A STUDY ON RISK STRATIFICATION OF ANTENATAL MOTHERS AT TERM AND IT'S IMPACT ON PRIMARY POSTPARTUM HEMORRHAGE AND LEVEL OF MANAGEMENT IN EACH RISK GROUP

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INTRODUCTION

INTRODUCTION

Postpartum haemorrhage (PPH) is a leading cause of maternal mortality and morbidity worldwide and 75-90% of these haemorrhage results from uterine atony. Delayed and substandard obstetrics care can kill a woman within hours of Major Obstetric Haemorrhage (MOH). Prenatal identification of at risk women, prompt assessment of blood loss, effective management and involvement of multidisciplinary teams is of utmost importance to save the lives of these women.

Postpartum haemorrhage is a leading cause of maternal mortality. The place of delivery and severity of haemorrhage determine the outcome. If the woman has developed PPH following delivery in a health facility, the immediate medical and surgical interventions are possible. It is not so, when woman delivers at home or in a small hospital ill equiped with facilities to manage obstetric emergencies. Diagnosis of PPH and decision to transfer to hospital or tertiary care centre is very crucial. Home deliveries and deliveries in small facilities have negativeinfluence on the outcome. Crucial time is lost in transfer of patient to higher centres. At times patients are transferred as per transfer protocols of the health care centres, which may further cause delay as small health facilities, including primary health centres and rural hospitals are not equipped with desired specialist manpower and blood transfusion facilities.

Postpartum hemorrhage (PPH) is the leading cause of maternal morbidity and mortality worldwide, and affects up to 10% of all deliveries. Although historically many definitions have been used, the American College of Obstetricians and Gynecologists' revitalize program, in an effort to standardize clinical definitions in

obstetrics, defines postpartum hemorrhage as blood loss greater than or equal to 1,000 mL or blood loss with signs or symptoms of hypovolemia within 24 hours of delivery whether cesarean section or vaginal birth.

Approximately 830 women die every day around the world as a result of pregnancy or childbirth-related complications with obstetric haemorrhage remaining a major causeof maternal morbidity and mortality. A World Health Organization (WHO) systematic analysis into the global causes of maternal deaths from 2003 to 2009 found haemorrhage to be the leading direct cause of maternal mortality followed by hypertensive disorders and sepsis. Overall, haemorrhage accounted for 27.1% of all maternal deaths worldwide.

Even in the developed world, obstetric haemorrhage remains one of the major causes of maternal death. The Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK)

Confidential Enquiries into Maternal Deaths found the mortality rate as a direct result of haemorrhage to be 0.55 per 100,000 maternities in the United Kingdom from 2011to 2013.

Obstetric haemorrhage encompasses both antepartum and postpartum haemorrhage (PPH).

PPH refers to excessive bleeding (more than 500 mL) from the genital tract following delivery. Women delivering by Caesarean section, however, generally lose more blood; therefore, a higher cut-off value of 1000 mL is used for significant blood loss. Massive PPH refers to the loss of 30%–40% of the patient's blood volume.

Risk factors for PPH.

- Age > 40 years
- High BMI
- Multiple pregnancy
- Placenta praevia
- Anaemia and grand multiparity
- Pre-eclampsia
- Hypertension
- Previous PPH
- Instrumental delivery
- Macrosomia
- Retained placenta
- Suspected or proven placental abruption
- Previous Caesarean sections – placenta accreta or percreta
- Prolonged third stage of labour

BMI: body mass index; PPH: postpartum haemorrhage.

PPH is classified as Primary if bleeding occurs within the first 24 h following delivery of the foetus. Secondary PPH occurs between 24 h and 12 weeks post-delivery.

Although the above arbitrary values guide clinical management, consideration should be given to factors that may predispose women to haemodynamic decompensation despite losing less blood, for example, women with preceding anaemia or those with low body mass index (BMI). The diagnosis of PPH, therefore, remains a subjective clinical assessment, which includes any degree of blood loss that threatens the woman's haemodynamic stability.

