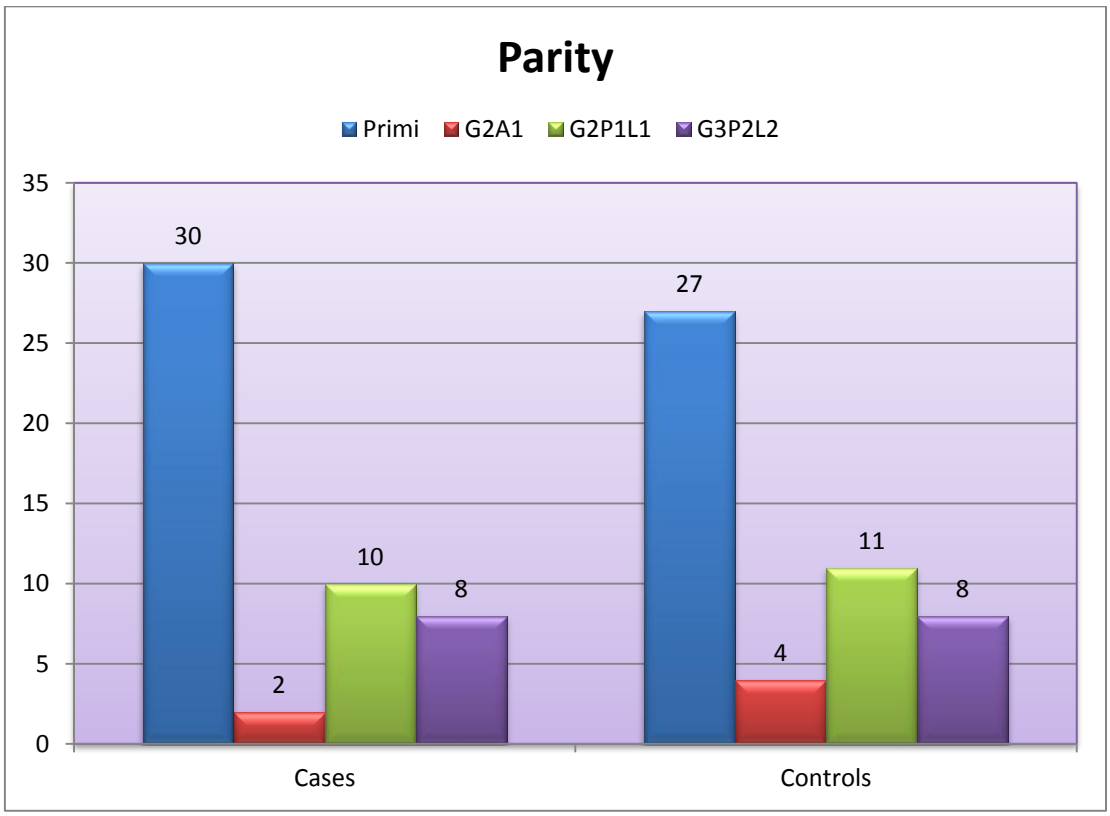
Socioeconomic Status	Cases	Controls	Cases %	Control %
Lower	7	6	14.00	12.00
Upper Lower	10	12	20.00	24.00
Lower Middle	15	19	30.00	38.00
Upper Middle	18	13	36.00	26.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.6805	

BMI



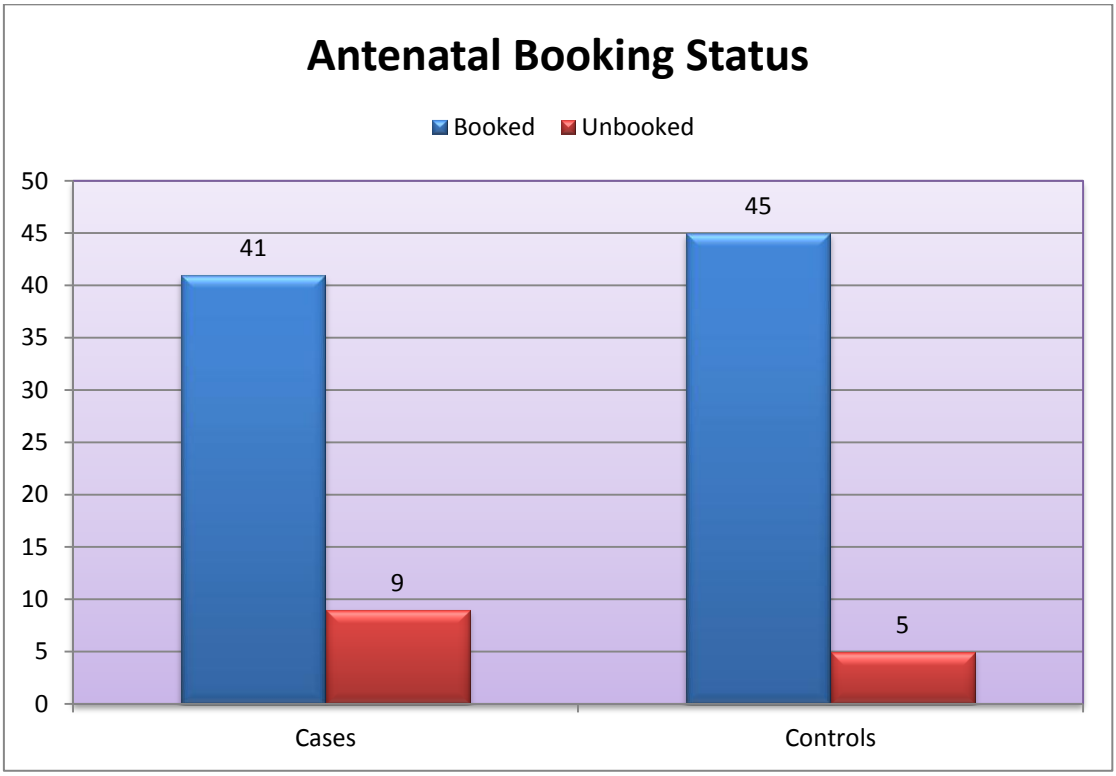
Pregnancy BMI	Cases	Controls	Cases %	Control %
Underweight	7	9	14.00	18.00
Normal	31	39	62.00	78.00
Overweight	11	2	22.00	4.00
Obese	1	0	2.00	0.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.0297	

Parity



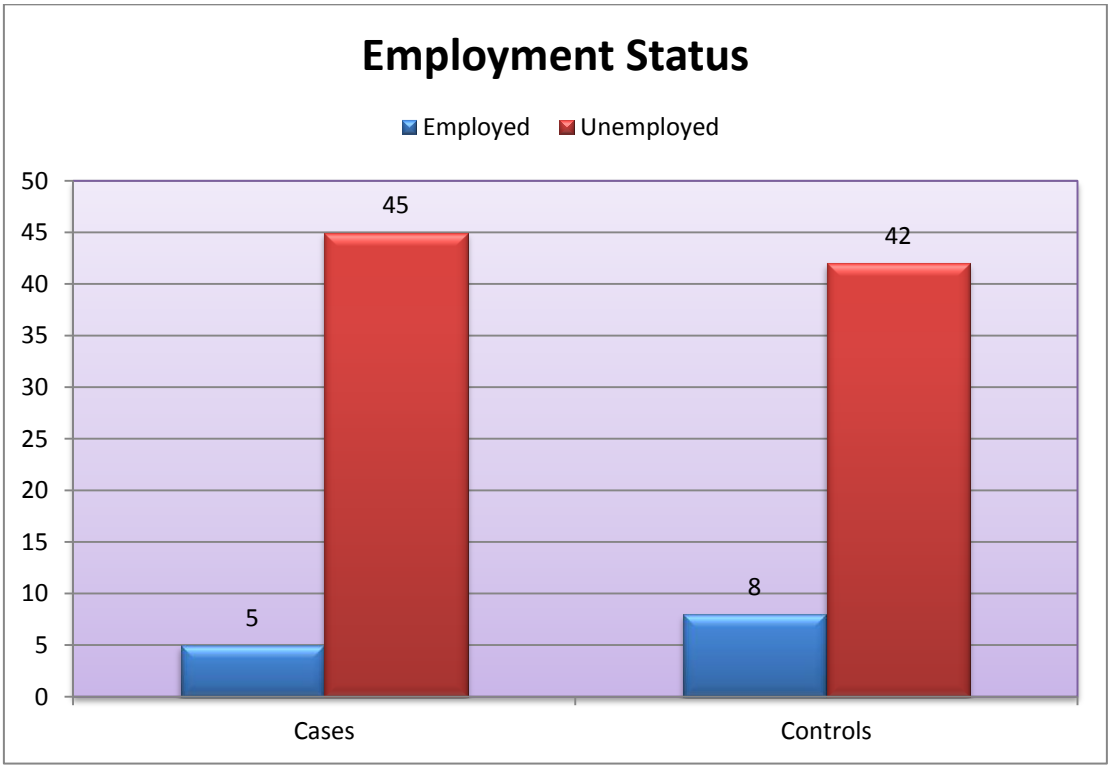
Parity	Cases	Controls	Cases %	Control %
Primi	30	27	60.00	54.00
G2A1	2	4	4.00	8.00
G2P1L1	10	11	20.00	22.00
G3P2L2	8	8	16.00	16.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.8556	

