A STUDY OF OUTCOME OF PREGNANCY IN FIRST AND SECOND TRIMESTER BLEEDING

Dissertation submitted to

THE TAMIL NADU DR.M.G.R. UNIVERSITY

In partial fulfillment of the requirements for the award of the degree of

M.S. (Obstetrics and Gynecology)

BRANCH – II

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MAY 2018
BONAFIDE CERTIFICATE

This is to certify that this dissertation entitled “A STUDY OF OUTCOME OF PREGNANCY IN FIRST AND SECOND TRIMESTER BLEEDING” is the bonafide work done by DR.V.SINDUMATHI Post Graduate in the Department of Obstetrics and Gynecology, Madras Medical College, Chennai, towards partial fulfilment of the requirements of The Tamil Nadu Dr.M.G.R University for the award of M.S. Degree in Obstetrics and Gynecology

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I solemnly declare that this dissertation entitled, “A STUDY OF OUTCOME OF PREGNANCY IN FIRST AND SECOND TRIMESTER BLEEDING” was prepared by me under the guidance and supervision of Dr. Prema Elizabeth, M.D, D.G.O., Professor, Department of Obstetrics and Gynecology, Institute of Obstetrics and Gynecology, Egmore, Chennai.

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Place: Chennai

Date: DR. V. SINDUMATHI
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Finally, I am thankful to all the patients who are willingly cooperated with me during the study.
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Dear Dr.V. Sindumathi,

The Institutional Ethics Committee has considered your request and approved your study titled "OUTCOME OF PREGNANCY IN FIRST AND SECOND TRIMESTER BLEEDING" - NO.04012017 (II).

The following members of Ethics Committee were present in the meeting hold on 19.01.2017 conducted at Madras Medical College, Chennai 3

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13. Tmt. Arnold Saulina, MA., MSW., Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

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INTRODUCTION
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Vaginal bleeding is a common occurrence during pregnancy. Some degree of vaginal bleeding during the first trimester occurs in approximately 25% of pregnancies. It will cause major maternal stress and anxiety. Vaginal bleeding in gravidas may have different causes, but developing or already developed placental unit is believed to be the most dominant. The fact that predominantly the bleeding origins from disrupted decidual vessels suggests that a placental pathology beginning early in pregnancy underlies the complications responsible for adverse perinatal outcome.

When bleeding occurs during the first 21 weeks of gestation and the examination reveals a viable intrauterine pregnancy and closed cervix, the diagnosis of threatened abortion is made. The incidence of this complication varies between 14-26% of all pregnancies. Evidently, threatened abortion may progress to spontaneous abortion. If the pregnancy continues, substantial data prove a higher incidence of multiple complications worsening perinatal outcomes.

Pregnancy complicated by vaginal bleeding should be treated as high risk pregnancy. The prevalence of progressing to spontaneous is directly proportional to the heaviness of bleeding. Furthermore, the stage
of pregnancy when the bleeding occurs is significant. A high rate of fetal loss and adverse infant outcomes like prematurity, Intrauterine Growth Retardation (IUGR), Still birth and neonatal death (NND) in pregnancies complicated by vaginal bleeding.

The goal of this study was to better understand vaginal bleeding symptoms occurring in pregnancy up to 24 weeks and its outcome. This was followed by an analysis of the association between bleeding and miscarriage. Prospectively collected bleeding data from a small subset of women were used to validate bleeding episode information obtained from the first trimester and second trimester interview.

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The goal of this study was to better understand vaginal bleeding symptoms occurring in pregnancy up to 24 weeks and its outcome. This was followed by an analysis of the association between bleeding and
miscarriage. Prospectively collected bleeding data from a small subset of women were used to validate bleeding episode information obtained from the first trimester and second trimester interview.

Most superficially, bleeding may result from vaginal or cervical pathology and this could be due to a local lesion, inflammation, or a polyp. Vaginal bleeding during pregnancy can occur frequently in the first trimester of pregnancy.

However, bleeding that occurs in the second and third trimester of pregnancy can often be a sign of a possible complication.

Nearly 50% of pregnancies end in pregnancy loss; if pregnancy continues, poor maternal and fetal outcomes such as preterm delivery, preterm prelabour rupture of membrane (PPROM), preeclampsia, placental abruption and intrauterine growth restriction (IUGR).
AIM AND OBJECTIVE
AIM AND OBJECTIVE

To determine the outcome of pregnancy in first and second trimester vaginal bleeding.

To study the maternal and fetal outcome and its association and complications associated with first and second trimester vaginal bleeding.
REVIEW OF LITERATURE
REVIEW OF LITERATURE

ABORTION

Abortion is the termination of pregnancy spontaneous or induced, before the period of viability (20 weeks of gestation or birth weight of 500grams).

INCIDENCE

Abortion occurs in 15% of confirmed pregnancies. A number of pregnancies which miscarry are however not clinically recognized the so call biochemical pregnancies. If all these were included, the abortion rate may be as high as 40 to 50%.

WHO reports that globally approximately 42 million pregnancies are, voluntarily terminated each year, 22 million within legal system and 20 million by unskilled providers or in unhygienic conditions, or both.

Estimates of number of abortions performed annually in India vary considerably, from 0.6 - 6.7 million. The exact incidence is unknown because of gross underreporting of abortions, the most widely cited figure suggests that around 6.7 million abortions take place annually, of which only about one million are performed legally and remaining are performed by medical and non medical practitioners.
TYPES OF ABORTION

Threatened Abortion

Threatened abortion is a clinical entity where the process of abortion has started but has not progressed to a state from which recovery is impossible.

Inevitable abortion

In this type of abortion the changes have progressed to a state from where continuation of pregnancy is impossible.

Complete abortion

When the products of conception are expelled en masse it is called complete abortion

Incomplete abortion

When the entire products of conception are not expelled, instead a part of it is left inside the uterine cavity it is called incomplete abortion. This is the commonest type.

Missed abortion

When the fetus is dead and retained inside the uterus for a variable period, it is called missed abortion.
**Septic abortion**

Any abortion associated with clinical evidences of infection of the uterus and its content, is called septic abortion.