Risk factors

Risk factors for PPH may present antenatally or intrapartum. These are listed in Table 1. Clinicians must be aware of these factors when counselling women on the settings and place of delivery.

Women with previous Caesarean delivery as well as placenta praevia have a high incidence of placental abnormalities including placenta accreta, increta and percreta; placental location and anatomy should therefore be fully investigated in these women with a high index of suspicionof abnormal placental invasion.

Those who have a suspected diagnosis of abnormal placental invasion should have their care transferred to a multi-disciplinary setting with the appropriate level ofexpertise.

PPH can also occur in women with no identifiable riskfactors; therefore, clinicians should be prepared to manage this complication at every delivery and anticipation is essential to save lives.

Causes

prevention and management of PPH, the Society of Obstetricians and Gynaecologists of Canadasummarized the causes of PPH as one or more of four simple processes:

1. *Uterine atony* – PPH will occur if the uterus does not contract well enough to arrest bleeding at the placental site.
2. *Retained products* – retained products of conception or blood clots will contribute to PPH.
3. *Trauma* – genital tract trauma may cause bleeding and lead to large volume PPH especially if not identified promptly.

4. *Coagulation abnormalities* – clotting disorders can lead to PPH alone or in combination with the other factors. These abnormalities may be congenital or acquired.

These causes can be thought of as the 'Four T's' as a memory aid: Tone, Tissue, Trauma and Thrombin (Table 2).

Diagnosis and management

The diagnosis of PPH requires clinicians to recognize excessive bleeding and follow a systematic method to identify the cause. Its effective management requires a multi-disciplinary approach.

Clinical diagnosis is based on the following:

1. Blood loss > 500 mL following vaginal delivery.
2. Blood loss > 1000 mL following Caesarean section.
3. Signs of haemodynamic instability in the context of excessive bleeding following delivery.
4. Substantial drop in the haematocrit (American College of Obstetricians & Gynecologists [ACOG] 1998).

Once PPH has been diagnosed, there must be a multi- disciplinary and multi-professional team approach in managing it, as ongoing patient resuscitation should occur alongsideidentification and treatment of the cause of bleeding.

Tone

In the third stage of labour, myometrial contraction is responsible for separation of placental membranes as well as haemostasis, which is achieved by constriction of uterine blood vessels as the myometrium contracts. Active management of the third stage, which includes prophylactic use of uterotonic agents, controlled cord traction and usually early cord clamping has been shown to reduce the risk of primary blood loss of greater than 500 mL.

2. The 'Four Ts' mnemonic for causes of PPH.

T	Cause	Approximate incidence
Tone	Uterine atony	80%
Tissue	Retained tissue, invasive placenta	5%
Trauma	Genital tract laceration or tear, uterine rupture, uterine inversion	13%
Thrombin	Coagulopathy, disseminated intravascular coagulation (DIC)	2%

H: Ask for HELP and Hands on the uterus – uterine massage
A: Assess and resuscitate (vital signs, intravenous fluids, blood and blood products)
E: Establish aetiology, Ensure availability of blood and Ecbolics (oxytocin)
M: Massage uterus
O: oxytocin – oxytocin infusion/prostaglandins
S: Shift to theatre – bimanual compression
T: Tissue and trauma – exclude/manage/proceed to tamponade balloon
A: Apply B-Lynch/modified compression sutures
S: Systematic pelvic devascularization (uterine/ovarian/quadruple/internal iliac)
I: Interventional radiology – uterine artery embolization if appropriate
S: Subtotal/total abdominal hysterectomy

Management algorithm for atonic postpartum haemorrhage: HAEMOSTASIS.

oxytocin and ergometrine have been in use since the 19th century for the treatment of atonic PPH.

Uterine atony is the most common cause of PPH and is managed initially by bimanual uterine compression or massage as well as uterotonic treatments. Following delivery, careful examination of the uterus should be performed to assess uterine contraction and tone.

A management algorithm – 'HAEMOSTASIS' – has been described to aid systematic and stepwise management of atonic PPH (Box 1).