Antenatal Booking Status



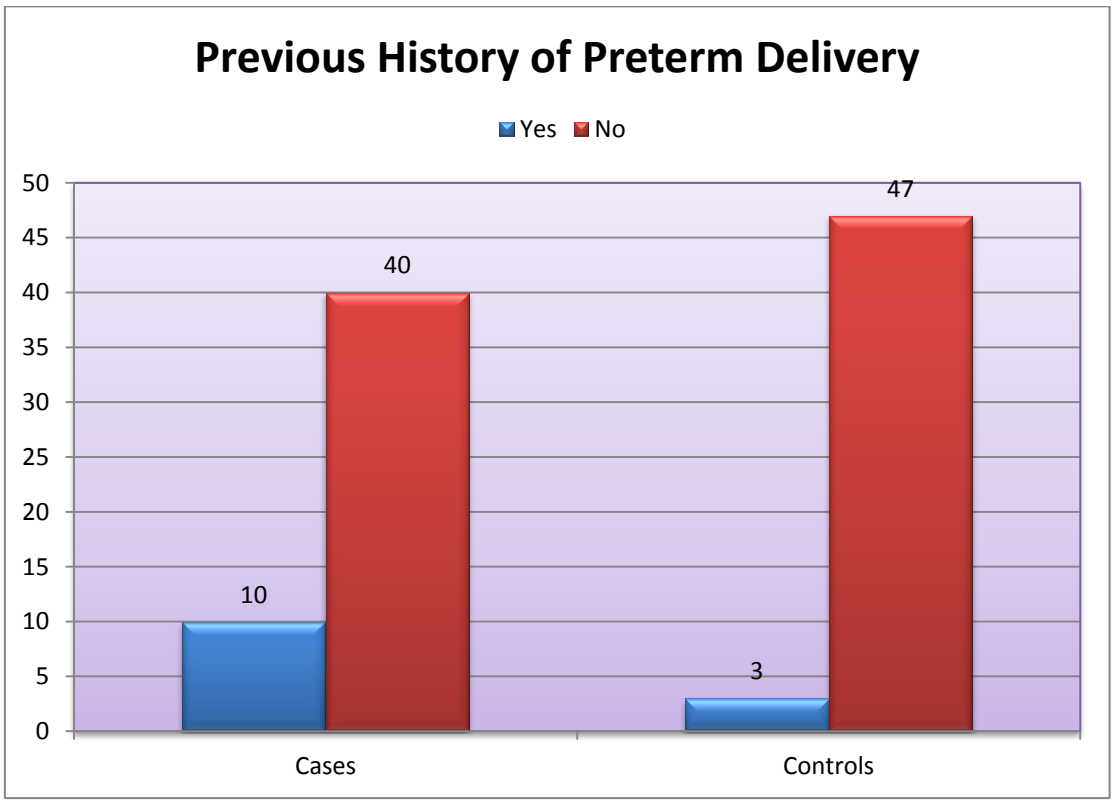
Antenatal Booking Status	Cases	Controls	Cases %	Control %
Booked	41	45	82.00	90.00
Unbooked	9	5	18.00	10.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.2679	

Employment Status



Employment Status	Cases	Controls	Cases %	Control %
Employed	5	8	10.00	16.00
Unemployed	45	42	90.00	84.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.3936	

Previous History of Preterm Delivery



Previous History of Preterm Delivery	Cases	Controls	Cases %	Control %
Yes	10	3	20.00	6.00
No	40	47	80.00	94.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.0411	

PREVIOUS HISTORY OF PRETERM DELIVERY

Single Table Analysis

		Disease (+)	Disease (-)	
Exposure	(+)	10	3	13
		76.9%	23.1%	100%
		20%	6%	
	(-)	40	47	87
		46%	54%	100%
		80%	94%	
		50	50	100
		50%	50%	100%
		100%	100%	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	4.332	0.01870	0.03739
Yates corrected chi square	3.183	0.03721	0.07442
Mantel-Haenszel chi square	4.289	0.01918	0.03836
Fisher exact		0.03565	0.07131
Mid-P exact		0.02150	0.04299

All expected values (row total*column total/grand total) are >=5

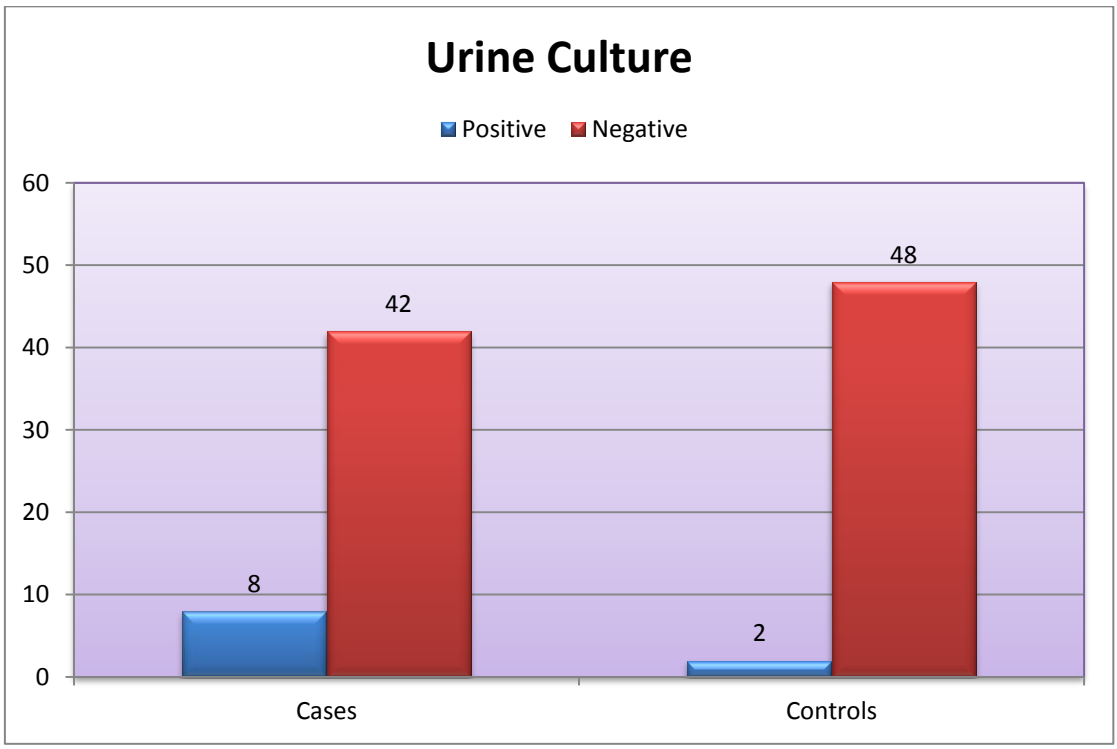
Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in Exposed	76.92%	49.06, 92.5	Taylor series
Risk in Unexposed	45.98%	35.9, 56.4	Taylor series
Overall Risk	50%	40.38, 59.62	Taylor series
Risk Ratio	1.673	1.15, 2.434[1]	Taylor series
Risk Difference	30.95%	5.764, 56.13°	Taylor series
Etiologic fraction in pop.(EFp)	8.046%	0.1977, 15.89	
Etiologic fraction in exposed(EFe)	40.23%	13.05, 58.91	

Odds-Based Estimates and Confidence Limits

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
CMLE Odds Ratio*	3.866	1.04, 18.52[1]	Mid-P Exact
		0.912, 23.36[1]	Fisher Exact
Odds Ratio	3.917	1.008, 15.22[1]	Taylor series
Etiologic fraction in pop.(EFp|OR)	14.89%	1.679, 28.11	
Etiologic fraction in exposed(EFe|OR)	74.47%	0.7939, 93.43	