Abortion is usually considered septic when there are

1. Rise of temperature of at least 100.4 F (38°C) for 24 hours or more

2. Offensive or purulent vaginal discharge

3. Lower abdominal pain and tenderness.

**RISK FACTORS**

**MATERNAL CHARACTERISTICS ASSOCIATED WITH ABORTION**

**ADVANCED MATERNAL AGE**

In general, miscarriage risk increases with increasing maternal age and number of prior miscarriage. These trends may be the result of an increased frequency of age-related errors in DNA replication, other aspects of oocyte and embryo quality, or a uterine environment that is less amenable to the development of the embryo.

Stein, in 1985, found that the higher risk of late abortion for older women are due to fetal chromosome abnormalities, impairment in uterine
function, incapacity of the uterus to support the fetus or involving uteroplacental hypoperfusion.

**Basama and Crosfill** assessed the influence of age on the rate of miscarriage. The highest rate of miscarriage (27.1%) were observed in the group of 31 to 40 year old.

Other maternal factors thought to affect the risk of miscarriage include structural uterine anomalies, such as bicornuate uterus, or benign tumors, such as fibroids.

These structural malformations physically interfere with the ability of the concepts to implant or grow in the uterus due to their space occupying effect.

Maternal comorbidities like thyroid disturbances, autoimmune diseases, thrombophilic defects, and other systemic disorders such as polycystic ovarian syndrome have an increased risk of miscarriage and decreased fertility. Similarly, maternal obesity and poorly controlled diabetes have also been linked to miscarriage.

Being underweight or being overweight has been linked with an increased risk of miscarriage. Other hormone alterations may also be related to miscarriage, including luteal phase defects. This condition is characterized, by low progesterone production by the corpus luteum, resulting in miscarriage or reduced fertility due to an inability to maintain
pregnancy. These factors contribute to a suboptimal uterine environment and decreased endometrial receptivity.

**PREVIOUS HISTORY OF ABORTION**

Women who have had two or more consecutive miscarriages are at higher risk of miscarriage.

Kline et al., suggested that induced abortion increases the risk of subsequent spontaneous abortion, by damaging the cervix or uterus.

**PSYCHOSOCIAL FACTORS**

Maternal behaviors and occupational factors have also been suggested to increase the risk of miscarriage. Work schedule, particularly working at night or working overtime during the first trimester, has been associated with increased risk of miscarriage. Work-related stress and stress due to acute or chronic stressors have also been found to be related to a higher risk of miscarriage.

Both active smoking and exposure to environmental tobacco smoke have been associated with miscarriage. This may result from both reduced maternal fertility and altered endometrial receptivity; in a population of women undergoing invitrofertilization, heavy smokers were less likely to achieve pregnancy.
Armstrong et al;1992; Kline et al;1995  Observed the association between heavy smokers[>20 cigarettes /day] during pregnancy and late abortion ; a weak or no association for moderate level of smoking.

**DIETARY FACTORS**

Maternal dietary exposures, including alcohol and caffeine exposure, have also been associated with increased risk of miscarriage. Some studies found an increased risk of miscarriage for caffeine exposure that occurred prior to pregnancy, regardless of consumption during pregnancy.

Low levels of folate intake are associated with higher rate of Miscarriage in the presence of chromosomal abnormality. If the fetus has no aneuploidy, folate level has no effect on miscarriage rate.

Certain medication exposures have also been thought to increase the risk of miscarriage, including non-steroidal anti-inflammatory drugs and some classes of anti-depressants.
ETIOLOGY

Regarding the fact that in 50% cases of bleeding the cause remains unknown, very often it is difficult to establish its origin.

In the Snell et al.’s study it is demonstrated that vaginal bleeding occurs among 15-25% of pregnancies and half of them continue their pregnancy. Three major reasons for first trimester bleeding are spontaneous abortion, EP and trophoblastic diseases in the pregnancy.

In the study of Dogra et al. it is reported that the most common causes for first semester bleeding are abortion and EP, and there were observable genetic disorders in more than 50% of spontaneous abortions.

The etiology of miscarriage is often complex and obscure. The following factors are important,

- Genetic factors (50%)
- Endocrine factors (10-15%)

Thyroid disorders

- Diabetes

- Luteal phase deficiency

- Anatomical abnormalities (10-15%)
A. Cervical incompetence

B. Mullerian fusion defects- Bicornuate uterus, septate uterus.

C. Uterine synechiae

D. Uterine fibroid

- Immunological factors (5-10%)
  
  SLE

  Antiphospholipid antibody syndrome

- Infections (5%)

- Thrombophilies

- Unexplained

OTHERS

- Environmental factors
  
  Smoking

  Alcohol

  Radiation exposure

  Drugs (antineoplastic)

- Maternal medical illness

- Prenatal procedures-chorionic villus sampling, Amniocentesis
- Caffeine intake
- Paternal factors (sperm chromosomal abnormalities)
- Trauma

**GENETIC FACTORS**

The causes of miscarriage remain unclear. Genetic causes include chromosomal abnormalities, single gene defects and polygenic multifactorial condition. 50% of spontaneous abortion are found to have chromosomally abnormal. Most common type is trisomy 16. Polyploidy is observed in 22%.

Trisomy 16 and trisomy 22, is entirely dependent on maternal age; other trisomies show both maternal age and other environmental or genetic effects.

Chromosomal abnormalities result from nondisjunction in gamete formation, resulting in early errors in zygote cell division and subsequent complications with blastocyst differentiation. Genetic abnormalities also stem directly from the maternal or paternal genotype, as in the case of unbalanced translocations that are passed on from the sperm or egg. Genetic factors may lead to structural or developmental aberrations in the embryo, slowing growth and progress towards subsequent stages in development, such as implantation.
ANATOMIC ABNORMALITIES

UTERINE ANOMALIES

Unicornuate, bicornuate, and septate uteri are associated with all three types of loss.

The cause of fetal loss are

- Reduced intrauterine volume
- Reduced expansile property of uterus
- Reduced placental vascularity when implanted on the septum
- Increased uterine irritability and contractility

Incompetent cervix

Cervical incompetence (cervical weakness) classically presents as painless dilatation of the cervix resulting in the rupture of the membranes and second trimester miscarriage or early pre-term delivery. Gaillard et al. suggested that cervical incompetence was a factor in 10% of second trimester miscarriages.