Once uterine atony is diagnosed, the following mechanical, pharmacological or surgical measures should be instigated to ensure uterine contraction and cessation of haemorrhage:

- Bimanual uterine massage

Once PPH is identified, the clinician should perform a bimanual examination of the uterus; if the uterus is soft or 'boggy', bimanual massage is initiated where one hand is placed in the vagina compressing the uterus and the other hand massages the fundus through the abdominal wall.

- Pharmacological management

Oxytocin, ergot alkaloids and prostaglandins are commonly used uterotonic agents. Prophylactic uterotonics should be offered routinely in all women as they reduce the risk of PPH by 60%.

- Syntocinon

Oxytocin is the first choice for the prevention of PPH and has fewer side effects compared to Ergot Alkaloids

- Ergometrine

Ergometrine is an Ergot Alkaloid (alpha adrenergic, dopaminergic and serotonin receptor agonist), which causes both the upper and lower segments of the uterus to con- tract. Its use is contraindicated in severe cardiac disease, hypertension as well as eclampsia.

- Syntometrine (a combination of oxytocin and ergometrine)
- Misoprostol

Misoprostol has been shown to be not as effective in comparison with oxytocin in reducing the incidence of PPH. However, in settings where no alternatives are available or in situations where resources are limited, misoprostol (600 μg orally) may be used to manage PPH.

- Carboprost (Hemabate)

Carboprost is a synthetic analogue of prostaglandin $F_{2\alpha}$ (15-methyl-$PGF_{2\alpha}$), which has oxytocin properties and therefore causes uterine contractions. It, therefore, has a role in managing atonic PPH.

- Tranexamic acid (1 g intravenously)

Tranexamic acid is an anti-fibrinolytic agent and should be considered in all cases of atonic and traumatic PPH to reduce the bleeding from the placental site and the site of trauma, respectively. It helps stabilize the blood clot by preventing breakdown of the

formed clot (i.e. fibrin) to fibrin degradation products

Balloon tamponade

Uterine tamponade can be attempted if bleeding continues despite conservative measures by using various balloons. These include the 'Bakri SOS' balloon or the Sengstaken–Blakemore oesophageal catheter. More commonly available Foley catheters can also be used.[5] Approximately 300–400 mL of sterile water or saline is used to infiltrate the catheter balloon to achieve the appropriate level of counter pressure to cease bleeding. Condous et al. have described the 'tamponade test', which has a positive predictive value of 87.5% for satisfactory management of PPH. If the test is positive, that is, the tamponade effect ceases bleeding, then the likeli- hood of need for further, more radical surgical intervention is minimal. If, however, the test is negative, then there is often the need for further intervention.

"Estimated blood loss" is perhaps the most common method used to assess blood loss at the time of delivery. Also known as "eyeball" estimation, estimated blood loss (EBL) mainly relies on a physician's opinion based on clinical experience and use of visual aids such as sponges, kidney dishes and sanitary pads. Despite the widespread utilizationof estimated blood loss, there have been inaccuracies and controversy in the literature described for many years on the utility and precision of visual aids. Buckland et al reportedthat visual aids such as kidney dishes or smaller containers were associated with more accurate estimation of blood loss than estimation of blood when soaked into linen or pads. On the other hand, the prospective simulation study by Brooks et al showed that the addition of visual aid led to overestimation of blood loss compared to just the use of a collector bag and baby scale. Larson and colleagues reported that standard estimation of blood loss with visual aids, pads, swabs and diapers have been proven to be imprecise and inaccurate both for vaginal delivery and cesarean section. Visual estimation is thought to be inaccurate amongst health care professionals and does not correlate with years of training and experience.

Simulation, teaching sessions and clinical reconstructions have been widely used in the clinical setting in an effort to improve clinical blood loss estimation skills.[8-11] However, the long-term benefit of such teaching tools has not been proven yet. A study by Toledo et al included 44 participants who underwent wed-based training of blood loss estimation. The post-training test, which was repeated 9 months later, showed a decline and inaccuracy of blood loss estimation skills remote from the didactic training. Simulation exercises increase the vigilance and accuracy of health care professionals initially, however education does not produce sustainable improvements in blood loss estimation.