Urine Culture



Urine Culture	Cases	Controls	Cases %	Control %
Positive	8	2	16.00	4.00
Negative	42	48	84.00	96.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.0437	

x 2 Table Statistics

Urine culture

Single Table Analysis

		Disease (+)	Disease (-)	
Exposure	(+)	8	2	10
		80%	20%	100%
		16%	4%	
	(-)	42	48	90
		46.7%	53.3%	100%
		84%	96%	
		50	50	100
		50%	50%	100%
		100%	100%	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value(2-tail)
Uncorrected chi square	4	0.02275	0.04550
Yates corrected chi square	2.778	0.04780	0.09560
Mantel-Haenszel chi square	3.96	0.02330	0.04660
Fisher exact		0.04582	0.09165
Mid-P exact		0.02683	0.05365

All expected values (row total*column total/grand total) are >=5

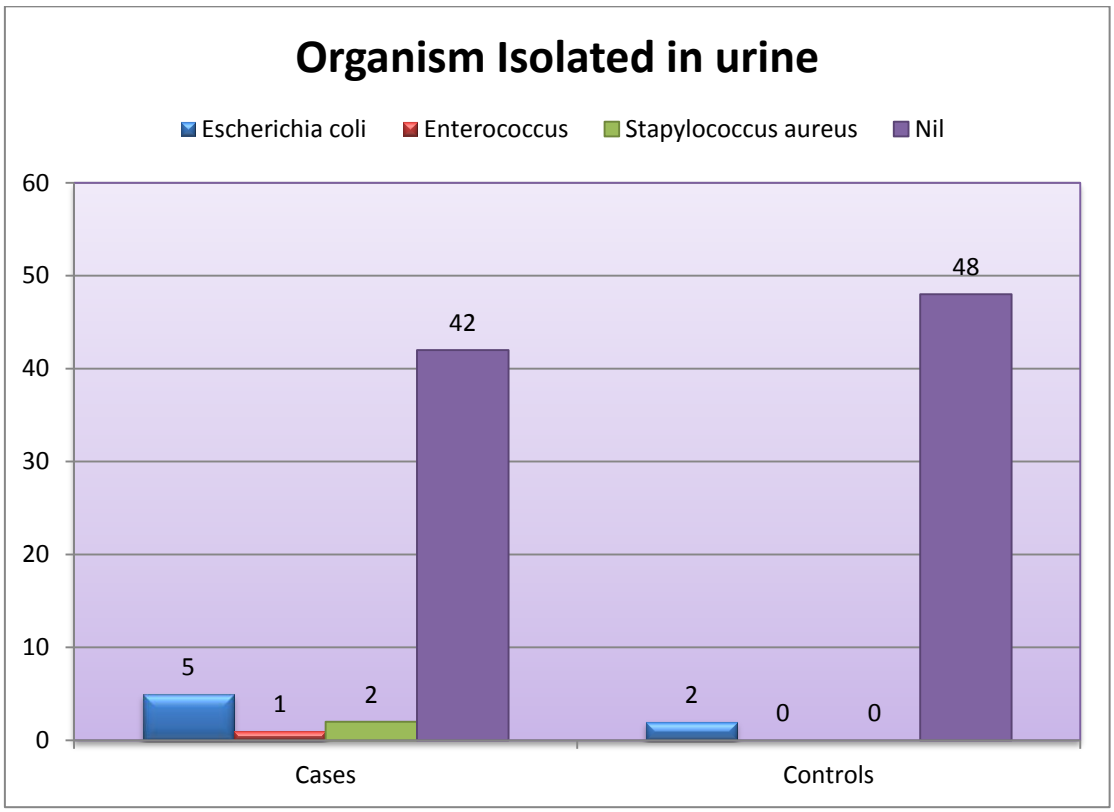
Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in Exposed	80%	47.94, 95.41	Taylor series
Risk in Unexposed	46.67%	36.71, 56.9	Taylor series
Overall Risk	50%	40.38, 59.62	Taylor series
Risk Ratio	1.714	1.172, 2.508[1]	Taylor series
Risk Difference	33.33%	6.486, 60.18°	Taylor series
Etiologic fraction in pop.(EFp)	6.667%	-0.09164, 13.42	
Etiologic fraction in exposed(EFe)	41.67%	14.66, 60.13	

Odds-Based Estimates and Confidence Limits

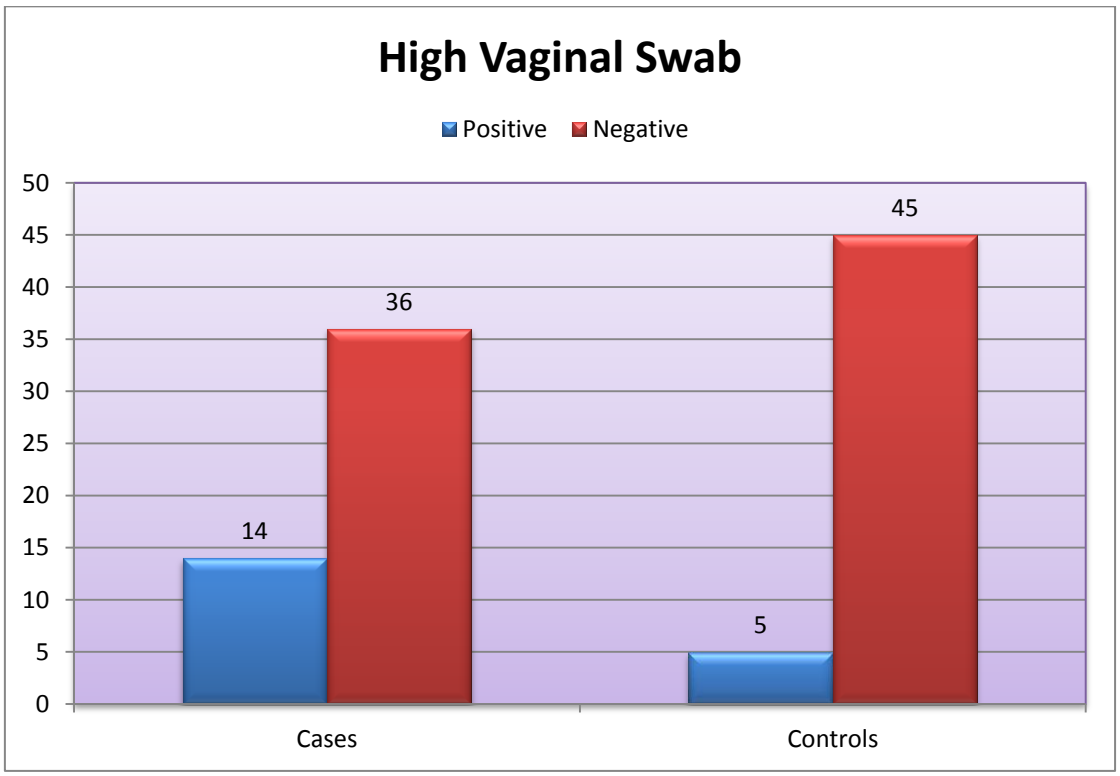
Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
CMLE Odds Ratio*	4.509	0.9791, 32.57[1]	Mid-P Exact
		0.8356, 45.89[1]	Fisher Exact
Odds Ratio	4.571	0.9195, 22.73[1]	Taylor series
Etiologic fraction in pop.(EFp|OR)	12.5%	0.8152, 24.18	
Etiologic fraction in exposed(EFe|OR)	78.13%	-8.758, 95.6	