Cervical incompetence has been considered an all-or-nothing phenomenon. (22) It has been shown that the length of the cervix is inversely related to the risk of pre-term delivery throughout the range of lengths supporting the concept of a spectrum of cervical competence.
ENDOCRINE FACTORS

THYROID DISORDERS

1. Overt Hypothyroidism or hyperthyroidism are associated with increased fetal loss.

2. Thyroid antibodies were associated with increased incidence of abortion.

3. Diabetes mellitus when poorly controlled causes increased miscarriage. Lejeune B et al, found that elevated antithyroperoxidase (TPOAb) and antithyroglobulin (TG-Ab) antibody titres are associated with an increased miscarriage rate.

Corpus luteum insufficiency

Luteal phase insufficiency is due to inadequate production of progesterone. Progesterone is essential for secretory transformation of the endometrium that permits implantation as well as maintenance of early pregnancy. [3] Luteal phase defect is one of the reasons for implantation failure, which has been responsible for many cases of miscarriages and unsuccessful assisted reproduction. diZerga and Hodgen states that corpus luteum insufficiency is a fault of aberrant folliculogenesis.
INFECTIONS

Transplacental fetal infections occur with most microorganism and fetal losses could be caused by any.

1. VIRAL

   Rubella
   Cytomegalovirus
   Variola
   Vaccinia
   HIV

2. PARASITIC

   Toxoplasmosis
   Malaria

3. Bacterial

   Ureaplasma
   Chlamydia
   Brucella
Spirochetes hardly cause abortion before 20 weeks due to effective thickness of placental barrier.

Viral infection especially Rubella and cytomegaloviruses produce congenital malformations and abortions if acquired in the early weeks of pregnancy.

Hepatitis and influenza have got lethal action on fetus causing death and expulsion.

Grnroos MHonkonen et al, found that an association between herpes simplex virus (HSV) and abortion is possible.
IMMUNOLOGICAL FACTORS

Both Autoimmune and alloimmune factors can cause miscarriage.

Autoimmune disease

Usually cause miscarriage in the second trimester. These patients form antibodies against their own tissue and placenta which will cause rejection of early pregnancy. Antibodies include

1. Anti-nuclear antibodies[ANAs]
2. Anti DNA antibodies[double or single stranded]
3. Antiphospholipid antibodies [lupus anticoagulant and anticardioliopin antibodies].

Women with recurrent spontaneous pregnancy loss have a higher frequency of these antibodies compared with normal controls—5 to 15 versus 2 to 5 percent, respectively.

Vitoratos and colleagues studied that the pro-inflammatory factors like IL-1$\text{a}$ and TNF-" levels in maternal serum are higher among women, with threatened abortion who miscarry comparing to those, who continue a normal pregnancy which suggests that spontaneous abortion is a result of maternal immune response.
**Alloimmune diseases**

A provocative theory suggests that normal pregnancy requires formation of blocking factors that prevent maternal rejection of foreign fetal antigens that are paternally derived. Factors said to prevent this include human leukocyte antigen (HLA) similarity with the father, altered natural killer cell activity, regulatory T cell stimulation, and HLA-G gene mutations.

**NSAIDS**

Increased use of NSAIDS and aspirin is associated with abortion.

**Caffeine**

The risk of miscarriage increases with very high level of intake of caffin (1000mg /day or more)

**PATHOGENESIS**

Miscarriage as a disorder of placentation. A hormonally functional placenta begins to produce sufficient amounts of progesterone to support the pregnancy around the 7th week of gestation. Progesterone plays a vital role in maintaining pregnancy, by preventing uterine contractility, maintaining the endometrium, and altering the maternal immune response to prevent rejection of the embryo, insufficient amounts of progesterone may cause miscarriage.
During the first ten weeks of gestation, the fetus develops in a largely hypoxic environment. The gestational sac serves as a barrier to prevent oxygen transfer to the fetus, whose metabolism is largely anaerobic during this time and additionally, extravillous trophoblastic cells of the fetus migrate to the edge of the intervillous space during most of the first trimester to plug the spiral arteries and seal off the intervillous space. This will create a trophoblastic shell that protects the fetus from the maternal blood supply and, at this time, the spiral arteries are narrow, high-resistance vessels that inhibit blood flow.

These barriers between the maternal and fetal circulation create a physiologically hypoxic environment during early pregnancy. Early onset of maternal-fetal circulation may expose the fetus to high levels of oxidative stress. Specifically, free oxygen radicals interact with lipids, proteins, and DNA, to destroy membranes and contribute to cellular dysfunction and cell death. Overall, oxidative stress damages fetal tissues, disrupts organogenesis, and affects other developmental processes during this critical period of pregnancy.

At about ten weeks of gestation, the plugs located at the periphery of the placenta begin to disintegrate, and maternal-fetal circulation begins in the intervillous space. The spiral arteries of the placenta transform into low-resistance vessels to accommodate increased blood volume. By
fourteen weeks of pregnancy, maternal blood flows freely into the placenta, permitting the exchange of nutrients and other essential factors. By this time, fetal antioxidant enzymes are functional, providing the fetus with additional defense mechanisms to maintain the balance of oxidative factors.
Factors affecting endometrial receptivity, particularly the uterine environment around the time of implantation, will cause pregnancy losses that cannot be directly related to genetic abnormalities. Defects in the early
processes of implantation, invasion into the myometrium, or access to the uterine vasculature may contribute to pregnancy loss. The site of implantation in the uterus also plays a role in pregnancy viability, with implantations occurring in the middle and lower regions of the uterus, more likely to miscarry.
PREDICTORS OF MISCARRIAGE

Certain factors help in predicting failed pregnancy which includes both the ultrasonogram and biochemical markers.