Different specialties and disciplines have also reached to similar conclusions on the challenges of accuratelyestimating blood loss. A prospective blinded cross sectional study among emergency medical services (EMS) personnel, showed that EMS professionals were also inconsistent with the amount of blood loss. There was no correlationbetween accuracy and level of training. The conclusion was that time is better to be spent attending to patient rather than visually estimating blood loss given poor estimates of bleeding. Similarly, a study on anesthesia providers, showed comparable results, with accuracy of estimated blood loss not related to provider training, years of education, years of experience, gender, or ethnicity. These results are reinforced by the report of Rothermel et al, who showed that visual estimation of operative blood loss is unreliable and inaccurate amongst anesthesia providers, surgeons, nurses and practitioners.

Quantitative blood loss

Given that estimation has been shown to be inaccurate in the evaluation of blood loss, an effort has been made for quantification of blood loss during labor. The California Maternal Quality Care Collaborative (CMQCC) developed an obstetric hemorrhage toolkit which emphasizes the need for cumulative quantitative assessment of blood loss. Under-buttock drapes during vaginal deliveries and gram scales to weigh blood soaked materials have been proposed toquantitate blood loss more precisely. It is speculated that quantitative blood loss (QBL) has multiple advantages in comparison to EBL. It is believed that it leads to earlier interventions and improves the culture of drawing attention to blood loss.

Objective data can help the nurse mobilize the obstetrical team and additional resources earlier. Proponents highlight that even though resource needs for

quantitative blood loss measurement are higher than EBL, the use of under buttock drapes or newborn scales to weight the soaked material are overall economic and cost effective measures which offer an advantage to labor and delivery units.

Multiple studies have evaluated the role of QBL in labor and delivery. A study by Toledo et al, where 106 obstetrics and anesthesia providers were randomized to estimate simulated blood loss in calibrated or noncalibrated vaginal delivery drapes, showed that the use of calibrated drapes improved the accuracy of EBL compared to noncalibrated drapes, with error of < 15%. Visual estimation of blood loss was inaccurate compared to quantitative methods, irrespective of experience, level of training or specialty. The discrepancy

was higher with increasing blood volume. A randomized controlled trial by Patel et al has also reported superiority of QBL. In this study, women were randomized to visual or drape estimation of blood loss at the time of delivery. EBL was shown to underestimate postpartum blood loss by 33% when compared to QBL. Additionally, the authors performed spectrometry in 10 patients and found a high correlation between blood loss and QBL. Similarly, a prospective study by Kadri et al, which included 150 women who had a vaginal delivery compared visual assessment of blood loss versus gravimetric measurement via measurement of weight of soaked materials. Health care providers underestimated blood loss by 30%, when visually calculating blood losscompared to gravimetric measurement.

Given the challenges of existing techniques to accurately calculate the measurement of blood loss, recently both invitro and clinical studies in obstetrics and also other surgical fields have investigated Triton, a novel mobile monitoring system. It measures hemoglobin loss absorbed by surgical sponges using a platform. Images of blood soaked sponged are captured and transferred to a remote server. Feature Extraction Technology is used to provide an

accurate and precise measurement of blood loss. It is speculated that it provides precise measurement ofhemoglobin on surgical sponges compared to manual rinsing measurements and is more accurate than gravimetric evaluation. However, further studies, in a larger set of patients, are needed to better evaluate the clinical use of this new technology and the role of Triton in labor and delivery.