Organism Isolated in urine



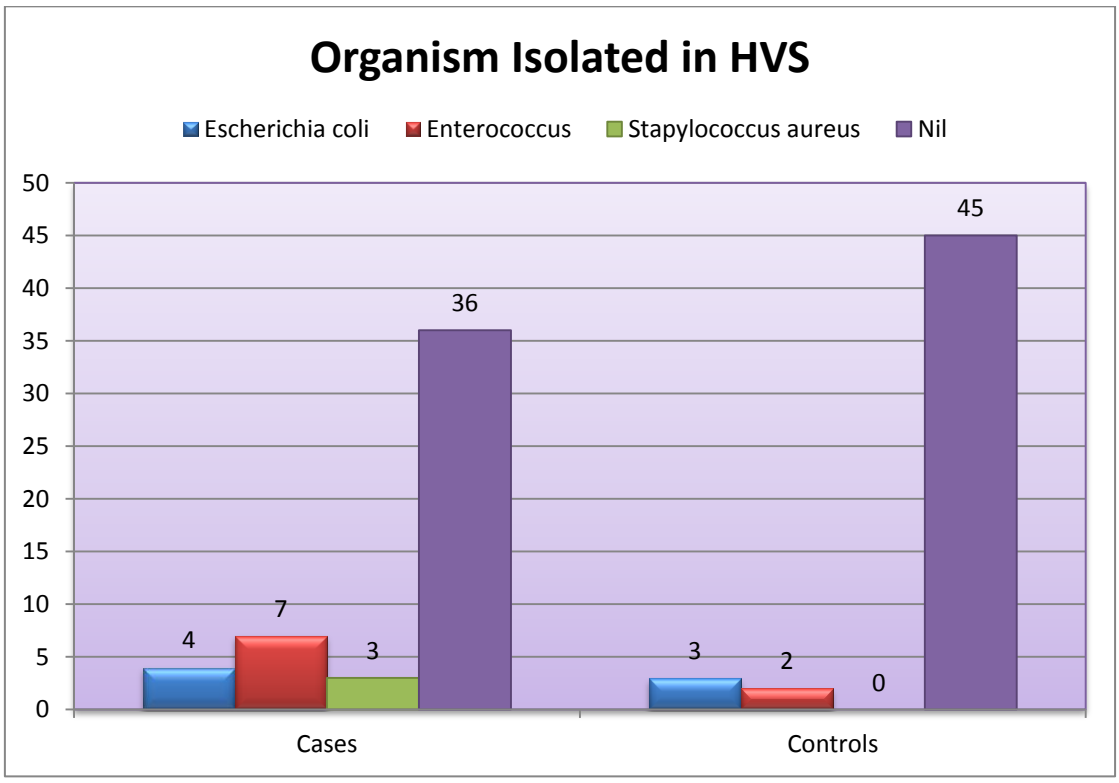
Organism Isolated in urine	Cases	Controls	Cases %	Control %	P value Fishers Exact Test
Escherichia coli	5	2	10.00	4.00	0.2739
Enterococcus	1	0	2.00	0.00	0.5000
Stapylococcus aureus	2	0	4.00	0.00	0.2475
Nil	42	48	84.00	96.00	
Total	50	50	100	100	

High Vaginal Swab



High Vaginal Swab	Cases	Controls	Cases %	Control %
Positive	14	5	28.00	10.00
Negative	36	45	72.00	90.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.0245	

Organism Isolated in HVS



Organism Isolated in HVS	Cases	Controls	Cases %	Control %	P value Fishers Exact Test
Escherichia coli	4	3	8.00	6.00	0.7180
Enterococcus	7	2	14.00	4.00	0.0952
Stapylococcus aureus	3	0	6.00	0.00	0.1212
Nil	36	45	72.00	90.00	
Total	50	50	100	100	

HIGH VAGINAL SWAB

Single Table Analysis

		Disease (+)	Disease (-)	
Exposure	(+)	14	5	19
		73.7%	26.3%	100%
		28%	10%	
	(-)	36	45	81
		44.4%	55.6%	100%
		72%	90%	
		50	50	100
		50%	50%	100%
		100%	100%	

Chi Square and Exact Measures of Association

Test	Value	p-value(1-tail)	p-value (2-tail)
Uncorrected chi square	5.263	0.01089	0.02178
Yates corrected chi square	4.159	0.02071	0.04143
Mantel-Haenszel chi square	5.211	0.01123	0.02245
Fisher exact		0.01976	0.03952
Mid-P exact		0.01225	0.02450

All expected values (row total*column total/grand total) are >=5

OK to use chi square.

Risk-Based* Estimates and 95% Confidence Intervals

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
Risk in Exposed	73.68%	50.86, 88.55	Taylor series
Risk in Unexposed	44.44%	34.12, 55.27	Taylor series
Overall Risk	50%	40.38, 59.62	Taylor series
Risk Ratio	1.658	1.154, 2.382[1]	Taylor series
Risk Difference	29.24%	6.677, 51.8°	Taylor series
Etiologic fraction in pop.(EFp)	11.11%	1.241, 20.98	
Etiologic fraction in exposed(EFe)	39.68%	13.32, 58.03	

Odds-Based Estimates and Confidence Limits

Point Estimates		Confidence Limits	
Type	**Value**	**Lower, Upper**	**Type**
CMLE Odds Ratio*	3.457	1.164, 11.61[1]	Mid-P Exact
		1.051, 13.45[1]	Fisher Exact
Odds Ratio	3.5	1.152, 10.63[1]	Taylor series
Etiologic fraction in pop.(EFp|OR)	20%	4.321, 35.68	
Etiologic fraction in exposed(EFe|OR)	71.43%	13.21, 90.59	

Single Table Analysis

		Disease (+)	Disease (-)	
Exposure	(+)	14	5	19
		73.7%	26.3%	100%
		28%	10%	
	(-)	36	45	81
		44.4%	55.6%	100%
		72%	90%	
		50	50	100
		50%	50%	100%
		100%	100%	

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OK to use chi square.

Risk-Based* Estimates and 95% Confidence Intervals

(Not valid for Case-Control studies)

Point Estimates		Confidence Limits	
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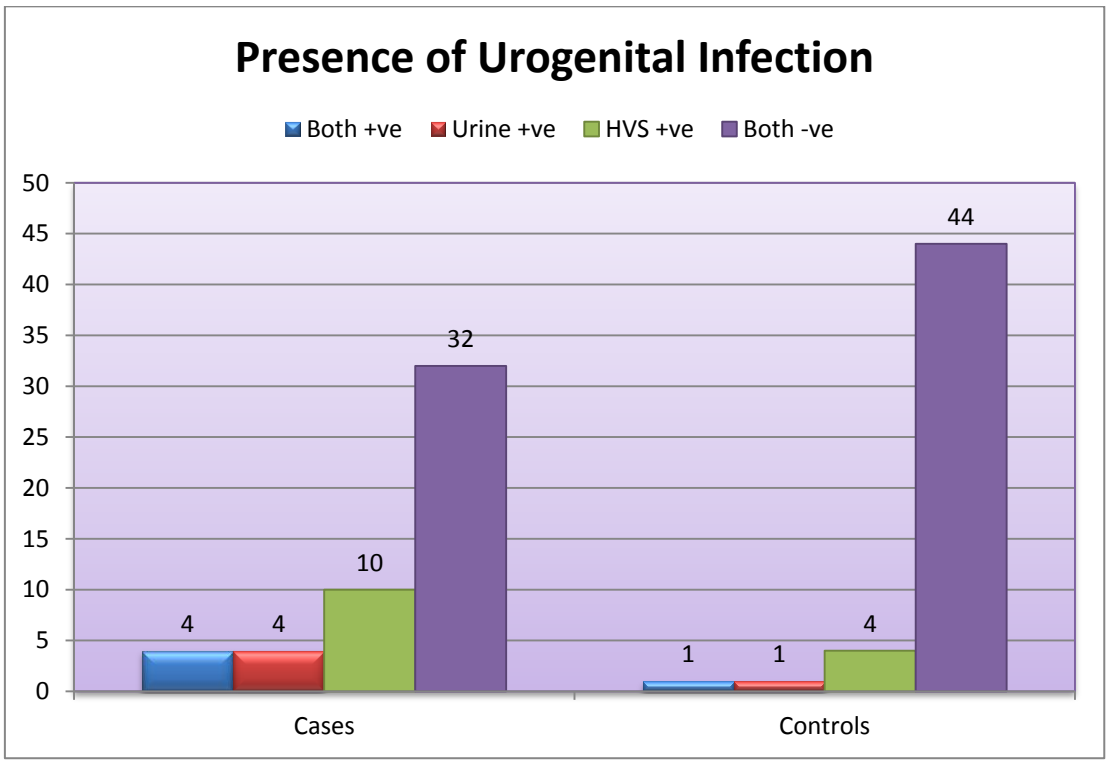
Presence of Urogenital Infection



Presence of Urogenital Infection	Cases	Controls	Cases %	Control %
Both +ve	4	1	8.00	2.00
Urine +ve / HVS -ve	4	1	8.00	2.00
Urine -ve / HVS +ve	10	4	20.00	8.00
Both -ve	32	44	64.00	88.00
Total	50	50	100	100
P value **Fishers Exact Test**			0.0425	

RESULTS AND DISCUSSION

In my study, of the case group 50 women were in 21–30 years of age group and no woman in <21 yrs 60% (30/50) of these were primigravida, multiparous 36% (18/50) and women with previous one abortion is 4% (2/50). In control group of 50 women 48 belonged to 21 to 30 yrs age group and 2 of 50 <21 years of age. The control group contained 54% (27/50) of prime gravida, 38% (19/50) were multigravida and 8% (4/50) with previous one abortion, there was no statistically significant difference in relation to age distribution between cases group (mean=26.50, SD=1.85) and control group (mean=25.38, SD=2.07) with a p value of <0.05 as per unpaired t test. And also no statistically significant difference in relation to parity status between cases group (majority primi – 60.00%) and control group majority primi – 54.00% with a p value of <0.05 as per Fishers exact test. Therefore we fail to reject the null hypothesis that there is no difference in age distribution between the study groups. Case group has 9 unbooked women compared with control group which was statistically insignificant (P 0.2679). There was no statistical difference (P 0.6805) in the socioeconomic status of the two groups. In the case group 33 women and in control group 32 women belonged to upper middle and lower middle class of socioeconomic scale. 7 women in my study were of lower socioeconomic class. No Statistical significance of age, parity, booking status and employment status was not noted in my study.