ULTRASOUND FEATURES

- **Abnormal gestation sac**
  - A sac which is abnormally small or large
  - A sac with irregular contour
  - Absence of double decidual sac sign
  - Low sac position in the uterus

- **Abnormal yolk sac**
  - Yolk sac with following characteristic
    - Large for gestational age
    - Irregular
    - Freely floating in the gestational sac rather than in the periphery
    - Calcified

- **Fetal Bradycardia**
  - A fetal heart rate less than 100 bpm at 6 to 7 weeks and it was considered to be bradycardia and its associated with 40% risk of fetal loss. If it was <70 bpm at 6 to 8 weeks which predicts 100% fetal loss.
**Subchorionic Hematoma**

Subchorionic hematoma, also called intrauterine hematoma or subchorionic haemorrhage is a, Common ultrasound finding in gravidas who bleed in the first half of pregnancy. It is frequently detected among asymptomatic patients as well. A subchorionic hematoma is described as a crescent-shaped, sonolucent fluid (blood) collection, behind the fetal membranes or the placenta, that may disrupt the placental bed. A hematoma may result in chronic inflammatory reaction, leading to uterine contractions and loss of pregnancy. Extra-cellular matrix degradation may also destabilize and weaken fetal membranes, thereby increasing pregnancy loss. These defects in placentation probably originate very early in gestation and the processes described may relate to anomalies of implantation or early fetal cell organization.

A subchorionic hematoma is an early proof of abnormal trophoblast invasion and impaired placental function resulting in PIH, IUGR and higher risk of placental abruption. Specific characteristics of SCH, such as size, location and gestational age at formation, have been associated with certain outcomes. Specifically, large volume SCH have been associated with poor obstetric
outcome, while other reports suggest that the location of SCH is more important in determining pregnancy outcome.

Large haematoma >25% of gestational sac

Increased risk of

Abortion
Placental abruption
Preterm/prelabour rupture of membrane
Preterm labour
Stillbirth

Nagy et al., reported that intrauterine hematoma (IUH) is diagnosed in 3.1% of patients during the first trimester of pregnancy. Comparing to controls, pregnancies with IUH are at higher risk of both fetal and maternal complications, such as operative delivery, PIH, IUGR, placental abruption (4.8 vs. 0.9%) and preterm delivery (16%).

Pedersen et al. revealed that 18% of patients with threatened abortion between 9 and 20 weeks of pregnancy and a viable fetus inside the uterine cavity had a subchorionic hematoma. There are reports that retroplacental location of haematoma is a strong risk factor of adverse perinatal outcome.
BIOCHEMICAL MARKERS

CA 125

Ca-125 is suggested to be a marker of decidual injury and may indicate upcoming spontaneous abortion, when vaginal bleeding had been present for 3 days or more, and there was high maternal serum CA125 activity the abortion risk was found to be 100%.

Pregnancy-associated plasma protein A (PAPP-A):

Decreased pregnancy-associated plasma protein A (PAPP-A) Concentrations have been found in patients with threatened abortion. Ruge S et al., developed a highly sensitive PAPP-A radio-immunoassay and have established a reference range in early pregnancy for PAPP-A between week 7 and week 20 of pregnancy, the serum values of PAPP-A were significantly lower (p = 0.002) in the group of women with vaginal bleeding than in the group of normally pregnant women.

Beta- hCG

Low levels of beta-hCG directly predict the risk of miscarriage. Al-Sebai et al. propose 20 ng/ml as a cut-off to distinguish between viable continuing and unviable pregnancy. They reported 88% sensitivity and 83% positive predictive value for this value. LaMarca et al., reported that significantly lower levels of hCG in patients who miscarried, suggest a threshold of 25 IU/ml to predict the risk of miscarriage.
**PROGESTERONE**

Low levels of serum progesterone hormones may predict spontaneous abortion. In very early pregnancy, the corpus luteum produces progesterone. The shift from luteal production to placental production of progesterone occurs by the seventh week of pregnancy and can result in a temporary reduction in progesterone. Presence of sufficient levels of progesterone during pregnancy is required for pregnancy maintenance.

Decreasing levels of progesterone are associated with the onset of menses outside of pregnancy; similarly, during pregnancy, decreasing levels may cause an episode of vaginal bleeding and limit successful maintenance of the pregnancy. Thus, bleeding at this time in pregnancy may signal that the early placenta has not developed optimally.

**Al-Sebai et al.,** reported serum progesterone concentrations appear to be significantly lower among patients whose pregnancy terminates or is ectopic, than among women with threatened abortion who continue gestation. A cut-off level of 45 nmol /l is suggested to differentiate between the viable and abnormal pregnancies, with estimated 87.6% sensitivity and 87.5% specificity. In the group of patients with 5 nmol/l or lower progesterone concentration, 86% experienced miscarriage.
OTHERS

The following are also reported to cause miscarriage,

Low Inhibin A, activin A

Placental lactogen,

Estradiol

AFP
DIAGNOSIS

Diagnosis mainly needs careful elicitation of history, clinical examination along with an ultrasound examination.

HISTORY

It is important to obtain a detailed history regarding patients last menstrual period (LMP), Parity general medical history, abdominal pain and its severity, amount of bleeding and colour of blood, passage of products, disappearance of symptoms of pregnancy such nausea and vomiting.

PHYSICAL EXAMINATION

Assessment of general condition should be the first step.

Vital signs

Tachycardia, low blood pressure, pallor suggest severe bleeding that requires immediate treatment.

Uterine size

Presence of products of conception.

Any tissue passed by the patient should be sent for histopathological examination to confirm the presence of products of conception or other pathologies.
INVESTIGATION

Haemoglobin and haematocrit

Severe anaemia may indicate need for transfusion

Blood grouping and Rh typing

Rh negative-Anti D to prevent alloimmunization

Blood sugar

Serology

VDRL ,HIV1 and HIV2

Special investigations

Hormonal assay

FSH, LH, Thyroid function test

Karyotyping

Hysterosalpingogram

Husband’s semen analysis

Ultrasonography
ULTRASOUND DIAGNOSIS OF MISCARRIAGE

Discriminatory criteria using transvaginal ultrasonography and beta subunit of human chorionic gonadotropin testing will help in distinguishing among the many conditions of first trimester bleeding.

In early pregnancy a failed pregnancy can be suspected when certain sonographic criteria are not met using transvaginal scan [TVS]. This is called discriminatory level.

When beta subunit of human chorionic gonadotropin, reaches levels of 1,500 to 2,000 mIU per mL, (1,500 to 2,000 IU per L), a normal pregnancy should exhibit, a gestational sac by transvaginal ultrasonography. When the gestational sac is greater than 10 mm in diameter, a yolk sac must be present.