Risk assessment

Both estimated and quantitative blood loss can be inaccurate and cannot predict or reduce the risk of PPH. Thus, early identification of risk factors for postpartum hemorrhage can lead to both awareness and preparedness for high blood loss. Risk assessments should be undertaken during prenatal visits, antepartum care, admission to labor and delivery, during the labor and postpartum course, as risk factors can change or evolve during labor course. Identifying the risk factors in each case provides the teamthe opportunity to prepare, confirm that supplies and blood products are available for use, get appropriate specialties involved in the care of patients and possibly transfer high

risk patients to other facilities in a timely fashion. Women with pregnancy complications that are at risk for hemorrhage such as placentation anomalies, should be transferred to centers which specialize in the management of such pregnancy complications with the help of a multidisciplinary team. Even though there are multiple validated risk assessment tools available to help providers identify women at high risk, (table 1) these tools can only be used as a guidance because they identify only a fraction of women who will have postpartum hemorrhage.

Vital signs and symptoms of hemorrhage

In addition to meticulous estimation of blood loss in cases of postpartum hemorrhage, careful observation of clinical signs is also vital. Low systolic blood pressure, tachycardia, and raised respiratory rate have been historically used as signs of hypovolemia. According to the Advance Trauma Life Support (ATLS) calcification, tachycardia with heart rate over 100 beats per minute (bpm), decreased pulse pressure and respiratory rate (RR) 20-30 correlates with 15% of blood volume lost, whereas decreased blood pressure, tachycardia over 120 bpm and RR 30-40 correlates with 30-40% of blood volume lost.

Many studies have challenged the use of vital signs cut offs in the setting of hemorrhage. Brasel et al, in a study which included the records of more than 10,000 trauma patients, reported that increased heart rate over 100bpm, did not

predict the need for immediate intervention in trauma patients. Similarly, Victorino et al, also showed that tachycardia is not a reliable sign of hypotension in surgical trauma patients. Even though it is independently associated with hypotension, absence of tachycardia is not indicative of absence of significant blood loss. Other studies have also questioned the validity of vital signs in trauma patients, showing that an association exists between tachycardia, lower systolic blood pressure and raised RR,but not to the degree reported in ATLS guidelines. A systematic review including 30 studies on the association of blood loss with clinical signs and symptoms reported a significant variability between blood loss and clinical signs. Thus, it is very challenging to establish specific cut off points for vital signs which could alert providers and trigger an expedited team response and action.

Most studies in the literature include mainly surgical patients and are not focused on the obstetric population. Changes in maternal physiology such as increase in maternal blood volume and cardiac output, could affect the role of vital signs as a surrogate for blood loss in pregnancy. Case reviews of maternal deaths led to the proposed Maternal Early Warning Criteria, which indicate vital sign parameters that should trigger prompt patient evaluation and management such as systolic and diastolic blood pressure, heart rate, respiratory rate, oxygen saturation, oliguria, maternal agitation, confusion or unresponsiveness. However, this list of parameters only provides guidelines to help alert providers and prevent delay in recognition of severe hemorrhage or other emergencies.

Since change of vital signs do not always correlate with the amount of blood loss, other clinical signs that could have a predictive value in the setting of postpartum hemorrhage have been studied. The shock index (SI) is calculated as the heart rate divided by the systolic blood pressure and can be an accurate predictor of cardiovascular changes secondaryto blood loss even in patients who otherwise would be considered normotensive. The SI represents a more reliable indicator of hemodynamic changes secondary to blood loss. Values over 0.9 have been associated with higher bleeding and mortality in trauma patients. An elevated SI greater than 0.9 has been shown to be associated with massive transfusion, and is a strongpredictor of ICU admissions and adverse outcomes in women with PP hemorrhage. Further prospective studies are needed to validate the role of SI in obstetric population, but it is a promising index that could be combined with the Maternal Early Warning Criteria and thus lead to earlier intervention and action.

Ultimately, even in the setting of normal vital signs, initiation of treatment for suspected or evolving PPH should not be delayed. When a clinically significant hemorrhage is identified, even without change in vital signs, medical management with uterotonic medications should be initiated, adequate intravenous access should be established and transfusion should be promptly initiated. With continued bleeding or abnormal vital signs, aggressive escalation

of therapy should be undertaken including massive transfusion protocol and transfer to the operating room for surgical interventions

The third stage of labor refers to the period following the deliveryof the fetus to the delivery of placenta.