There is a statistically significant difference in relation to pregnancy BMI status between cases group (majority normal pregnancy BMI – (62.00%) and control group (majority normal pregnancy BMI – 78.00%) with a p value of <0.05 as per Fishers exact test. Therefore we reject the null hypothesis that there is no difference in pre pregnancy BMI status between the study groups.

The incidence of overweight and obese category of pre pregnancy BMI was significantly more in cases group compared to control group by a percentage difference of 20.00 percentage points (83% higher). This difference is significant with a p-value of 0.0297 as per Fisher's exact test. My observation is similar to the results of Cnattinqius et al.

Past history of preterm labor or abortion in previous pregnancy was seen in 20.1%) multigravida in Case group compared with 6.22% in Control group showing a significant association with p value of 0.0411 of the past history of abortion or preterm labor and the women going into preterm labor in the present pregnancy. Pandey et al., also reported that past history of preterm births was a significant contributory factor for preterm labor.

In a study by Chhabra and Patil, 14% of women with PTL had urine infection and 28% had cervical colonization. My preterm group showed urinary tract infection in 16% and genital tract infection in 28%, while 4 women had both cultures positive which is comparable to the observations by Chhabra and Patil. Commonest microorganism isolated

in urine culture was E coli. and that in high vaginal swab was Enterococcus fecalis. In control group, urinary tract infection was seen in 4%, positive high vaginal swab culture in 10% and both in 2.1 % women.

In the case group, overall urinary tract infection was detected in 16.38% (8/50) which was 3.3 times more than that in the control group (5.77%, 2/50). This shows that women in preterm labor had 3.3 times more incidence of urinary tract infection than their counterparts with term pregnancy. My observations are similar to the results of Pandey et al. who reported urinary tract infection in 20.34 % of women in preterm labor and those of McPheeters et al. who reported 17.1% of urinary tract infection in women with preterm labor and 10.9% in women without preterm labor. In my study, positive high vaginal swab cultures were noted in 28.00% (14/50) in the Case Group and 10.38% (5/50) in Control Group. Lajos et al., reported the prevalence of endocervical colonization to be 14.20% in preterm labor or premature of membranes similar to that of this study.

CONCLUSION

I conclude that, in my study, that patients with high vaginal swab positivity are associated with a significant increase in the incidence of preterm labour. In other words vaginal infection was 2.80 times more in women with preterm labor compared to those in control group. And urinary infection is 4 times higher in women with preterm labour compared to those in control group, which indicates a significant association of urogenital infections in preterm labor. Urogenital infections contribute significantly to the preventable causes of preterm labor. We recommend that women coming for first antenatal check-up should be investigated for the presence of asymptomatic genitourinary infections. Making early diagnosis of urogenital infections and treating them adequately with the antimicrobials will go a long way in decreasing the incidence of preterm labour, preterm births and associated neonatal and maternal morbidities.

BIBLIOGRAPHY

1. Birwa M, Rajput M, Sac deva S. Modified Kuppuswamy's socioeconomic scale: social researcher should include updated income criteria, 2012. Indian J Community Med. 2013; 38(3): 185–6.

2. Beck S, Wojdyla D, Say L, et al. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. Bull World Health Organ. 2010;88:31.

3. Bamshad M. Genetic influences on health: Does race matter. JAMA. 2005;294:937–946

4. Berkman ND, Thorp JM, Lohr KN, et al. Tocolytic treatment for the management of preterm labor: A review of the evidence. American Journal of Obstetrics and Gynecology. 2003;188:1648–1659

5. Berkowitz GS, Papiernik E. Epidemiology of preterm birth. Epidemiologic Reviews. 1993;15(2):414–443

6. Chhabra S, Patil N. Study of factors causing and arresting preterm labour. J Obstet Gynecol India. 2001;51:99–103.

7. Collee JG, Miles RS, Watt B. Tests for identification of bacteria. In: Fraser AG, Marmion BP, Simmons A, editors. Mackie and McCartney's practical medical microbiology. 14th ed. Edinburgh: Churchill Livingstone; 1996. p. 131–49.

8. Collins NL, Dunkel-Schetter C, Scrimshaw SC. Social support in pregnancy: Psychosocial correlates of birth outcomes and

postpartum depression. Journal of Personality and Social Psychology. 1993;65(6):1243–1258

9. Crowley PA. Prophylactic corticosteroids for preterm birth. Cochrane Reviews. 1999;2

10. Danelian P, Hall M. The epidemiology of preterm labour and delivery. In: Norman J, Greer I, editors. Preterm labour: managing risk in clinical practice. Cambridge: Cambridge University Press; 2005. p. 1–12.

11. Gibbs RS, Romero R, Hillier SL, Eschenbach DA, Sweet RL. A review of premature birth and subclinical infection. American Journal of Obstetrics and Gynecology. 1992;166(5):1515–1528

12. Goldenberg RL, Hauth JC, Andrew WW. Intrauterine infection and preterm delivery. N Eng J Med. 2000;342:1500–7.

13. Gomez R, Romero R, Medina L, et al. Cervicovaginal fibronectin improves the prediction of preterm delivery based on sonographic cervical length in patients with preterm uterine contractions and intact membranes. American Journal of Obstetrics and Gynecology. 2005;192:350–359.

14. Hsieh TT, Chen SF, Shau WY, Hsieh CC, Hsu JJ, Hung TH. The impact of interpregnancy interval and previous preterm birth on the subsequent risk of preterm birth. Journal of the Society for Gynecologic Investigation.2005;12:202–207.

15. Institute of Medicine (US) Committee on Understanding Premature Birth and Assuring Healthy Outcomes; Behrman RE, Butler AS, editors.

16. Keelan JA, Blumenstein M, Helliwell RJA, et al. Cytokines, prostaglandins and parturition- a review. Placenta. 2003;17: S33–46.

17. Lockwood CJ. Predicting premature delivery- no easy task. N Eng J Med. 2002;346:282–4.

18. Maternal placental vasculopathy and infection: Two distinct subgroups among patients with preterm labor and preterm ruptured membranes. American Journal of Obstetrics and Gynecology. 1993;168:585–591.

19. Asrat T. Intra-amniotic infection patients with preterm prelabor rupture of membranes. Pathophysiology, detection and management. Clinicial Perinatology. 2001;28:735–751.

20. Olds DL, Henderson CR Jr, Tatelbaum R, Chamberlin R. Improving the delivery of prenatal care and outcomes of pregnancy: A randomized trial of nurse home visitation. Pediatrics. 1986;77(1):16–28.

21. Pandey K, Bhagoliwal A, Gupta N, et al. Predictive value of various risk factors for preterm labour. J Obstet Gynecol India. 2010;60:141–Arias F, Rodriquez L, Rayne SC, Kraus FT.

22. Romero R, Espinoza J, Chaiworapongsa T, et al. Infection and prematurity and the role of preventive strategies. Semin Neonatol. 2002;7:259–74.

23. Romero R, Gomez R, Chaiworapongsa T, et al. The role of infection in preterm labour and delivery. Paediatr Perinat Epidemiol. 2001;15(Suppl2):41–56.

24. Romero R, Oyarzun E, Mazor M, et al. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. Obstet Gynecol. 1989;73:576–642.

25. Romero R, Oyarzun E, Mazor M, Sirtori M, Hobbins JC, Bracken M. Meta-analysis of the relationship between asymptomatic bacteriuria and preterm delivery/low birth weight. Obstetrics and Gynecology. 1989;73(4):576–582.

26. Sanchez-Ramos L, Kaunitz AM, Delke I. Progestational agents to prevent preterm birth: A meta-analysis of randomized controlled trials. Obstetrics and Gynecology. 2005;10(5):273–279

27. Shubert P, Diss E, Iams JD. Etiology of preterm premature rupture of membranes. Obstetrics and Gynecology Clinics of North America. 1992;19:251–263.