A live embryo must exhibit, cardiac activity, when the crown-rump length is greater than 5 mm. In a normal pregnancy, beta subunit of human chorionic gonadotropin levels increase by 80 percent every 48 hours. The absence of any normal discriminatory findings is consistent with early pregnancy failure.

Beta HCG level is useful in predicting early pregnancy loss. HCG normally doubles every 48-72 hours very early in pregnancy. The presence
of a nonviable pregnancy is suspected even if there is an HCG rise below 50% over 48 hours during the first 4 weeks of the pregnancy.

In most normal pregnancies at HCG levels below 1200 mIU/ml the HCG level usually doubles every 48 to 72 hours. In early pregnancy 48 hour increase of HCG by 35% will still be considered normal and as pregnancy progresses, the HCG level increase slows down significantly. Between 1200 and 6000 mIU/ml serum, the HCG level usually takes 72 to 96 hours to double. Above 6000 mIU/ml, the human chorionic gonadotropin levels often takes over four or more days to double. In general, when the HCG level reached 7200 mIU/ml, a yolk sac should be visible and at an HCG level greater than 10800 mIU/ml there should be a visible embryo with a heartbeat.
ULTRASOUND CRITERIA FOR FAILED EARLY PREGNANCY

Transvaginal ultrasonography is a golden standard in diagnosing patients who bleed during pregnancy.

Diagnosis can be based on the following criteria

Gestational sac

- No fetal pole or yolk sac in the gestational sac with mean sac diameter (MSD) greater than or equal to 25mm.
- No change in the mean sac diameter on consecutive scans 7 days apart Crown rump length (CRL).
- NO heartbeat in an embryo with CRL greater than or equal to 7mm
  CRL<7mm and no interval over 5-7 days.

If there is any doubt, the ultrasound should be repeated after 5-7 days.

Threatened Abortion

Vaginal bleeding before 20 gestational weeks is the common complication in pregnancy, occurring in about a fifth of cases. Abortion is 2.6 times as likely, and 17% of cases are expected to present complications later in pregnancy. Bed rest is routinely recommended, and about a third of women presenting with threatened miscarriage are prescribed drugs. Threatened abortion occurs often and is a serious emotional burden for women.
ULTRASONOGRAPHY (TVS)

Findings may be

- A well formed gestation ring with central echoes from the embryo indicating healthy fetus.
- Observation of fetal cardiac motion with there is 85-97% chance of continuation of pregnancy.

Management of threatened abortion

Bed rest

Progesterone

Progesterone use is controversial. Unless there is a luteal phase defect, progesterone should not be used. Progesterone is prescribed in 13-40% of women with threatened miscarriage, according to published series.

Progesterone is the main product of the corpus luteum, and giving progestogen is expected to support a potentially deficient corpus luteum gravidarum and induce relaxation of a cramping uterus. The evidence on progesterone is of low quality.

RH negative pregnancy - Dayton VD et al, reported that patient with a threatened abortion probably should receive anti-D immunoglobulin.
BLEEDING AND OBSTETRIC OUTCOME

Saraswat et al.’s and Siddiqui’s, demonstrated that, women with bleeding in the first trimester of pregnancy, more frequently developed bleeding in the second and third trimesters due to the probability of placenta praevia, placenta disruption and bleeding with unknown place.

Deutchman et al. and Thorstensen et al. reported that in pregnancies with first trimester bleeding the most important diagnostic actions include transvaginal ultrasound and evaluating the rising of serum level of β HCG.

Weiss et al.’s showed that abortion, premature delivery and placenta disruption are the most common complications of first trimester bleeding in the pregnancy.

MISCARRIAGE

The rate of miscarriage is influenced to a greater extent by the detection of a positive fetal heart activity. Everett CB et al, concluded that, If fetal heart movement is detected at the initial scan, approximately 19 out of every 20 viable pregnancies will not miscarry before the 20th week. When fetal heart movement was detected, it indicates a good prognosis and the women can be given strong reassurance.
Bennett et al. found that the risk of miscarriage more than doubled when bleeding occurred in the first eight weeks of pregnancy.

Threatened abortion in the first-trimester is 1.56 fold higher according to Wijesiriwardana et al.

According to Basama and Crosfill, first trimester bleeding leads to miscarriage in 15% of cases.

Tonsong et al. reported association between first trimester threatened abortion and miscarriage.

Strobino and Pantel-Silverman published a report showing that moderate or heavy bleeding was related to pregnancy loss of both a normal and abnormal karyotype slight bleeding was only associated with a miscarriage of a normal karyotype.

Preterm delivery and preterm premature rupture of membranes (PPROM)  Preterm is defined as the infant born before 37 completed weeks of gestation.

ETIOLOGY

1. Chorioamnionitis
2. Infection outside the uterus, Commonest cause is urinary tract infection.
3. Placental abnormalities
4. Anatomic abnormalities

5. Fetal Pathology

6. Uterine over distentioe, Multifetal gestation and hydramnios

7. Idiopathic

Preterm delivery (PTD) is the most frequently reported outcome of bleeding during pregnancy, regardless of gestational age. These cases are at high risk of preterm delivery and intrauterine infection. The mechanisms behind this is that the hematoma pressing the uterine wall, will provoke uterine contractions and the bacteria accumulating in the hematoma leading to inflammatory factors release thereby inducing preterm labor.

**Yanget al.** proved that vaginal bleeding during 1st and 2nd trimester increases the overall risk of preterm delivery 1.3 fold. Unless, bleeding in the first trimester, increase the relative risk of delivery at or before 341.6 fold, and the incidence of PTD caused by PPROM was nearly two fold higher.

**Hossain et al.** stated that the risk of PPROM and preterm delivery rises if a woman bleeds during both 1st and 2nd trimester and it’s 3.0 and 6.24 fold higher, respectively.

**Saraswat et al.** reported that the risk of PPROM rises 1.78 fold after first-trimester bleeding and the rate of preterm delivery is twice higher.
According to Wijesiriwardana et al., preterm deliveries, after threatened abortion in the first-trimester is 1.56 fold higher (95% CI 1.43-1.71)

Hay et al. reported low risk for pre-term delivery and found that the presence of bacterial vaginosis in early pregnancy was associated with second trimester miscarriage and pre-term delivery.