28. Smaill F. Antibiotics for asymptomatic bacteriuria in pregnancy. Cochrane Database of Systematic Reviews.2001;

29. So T. The role of matrix metalloproteinases for premature rupture of membranes. Nippon Sanka Fujinka Gakkai Zasshi. 1993;45:227–233

30. Ugwumadu A, Manyonda I, Reid F, Hay P. Effect of early oral clindamycin on late miscarriage and preterm delivery in asymptomatic women with abnormal vaginal flora and bacterial vaginosis: A randomised controlled trial. Lancet. 2003;361:983–988.

31. Varma R, Gupta JK. Antibiotic treatment of bacterial vaginosis in pregnancy: Multiple meta-analyses and dilemmas in

interpretation. European Journal of Obstetrics, Gynecology, and Reproductive Biology.

32. Vogel I, Thorsen P, Curry A, Sandager P, Uldbjerg N. Biomarkers for the prediction of preterm delivery. Acta Obstetricia et Gynecologica Scandinavica. 2005;84(6):516–525.

MASTER CHART

CONTROL GROUP

S.NO	NAME	AGE	SOCIOECONOMIC STATUS	BMI	PARITY	G.AGE	ANTENATAL BOOKING STATU	PREV H/O PTL	URINE CULTURE	ORGANISM ISOLATED IN URINE	HIGH VAGINAL SWA	ORGANISM ISOLATED IN HVS
1	PREMA	22	LOWER	UNDERWEIGHT	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
2	KANMANI	24	UPPER MIDDLE	NORMAL	G2P1LI	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
3	GANDHIMATHY	23	UPPER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	POSITIVE	-
4	NEELAVATHY	25	UPPER LOWER	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
5	SUMATHY	22	LOWER MIDDLE	NORMAL	G3P2L2	38	UNBOOKED	YES	NEGATIVE	-	NEGATIVE	-
6	PALLAVI	21	LOWER MIDDLE	NORMAL	G3P2L2	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
7	LAKSHMI	26	LOWER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
8	MARIAMMAL	27	LOWER MIDDLE	OBESE	G2A1	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
9	SANDHYA	29	LOWER	OVERWEIGHT	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
10	RANJITHA	25	UPPER MIDDLE	NORMAL	PRIMI	37	BOOKED	-	POSITIVE	E.COLI	POSITIVE	E.COLI
11	USHA	26	UPPERLOWER	NORMAL	PRIMI	38	UNBOOKED	-	NEGATIVE	-	NEGATIVE	-
12	THILAGA	27	UPPERLOWER	UNDERWEIGHT	PRIMI	39	UNBOOKED	-	NEGATIVE	-	NEGATIVE	-
13	MAHALAXMI	28	UPPERLOWER	UNDERWEIGHT	G2P1L1	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
14	VIDYA	24	UPPER MIDDLE	OVERWEIGHT	G2P1L1	39	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
15	RAJESWARI	25	UPPER MIDDLE	OVERWEIGHT	G2P1L1	37	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
16	DEVI	23	LOWER MIDDLE	NORMAL	G3P2L2	40	BOOKED	-	NEGATIVE	-	NEGATIVE	-
17	BAKIALAXMI	24	LOWER MIDDLE	NORMAL	G2A1	40	BOOKED	-	NEGATIVE	-	NEGATIVE	-
18	VIJAYA	25	LOWER MIDDLE	NORMAL	PRIMI	38	BOOKED	-	NEGATIVE	-	NEGATIVE	-
19	GIRIJA	25	LOWER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
20	PAVITHRA	25	UPPER MIDDLE	OVERWEIGHT	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
21	THANGAM	28	UPPERM	UNDERWEIGHT	G2P1L1	38	BOOKED	YES	NEGATIVE	-	NEGATIVE	-
22	GEETHA	24	LOWER	UNDERWEIGHT	G3P2L2	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
23	DEVIPRIYA	26	LOWER	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
24	NITHYA	21	UPPER LOWER	NORMAL	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
25	SUDARVIZHI	24	UPPER LOWER	NORMAL	G2A1	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
24	MEGALA	22	UPPER MIDDLE	NORMAL	G2P1L1	39	UNBOOKED	NO	NEGATIVE	-	NEGATIVE	-
25	LATHA	29	UPPER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
26	JENITHA	23	LOWER MIDDLE	OBESE	PRIMI	39	BOOKED	-	NEGATIVE	-	POSITIVE	ENTEROCOCCUS
27	AISHA BANU	28	UPPERLOWER	UNDERWEIGHT	G2P1L1	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
28	PRIYANKA	28	UPPER LOWER	OVERWEIGHT	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
29	SOWMYA	27	UPPER LOWER	UNDERWEIGHT	G3P2L2	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
30	REVATHY	26	LOWER MIDDLE	UNDERWEIGHT	G2A1	38	BOOKED	-	NEGATIVE	-	NEGATIVE	-
31	JENNIFER	28	LOWER MIDDLE	OVERWEIGHT	PRIMI	39	BOOKED	-	NEGATIVE	-	POSITIVE	ENTEROCOCCUS
32	JOTHI	26	LOWER MIDDLE	NORMAL	PRIMI	40	BOOKED	-	NEGATIVE	-	NEGATIVE	-
33	BHAVANI	23	LOWER	NORMAL	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
34	KAVERY	23	UPPER LOWER	NORMAL	G2P1L1	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
35	SUGUNA	24	UPPERMIDDLE	NORMAL	G2P1L1	37	BOOKED	YES	NEGATIVE	-	NEGATIVE	-
36	GOMATHY	26	UPPER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	POSITIVE	E.COLI	NEGATIVE	-
37	KALPANA	25	UPPER MIDDLE	NORMAL	PRIMI	40	UNBOOKED	-	NEGATIVE	-	NEGATIVE	-
38	AMULU	27	UPPER LOWER	OVERWEIGHT	G3P2L2	39	UNBOOKED	NO	NEGATIVE	-	NEGATIVE	-
39	ISHWARYA	28	UPPER LOWER	NORMAL	PRIMI	40	BOOKED	-	NEGATIVE	-	POSITIVE	E.COLI
40	AMMU	26	LOWER MIDDLE	NORMAL	PRIMI	40	BOOKED	-	NEGATIVE	-	NEGATIVE	-
41	MARIAMMAL	26	LOWER MIDDLE	UNDERWEIGHT	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
42	SONIA	24	LOWER MIDDLE	NORMAL	G2P1L1	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
43	SUDARVIZHI	28	UPPERMIDDLE	NORMAL	PRIMI	37	BOOKED	-	NEGATIVE	-	NEGATIVE	-
44	RAMYA	25	LOWER MIDDLE	NORMAL	PRIMI	38	BOOKED	-	NEGATIVE	-	NEGATIVE	-
45	SHANTHHY	25	LOWER MIDDLE	NORMAL	G2P1L1	39	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
46	ROSY	27	LOWER MIDDLE	NORMAL	G3P2L2	39	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
47	GAYATHRI	29	LOWER MIDDLE	NORMAL	G2P1LI	39	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
48	DURGADEVI	25	UPPER MIDDLE	NORMAL	G3P2L2	38	BOOKED	NO	NEGATIVE	-	NEGATIVE	-
49	ESWARI	24	UPPER MIDDLE	NORMAL	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-
50	REGINA	29	LOWER	OVERWEIGHT	PRIMI	39	BOOKED	-	NEGATIVE	-	NEGATIVE	-

CASES

S.NO	NAME	AGE	SOCIOECONOMIC STATUS	BMI	PARITY	G. AGE	ANTENATAL BOOKING STATUS	WORKING STATUS	PREV H/O PTL	URINE CULTURE	ORGANISM ISOLTED IN URINE	HIGH VAGINAL SWAB	ORGANISM ISOLATED IN HVS
1	ANANDHI	25	LOWER	NORMAL	PRIMI	35	UNBOOKED	NO		POSITIVE	E.COLI	POSITIVE	E.COLI
2	ROJA	26	UPPER LOWER	NORMAL	G2P1L1	34	UNBOOKED	NO	NO	POSITIVE	E.COLI	NEGATIVE	-
3	MADHUMITHA	24	UPPER LOWER	UNDERWEIGHT	PRIMI	34	BOOKED	NO		NEGATIVE		NEGATIVE	-
4	AASYA	25	LOWER MIDDLE	NORMAL	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-
5	CHRISTY	26	UPPER LOWER	NORMAL	PRIMI	36	BOOKED	NO		NEGATIVE		NEGATIVE	-
6	BANU	23	UPPER MIDDLE	NORMAL	G2P1L1	34	BOOKED	NO	NO	NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
7	SARASWATHY	29	LOWER	UNDERWEIGHT	G3P2L2	32	UNBOOKED	YES	NO	NEGATIVE		NEGATIVE	-
8	INDRA	28	UPPER LOWER	OBESE	G2A1	34	BOOKED	NO		NEGATIVE		NEGATIVE	-
9	LAVANYA	24	UPPER LOWER	NORMAL	G2P1L1	35	BOOKED	NO	YES	NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
10	RENUKA	25	LOWER MIDDLE	NORMAL	PRIMI	36	BOOKED	NO		POSITIVE	ENTEROCOCCUS	NEGATIVE	-
11	ALOSIUS MARY	26	LOWER MIDDLE	NORMAL	PRIMI	33	UNBOOKED	NO		NEGATIVE		NEGATIVE	-
12	MUTHUMARU	29	LOWER MIDDLE	NORMAL	PRIMI	34	BOOKED	NO		NEGATIVE		NEGATIVE	-
13	SANGITHA	23	UPPER MIDDLE	NORMAL	G2P1L1	35	BOOKED	YES	NO	NEGATIVE		POSITIVE	STAPH AUREUS
14	RANI	27	LOWER MIDDLE	NORMAL	PRIMI	36	BOOKED	NO		NEGATIVE		NEGATIVE	-
15	THULASI	26	LOWER	UNDERWEIGHT	G3P2L2	32	UNBOOKED	NO	YES	NEGATIVE		NEGATIVE	-
16	GOMATHY	25	UPPER MIDDLE	OVERWEIGHT	PRIMI	31	BOOKED	NO		NEGATIVE		NEGATIVE	-
17	SIVASHANKARI	25	LOWER MIDDLE	NORMAL	G2P1L1	34	BOOKED	NO	YES	NEGATIVE		NEGATIVE	-
18	DIVYA	26	LOWER MIDDLE	OBESE	PRIMI	34	BOOKED	NO		NEGATIVE		POSITIVE	E.COLI
19	KATHIJA	27	LOWE	NORMAL	G3P2L2	35	BOOKED	NO	NO	POSITIVE	STAPH AUREUS	POSITIVE	STAPH AUREUS
20	VINNARASI	27	LOWER MIDDLE	OVERWEIGHT	PRIMI	36	BOOKED	YES		NEGATIVE		NEGATIVE	-
21	ELAVARASI	24	UPPER MIDDLE	NORMAL	PRIMI	32	BOOKED	NO		NEGATIVE		NEGATIVE	-
22	SUDHA	23	UPPER MIDDLE	NORMAL	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-
23	SUNDARI	29	UPPER MIDDLE	NORMAL	G3P2L2	34	BOOKED	NO	YES	NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
24	RAJESWARI	28	LOWER	UNDERWEIGHT	G3P2L2	31	UNBOOKED	NO	YES	NEGATIVE		NEGATIVE	-
25	SHANTHY	27	LOWER	UNDERWEIGHT	PRIMI	35	BOOKED	NO		NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
26	ARTHY	29	UPPER LOWER	NORMAL	PRIMI	29	BOOKED	NO		NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
27	CHITIRAISELVI	28	UPPER MIDDLE	OBESE	G2P1L1	30	BOOKED	NO	YES	POSITIVE	E.COLI	NEGATIVE	-
28	SUGANYA	28	UPPER MIDDLE	NORMAL	G2P1L1	28	BOOKED	YES	NO	NEGATIVE		NEGATIVE	-
29	DHARANI	26	UPPER MIDDLE	OVERWEIGHT	PRIMI	36	BOOKED	NO		NEGATIVE		NEGATIVE	-
30	JEYAGAYATHR	25	LOWER MIDDLE	UNDERWEIGHT	PRIMI	35	UNBOOKED	NO		NEGATIVE		NEGATIVE	-
31	REVATHY	25	UPPER MIDDLE	UNDERWEIGHT	PRIMI	34	BOOKED	NO		NEGATIVE		POSITIVE	E.COLI

32	SEETHA	25	UPPER MIDDLE	NORMAL	G2P1L1	28	UNBOOKED	NO	NO	NEGATIVE		NEGATIVE	-
33	RISHNAKUMAR	26	LOWER	NORMAL	PRIMI	32	BOOKED	NO		NEGATIVE		NEGATIVE	-
34	JEYARANI	29	UPPER MIDDLE	NORMAL	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-
35	RADHIKA	28	LOWER MIDDLE	NORMAL	PRIMI	33	BOOKED	NO		POSITIVE	ECOLI	POSITIVE	ENTEROCOCCUS FECALIS
36	MALAR	27	UPPER MIDDLE	OBESE	PRIMI	31	BOOKED	NO		NEGATIVE		NEGATIVE	-
37	FATHIMA BEE	24	UPPER MIDDLE	NORMAL	G2A1	29	BOOKED	NO		NEGATIVE		POSITIVE	ENTEROCOCCUS FECALIS
38	CHELLAKILI	24	UPPER LOWER	NORMAL	G3P2L1	36	BOOKED	NO	YES	NEGATIVE		NEGATIVE	-
39	TAMILMANI	29	UPPER MIDDLE	NORMAL	G3P2L2	35	BOOKED	NO	NO	NEGATIVE		NEGATIVE	-
40	VANAROJA	28	UPPER MIDDLE	NORMAL	PRIMI	29	BOOKED	YES		POSITIVE	STAPH AUREUS	NEGATIVE	-
41	DURGALAXMI	28	UPPER LOWER	NORMAL	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-
42	HARIPRIYA	28	UPPER MIDDLE	NORMAL	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-
43	ANJALAI	25	LOWER MIDDLE	NORMAL	PRIMI	34	BOOKED	NO		POSITIVE	E.COLI	POSITIVE	E.COLI
44	DEEPA	27	LOWER MIDDLE	NORMAL	G2P1L1	36	BOOKED	NO	YES	NEGATIVE		NEGATIVE	-
45	JEYANTHI	29	UPPER LOWER	NORMAL	PRIMI	33	BOOKED	NO		NEGATIVE		NEGATIVE	-
46	IRIPURASUNDA	29	UPPER MIDDLE	NORMAL	PRIMI	31	BOOKED	NO		NEGATIVE		NEGATIVE	-
47	SUBATHRA	27	UPPER LOWER	NORMAL	G2P1L1	30	UNBOOKED	NO	YES	NEGATIVE		NEGATIVE	-
48	MAMAHESHWA	28	LOWER MIDDLE	NORMAL	PRIMI	34	BOOKED	NO		NEGATIVE		POSITIVE	STAPH AUREUS
49	VALLI	29	LOWER MIDDLE	NORMAL	G3P2L2	35	BOOKED	NO	YES	NEGATIVE		NEGATIVE	-
50	HUVANESHWAI	27	LOWER MIDDLE	OVERWEIGHT	PRIMI	35	BOOKED	NO		NEGATIVE		NEGATIVE	-

ANNEXURE

PROFORMA

NAME :

AGE :

IP NO :

ADDRESS :

SOCIOECONOMIC STATUS :

OBSTETRICS HISTORY :

1. Gravida/ Parity /Gestational age
2. Regular ANC
3. LMP EDD
4. Living children
5. Abortion
6. Still birth
7. Previous h/o preterm labour

COMPLAINTS IF ANY :

MENSTRUAL HISTORY : Regular /Irregular

MARIETAL HISTORY : Married since

PAST HISTORY

1. Diabetes
2. Hypertension
3. Heart disease
4. Tuberculosis
5. Epilepsy
6. Chronic renal failure
7. Obesity
8. Drug intake