Hauth et al. reported high risk of pre-term delivery for bacterial vaginosis at a mean gestation of 22.9 weeks.

Antepartum hemorrhage and placental abruption

Significant bleeding results in thrombin generation and proteolytic cascade activation that is proven to trigger PPROM and preterm contractions of the uterus. The connection between early pregnancy bleeding and placental complications later in pregnancy suggests underlying impaired placentation.

As established by Wijesiriwardana et al., bleeding in the first trimester leads to 1.83 fold higher risk of antepartum hemorrhage.

Saraswat and colleagues established that first-trimester bleeding increases the incidence of vaginal haemorrhage in subsequent trimesters, especially caused by placenta praevia (OR 1.62, 95% CI 1.19, 2.22) or of unknown origin.
Saraswat et al.’s and Siddiqui’s, report that women with bleeding in the first trimester of pregnancy, developed bleeding in the second and third trimesters due to the probability of placenta praevia, placenta disruption and bleeding with unknown etiology.

Saraswat and Dadkhah, placental abruption reported no impact on the route of delivery.

Lykke and colleagues, reported 1.4% placental abruption rate, in the group of first-trimester bleeders, versus 1.0% in controls. The risk of bleeding recurrence in subsequent pregnancy was 8.2%. The incidence of placental abruption is high among patients with IUH, but also the necessity of manual placental removal, suggesting abnormal placentation with liability to, pathological attachment to the myometrium that may result in placenta accreta.

**Preeclampsia and IUGR**

Das AG et al, conducted a study to find out the perinatal outcome of patients with threatened abortion and follow the growth pattern of the fetuses of such pregnancies and found a significantly increased prevalence of pregnancy-induced hypertension (15.5% vs. 7.5%), preeclampsia (8% vs. 2%) and IUGR (7% vs. 3%) in the case compared to controls.
LOW BIRTH WEIGHT

WHO defines these low weight babies as birth weight less than 2500 grams irrespective of gestation age. Very low birth babies as birth weight 1500 grams and extremely low birth weight as 1000 grams or less. These babies are prone for birth asphyxia year as hypothermia, infection, retinopathy of prematurity.

Williams MA et al, found that LBW occurred more often women reporting first-trimester bleeding than in those who never bled.

Bleeding limited to the first trimester was associated with a 1.6-fold risk of delivery of a term LBW infant (95% confidence interval 1.3-2.0).

Meis PJ et al, and Williams MA et al, found that LBW occurred more often in women with first-trimester bleeding than in those who never bled. Bleeding limited to the first trimester was associated with a 1.6-fold risk of delivery of a term LBW infant (95% confidence interval 1.3-2.0).

Mulik V et al, found that the incidence of low and very low birth weight deliveries, significantly high.
Neonatal outcome

Neonatal complication most common that occur is prematurity. Preterm babies are more prone for respiratory distress syndrome, hypothermia and necrotizing enterocolitis.

It was proved that a history of bleeding significantly increases the incidence of complications in ongoing pregnancy, increasing perinatal morbidity and mortality.

Williams and colleagues reported a double risk of prematurity (RR 2.0; 95% CI 1.6-2.5), and higher incidence of neonatal death with patients with vaginal bleeding.

According to Nagy et al., fetuses from gestations diagnosed with intrauterine hematoma are at higher risk intrauterine death (1.1% vs. 0.7%).
MATERIALS AND METHODS
MATERIALS AND METHODS

Sample size 100

Inclusion criteria

All cases of singleton gestation with vaginal bleeding up to 24 weeks [by LMP and confirmed by ultrasound]

Exclusion criteria

Multiple gestation

Chronic medical illness like diabetes or hypertension

Preeclampsia

Gestational trophoblastic disease

Ectopic pregnancy

Bleeding diathesis

This cohort study was conducted on pregnant women with a history of vaginal bleeding in first and second trimester of their pregnancy and matched controls with no vaginal bleeding. Pregnant women who came to the hospital for vaginal bleeding less than 24 weeks of gestation are the cases whom are followed up prospectively until the end of pregnancy.
This prospective cohort study was done in the Department of Institute of obstetrics and gynecology, Egmore Chennai in the year 2016-2017. The cases are selected from the inpatient department. Participants with vaginal bleeding in the first and second trimester were recruited in the study group. Participants were recruited into study group after obtaining informed consent.

The control group consist of age matched women who booked for the antenatal care in the hospital during the same time period. They were identified, consecutively matched for maternal age, from the obstetric ultrasound data done during routine first trimester. All the women in the study group were followed from the first visit till delivery. The characteristics of all the patients related to their age, gravidity, period of gestation duration of bleed, ultrasound results, duration of hospital stay treatment modalities and outcome were determined and data were collected through self administered structured questionnaire.

The cases and controls are matched in terms of age, parity, level of education, working during pregnancy. The potential confounding factors like maternal age, gravidity, previous recurrent abortion, previous preterm delivery, previous induced abortion, are identified and adjustment was made in the statistical model.
Outcome data were obtained from the hospital notes and confirmed by telephone follow up whenever necessary. Late pregnancy complications were evaluated in two categories of maternal complications and fetal complications. Maternal complication include PROM, preeclampsia, preterm and caesearean section delivery. Fetal complications included low birth weight, IUGR, NICU admission.

First a statistical test was used to insure that the two groups of cases and controls match. In the next step, the incidence of maternal and fetal complications were evaluated using Chi square test.
OBSERVATIONS

AND RESULTS
OBSERVATION AND RESULTS

AGE DISTRIBUTION

Age of the patients in this study group ranged from 18-33 years with mean age 26.5 years. The age distribution was as follows,

DISTRIBUTION OF CASES IN RELATION TO AGE

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percent(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 21 years</td>
<td>27</td>
<td>27.0</td>
</tr>
<tr>
<td>22-25 years</td>
<td>42</td>
<td>42.0</td>
</tr>
<tr>
<td>26-29 years</td>
<td>23</td>
<td>23.0</td>
</tr>
<tr>
<td>30-33 years</td>
<td>8</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

In this study, 42% of the cases were in the age group of 22-25 years, 27% are in the age group 18-25 years, 23% in the age group of 26-29 years, and 8% were in the age group of 30-33 years. The mean age in this study is 26.5 years.
PARITY

In this study primi contributes around 53% and multi contributes 47%.

**DISTRIBUTION IN RELATION WITH PARITY**

<table>
<thead>
<tr>
<th>Obstetric code</th>
<th>Frequency</th>
<th>Percent (%)</th>
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<tbody>
<tr>
<td>Primi</td>
<td>53</td>
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<tr>
<td>Multi</td>
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<td>47.0</td>
</tr>
<tr>
<td>Total</td>
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<td>100.0</td>
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</table>
DISTRIBUTION IN RELATION WITH MODE OF DELIVERY

<table>
<thead>
<tr>
<th>MOD</th>
<th>CASES</th>
<th>CONTROL</th>
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</thead>
<tbody>
<tr>
<td>LN</td>
<td>21</td>
<td>23</td>
<td>44</td>
</tr>
<tr>
<td>LSCS</td>
<td>19</td>
<td>24</td>
<td>43</td>
</tr>
</tbody>
</table>

In the above table, among the case group vaginal delivery is 21 and LSCS is 19 and among the case group vaginal delivery is 23 and LSCS is 24, which indicates more number of vaginal delivery in this study.
Mode of delivery

44%  LN
43%  LSCS
Outcome

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Abortion</td>
<td>10%</td>
</tr>
<tr>
<td>IUGR</td>
<td>6%</td>
</tr>
<tr>
<td>LBW</td>
<td>3%</td>
</tr>
<tr>
<td>Post Dated</td>
<td>10%</td>
</tr>
<tr>
<td>Preeclampsia</td>
<td>7%</td>
</tr>
<tr>
<td>Preterm</td>
<td>10%</td>
</tr>
<tr>
<td>PROM</td>
<td>5%</td>
</tr>
<tr>
<td>Term</td>
<td>10%</td>
</tr>
</tbody>
</table>

Outcome Breakdown:
- No complications: 49%
- IUGR: 10%
- NEC: 3%
- RDS: 5%
- RDS, NEC: 10%

NEONATAL COMPLICATIONS

- No complications: 85%
- Complications: 15%
  - NEC: 2%
  - IUGR: 3%
  - RDS: 8%
  - RDS, NEC: 2%
### ABORTION

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Abortion</th>
<th>No Bleeding</th>
<th>Bleeding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count</strong></td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>6.00%</td>
<td>14.00%</td>
<td>7.00%</td>
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</tr>
<tr>
<td><strong>No Abortion</strong></td>
<td>47</td>
<td>43</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td><strong>Count</strong></td>
<td>50</td>
<td>50</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>%</strong></td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
<td></td>
</tr>
</tbody>
</table>

Chi square 1.78 p=0.182

In this study of outcome in relation with abortion the incidence among the control group is 7 (14%) and the case group it is 3 (6%) which shows that chisquare is 1.78 p=0.182 which is statistically significant association between first and second trimester bleeding and abortion.
The above table shows that in relation to outcome with IUGR cases total among the study is 6.7%(2), control group is 9.3%(4) and the case group is 4.3%(2) which shows there is significant association between first and second trimester bleed and IUGR.
LOW BIRTH WEIGHT

<table>
<thead>
<tr>
<th>Outcome</th>
<th>LBW</th>
<th>Count</th>
<th>No Bleeding</th>
<th>Bleeding</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>% within GA_at_Bleeding</td>
<td>0.0%</td>
<td>7.0%</td>
<td>3.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the above table it is shown that among the total study population is 3.3%(3) Control group LBW it is 0% and among the cases is 7%(3) which shows significant association between first and second trimester bleeding.
In this study of outcome preeclampsia among the total study group is 7.8% (7), control group is 9.3%(4) and the case group is 6.4%(3) shows significant association between and second trimester bleed.
PREECLAMPSIA

No bleeding

Bleeding
The above table shows that the outcome of study group, total is 11.1%(10), among this the control group is 6.4% (3) and case group is 16.3%(7) and it is significant.
PRETERM

- No bleeding
- Bleeding
In the above it is shown that the outcome of total PROM in the study group is 5.6% (5) and among the control group is 11.6% (5) and in the case group is 0% which shows significant association between first trimester bleeding.
This table shows that the total term patients in this outcome study is 54.4% (49) and among the case group is 46.5% (20) and the control group is 61.7% (29) which shows significant association between first trimester and second trimester bleed.
TERM

No bleeding

Bleeding

0.00%

10.00%

20.00%

30.00%

40.00%

50.00%

60.00%

70.00%
Leaving the 10 abortion cases 90 for the analysis

<table>
<thead>
<tr>
<th>Outcome * GA_at_Bleeding Crosstabulation</th>
<th>GA_at_Bleeding</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>No Bleeding</td>
<td>Bleeding</td>
</tr>
<tr>
<td>IUGR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>% within GA_at_Bleeding</td>
<td>4.3%</td>
<td>9.3%</td>
</tr>
<tr>
<td>LBW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>% within GA_at_Bleeding</td>
<td>0.0%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Post dated</td>
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<tr>
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<td>0</td>
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<tr>
<td>% within GA_at_Bleeding</td>
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<td>0.0%</td>
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<td>4</td>
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</tr>
<tr>
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<td>11.6%</td>
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<tr>
<td>Term</td>
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<tr>
<td>Count</td>
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<td>20</td>
</tr>
<tr>
<td>% within GA_at_Bleeding</td>
<td>61.7%</td>
<td>46.5%</td>
</tr>
<tr>
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<td>43</td>
</tr>
<tr>
<td>% within GA_at_Bleeding</td>
<td>100.0%</td>
<td>100.0%</td>
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</table>

Pearson Chi-Square=21.928 p= 0.001

The above table shows p value of 0.001 which is statistically significant association.
If we take all the cases