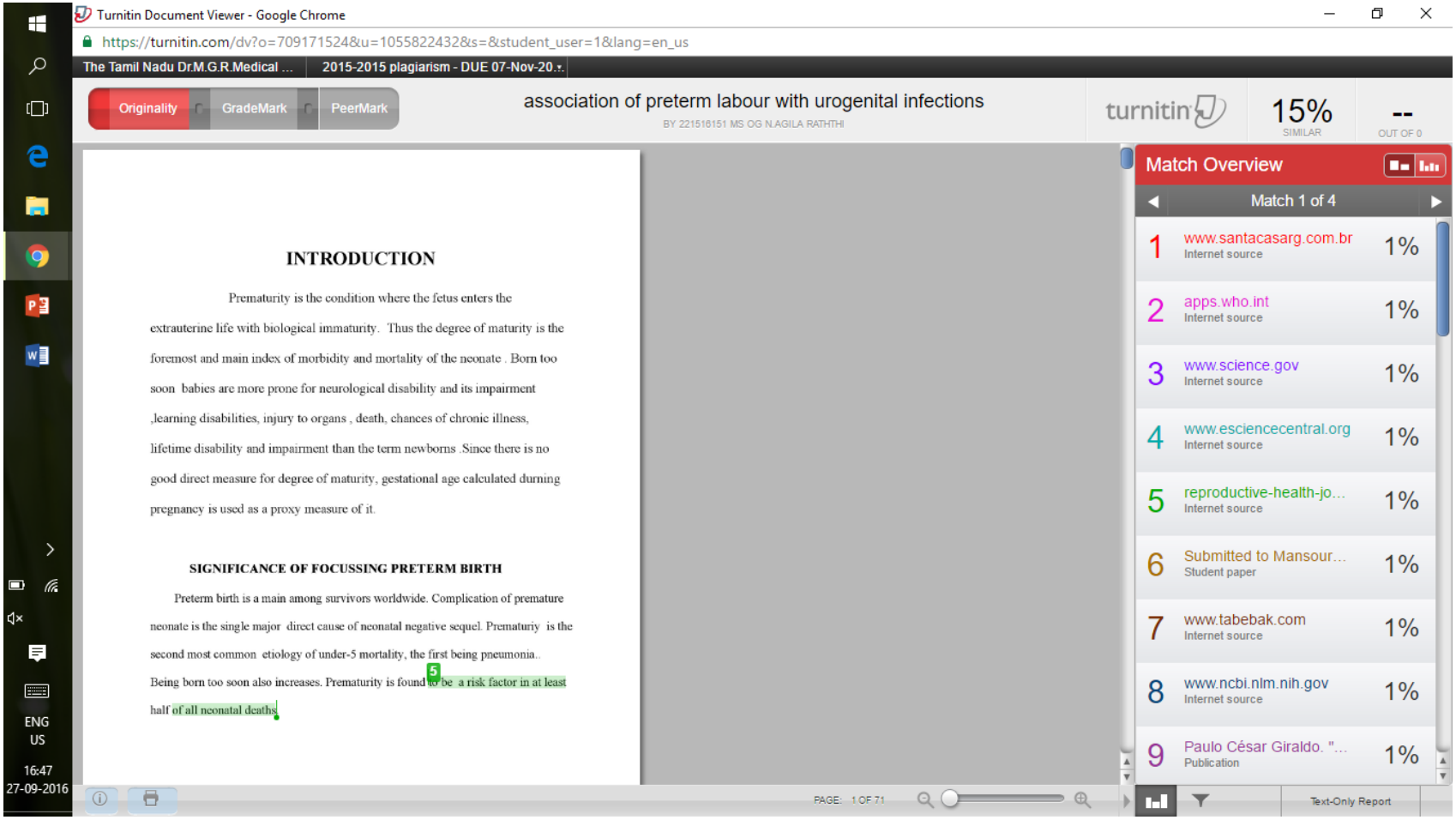
GENERAL EXAMINATION

FEBRILE	:	HEIGHT	:
PALLOR	:	WEIGHT	:
PEDAL EDEMA	:	BMI	:
VITALS	:		
TEMP	:		
PULSE	:		
BP	:		
CVS	:		
RS	:		
PER ABDOMEN	:		

SPECULUM EXAMINATION :

HIGH VAGINAL SWAB

URINE SAMPLE COLLECTION :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INTRODUCTION
Prematurity is the condition where the fetus enters the extrauterine life with biological immaturity. Thus the degree of maturity is the foremost and main index of morbidity and mortality of the neonate . Born too soon babies are more prone for neurological disability and its impairment ,learning disabilities, injury to organs , death, chances of chronic illness, lifetime disability and impairment than the term newborns .Since there is no good direct measure for degree of maturity, gestational age calculated durning pregnancy is used as a proxy measure of it.
SIGNIFICANCE OF FOCUSSING PRETERM BIRTH
Preterm birth is a main among survivors worldwide. Complication of premature neonate is the single major direct cause of neonatal negative sequel. Prematuriy is the second most common etiology of under-5 mortality, the first being pneumonia.. Being born too soon also increases. Prematurity is found to be a risk factor in at least half of all neonatal deaths
Match Overview
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1 www.santacasarg.com.br Internet source 1%
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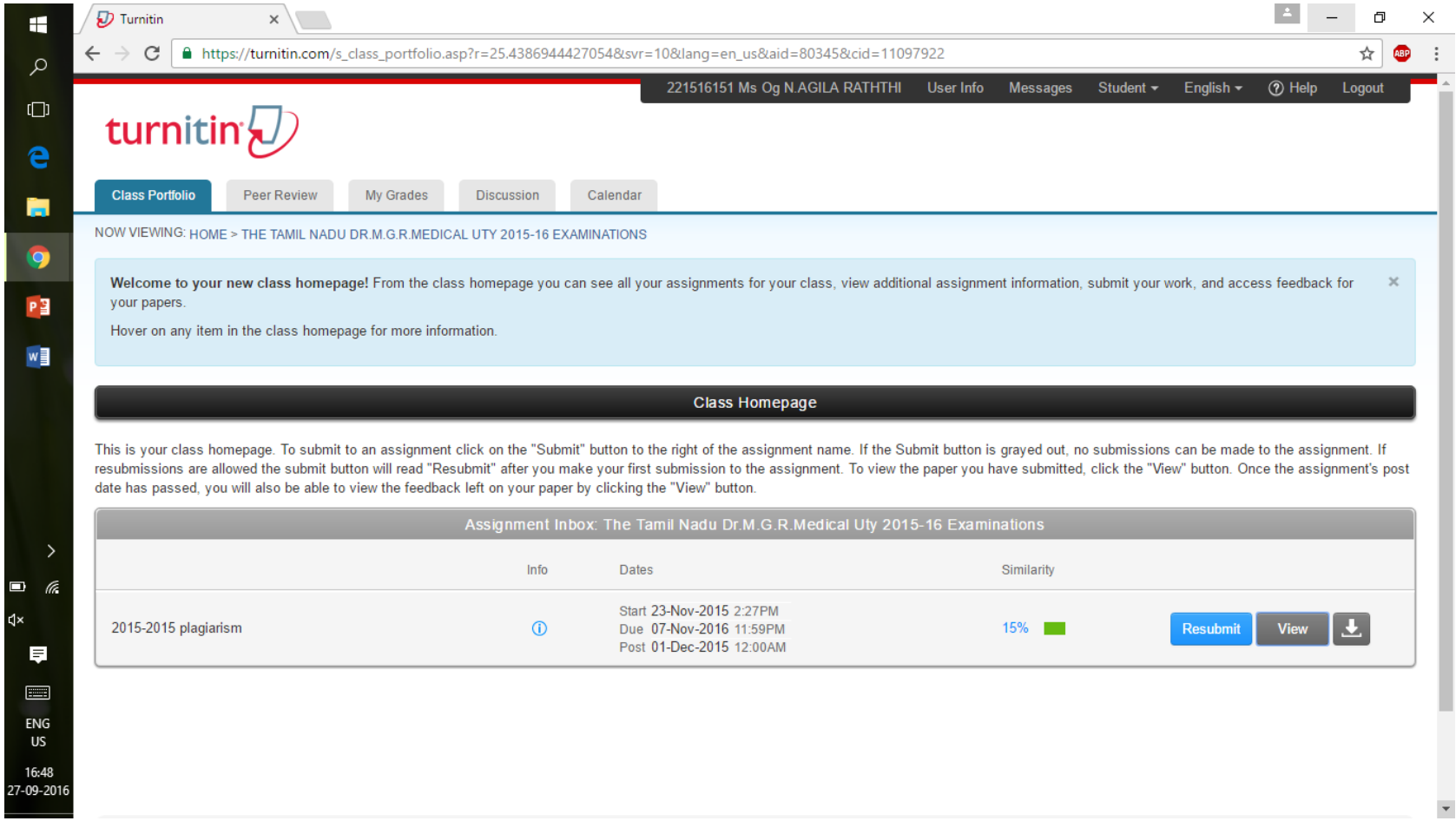
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INSTITUTIONAL ETHICS COMMITTEE
GOVT.KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID. No. 1/2016 Dt: 04.04.2016
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval " **Study of association between urogenital infections and preterm labour** " - For Project Work submitted by Dr.N.Agila Raththi, Post Graduate in MS Obstetrics & Gynaecology,dept., Govt. Kilpauk Medical College, Chennai – 10.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

DEAN, 2/6/16
Govt.Kilpauk Medical College,
Chennai – 10.