### Outcome * GA_at_Bleeding Crosstabulation

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No Bleeding</th>
<th>Bleeding</th>
<th>Total</th>
</tr>
</thead>
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<tr>
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<td>Count</td>
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<td></td>
</tr>
<tr>
<td>Abortion</td>
<td>3</td>
<td>6.0%</td>
<td>10.0%</td>
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<tr>
<td>IUGR</td>
<td>2</td>
<td>4.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td>LBW</td>
<td>0</td>
<td>0.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Post dated</td>
<td>10</td>
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<tr>
<td>Preeclampsia</td>
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<td>7.0%</td>
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<tr>
<td>Preterm</td>
<td>3</td>
<td>6.0%</td>
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<tr>
<td>PROM</td>
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<td>5.0%</td>
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<tr>
<td>Term</td>
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<td>58.0%</td>
<td>49.0%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Pearson Chi-Square=23.663** p= 0.001
Abortion: 6%
IUGR: 4%
LBW: 0%
Post Dated: 0%
Preeclampsia: 6%
Preterm: 6%
PROM: 0%
Term: 58%

Bleeding control: 14%
Bleeding case: 40%

Legend:
- Green: No Bleeding control
- Red: Bleeding Case
DISCUSSION
DISCUSSION

This cohort is conducted to study the outcome of first and second trimester bleeding in 100 cases. In our study the result showed that bleeding in early pregnancy is associated with high rate of miscarriage, less than 10 weeks of gestation associated with more chance of abortion (14%).

In this study it is observed that around 42% of the case are in age group of 22-25yrs and around 8% are in the age group of 30-33 years and the mean age group is 26.5 years.

In our study, vaginal delivery is high when compare with caesarean section.

In this study, if we take all cases, the total outcome of abortion is 6% (3), among the control group is 6% (3), case group is 14% (7). The total outcome of IUGR is 6% (6), among the control group is 4% (2), case group is 8% (4). The total outcome of LBW is 3% (3), among the control group is 0% (0), case group is 6% (3). The total outcome of Postdated is 10% (10), among the control group is 20% (10), case group is 0% (0). The total outcome of Preeclampsia is 7% (7), among the control group is 6% (3), case group is 8% (4). The total outcome of Preterm is 10% (10), among the control group is 6% (3), case group is 14% (7). The total outcome of PROM is 5% (5), among the control group is 0% (0), case group is 10%
The total outcome of Term is 49% (49), among the control group is 58% (29), case group is 40% (20) which shows that Pearson Chi-Square=23.663** and the p value is 0.001, which shows significant association between first and second trimester vaginal bleeding and the abortion, IUGR, Low birth weight, Preeclampsia, preterm, PROM.

There is increased risk of IUGR, preeclampsia, PPROM and prematurity, LBW, IUGR, NICU admission. The infant outcomes studied here - preterm birth, IUGR and low birth weight have been chosen because of their relevance with regard to infant morbidity and mortality statistically significance association is found between second trimester bleed and LBW and preterm labor. Bleeding prolonged into the second trimester is likely to affect fetal outcome adversely, that limited to the first trimester may either end in abortion or may not affect fetal health, unduly as enough, recovery time is available.
CONCLUSION
CONCLUSION

Pregnancy complicated by first and second trimesters bleeding, should be considered as a high risk pregnancy and they require better care and consultation they have to referred to well equipped centers to reduce the risk of complications and also inform health care professionals that this is a warning sign.

All the patients with early pregnancy bleeding should be managed in a center where there are facilities for NICU to deal with the cases of prematurity and IUGR babies.

Blood bank facilities should be available as there is increased chance of ante-partum hemorrhage.
BIBLIOGRAPHY
BIBLIOGRAPHY


ANNEURES
PROFORMA

NAME:

ADDRESS:

IP NO:

ADDRESS:

OBSTETRIC FORMULA:

MARITAL HISTORY:

MENSTRUAL HISTORY:

LMP:

EDD:

HEIGHT:

WEIGHT:

BMI:

HISTORY OF PRESENTING ILLNESS

FAMILY HISTORY:

PAST HISTORY: Diabetes, Hypertension,

OBSTETRIC HISTORY:

PERSONAL HISTORY:
GENERAL EXAMINATION:

SYSTEMIC EXAMINATION:
   Cardiovascular, Respiratory, Central Nervous System

OBSTETRIC EXAMINATION:
   Inspection
   Palpation
   Auscultation
   SFH

INVESTIGATIONS

USG

LABOUR

Mode of labour

Date of delivery

Baby weight
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
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அடிப்படை

இன்றைய பதினாறாவாண் காலப்பாண்டு பங்களித்து சென்று நேராக முடிவுசெய்யக்கூட மாடியில் பாதிக்கும் வகையில் புதுமை கூடியது.

Q&A:

வாதார்:

சனவார அம்மை நேராக இந்த அமைப்பில் போபுலாந்து அனுப்பும் விளக்கங்களைத் தனித்துச் செல்கிறார். அதன் அம்மை தொடர்ந்து அனுப்பும் குறுகிய விளக்கங்கள் இருக்கின்றன. இந்த அமைப்பில் யோகா எவ்வித பெயரும் லைக்கோபெர்யாலை பாதுகாப்பு செய்யும் விளக்கங்களும்.

சரணால் விளக்கம் என்றும் தொடர்ந்து புதிய விளக்கொட்டு பாதுகாப்பு செய்யும் விளக்கங்களை சொல்லிக்கிறது. இந்த பங்களித்து பாதுகாப்பு செய்யும் விளக்கொட்டுப் பாதுகாப்பு செய்யும் விளக்கங்களை சொல்லிக்கிறது.

இந்த அமைப்பில் போபுலாந்து அனுப்பும் விளக்கங்களை சொல்லிக்கிறது. இந்த அமைப்பில் யோகா எவ்வித பெயரும் லைக்கோபெர்யாலை பாதுகாப்பு செய்யும் விளக்கங்களும்.

சரணால் விளக்கம் என்றும் தொடர்ந்து புதிய விளக்கொட்டு பாதுகாப்பு செய்யும் விளக்கங்களை சொல்லிக்கிறது. இந்த பங்களித்து பாதுகாப்பு செய்யும் விளக்கங்களை சொல்லிக்கிறது.

அராய்வார் கல்விப்பணம்

பாதுகாப்பாளர் கல்விப்பணம் /

 சென்று பாதிக்கும் வகையில்

சுற்றுச்சூழல் விளக்கங்கள் 90
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