Relatively little thought or teaching seems to be devoted to thethird stage of labor compared with that given to first & second stages. A leading North American obstetrics text devotes only 4 of more than 1500 paper to third stage of labor but significantly more to the complicationsthat may arise immediately following delivery (Cunningham, 2001).

One author states, "This indeed is the unforgiving stage of laborand in it there lurks more unheralded treachery than in both the other stages combined. The normal case can, within a minute, become abnormal and successful delivery can turn swiftly to disaster" (Donald, 1979).

About 5.29 lakh mothers die in child birth every year in the world (WHO, 2004). Maternal mortality and morbidity is 50 times more common in developing countries than in developed countries (Kwast et al, 1986). According to WHO report 2004, maternal mortality ratio are shown as MMR per 1 lakh Live Birth.

Region	MMR	No of Maternal death
World average	400	529000
Developed Countries	<20	2500
Asia	330	253000
Africa	830	251000
Latin America	190	22000
Oceana	240	530
India	307	136000

MMR in South East Asia

Srilanka	30
China	115
Thailand	200
Pakistan	340
India	307
Bangladesh	850

With 16% of world's population, India counts for over 20% ofworld's maternal death. The maternal mortality ratio is incredibly high at 307/100,000 LB which is unacceptable when, other health and economic indicators are showing an upward trend in India.

‘Make every mother & child count’

‘More than half a million women will die in pregnancy, childbirth or soon after that. Reducing the toll in line with the Millennium Development Goal depends largely on every mother having right to access to health care.

According to WHO 2005, contributors to maternal mortality ratio are

PPH	25%
Infection	13%
Anemia	19%
Eclampsia	12%
Obstructed labor	8%
Complication of abortion	13%
Others	9%

PPH remains the most common cause of maternal death in developing countries. The condition has not changed for over a century. WHO statistics suggest that 25% of maternal deaths are due to PPH accounting for more than 100,000 maternal deaths per year (Abouzahr,1998). The death of these mothers has serious complications for the newborn and any other surviving children.

There were nearly 1000 maternal deaths in TamilNadu in 2005-06 with a MMR of 92/100,000 live births out of which nearly 35% is due to hemorrhage (National Family Health Survey III).

Several complication encountered in the third stage of labor may lead to maternal morbidity. PPH leads to poor iron reserves, ultimately contributing to anemia. Anemia may cause weakness & fatigue. Hospitalization may be prolonged and establishment of breastfeeding may be affected. A blood transfusion may ameliorate the anemia and shorten the hospital stay, but it carries the risk of transfusion reaction and infection. Access to safe blood is not universal and PPH can sometimes strain the resources of the best blood bank. The primary aim in the management of PPH should be its prevention (Chamberlain 1992). Uterine atony remains the major cause of PPH. Adequate contraction & retraction of it is essential for prevention of PPH.

Active management of third stage of labor (Reproductive Health Research, WHO, 2003)

1. administration of oxytocins within 1 min of baby's birth
2. controlled cord traction with counter traction.
3. Uterine massage.

The Hinchingbrooke randomised controlled trial, reported in Lancet in 1998, and concluded that PPH was significantly lower in active management compared to expectant management (6.8% Vs 16.5% respectively). Bristol trial demonstrated significant reduction in incidence of PPH with active management as compared to expectant management (5.9% Vs 17.9%).

Active management of 3rd stage of labor with prophylacticoxytocin, controlled cord traction and uterine message has made the III stage of labor less hazardous. Careful vigilance during the short interval between the delivery of baby and placenta will go a long way in decreasing retained placenta with its attendant risks. Though active management of labor has become a routine in most of the centers, in this part of country, 3rd stage of labor is still managed by conventional methods in many places unless the patient's condition warrants prophylactic intervention. This preliminary study was undertaken to analyse the superiority or otherwise of active management of 3rd stage of labor is a conventional method of giving IV methyl ergometrine after delivery of placenta.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

The traditional conservative attitude to the management of third stage is changing. Recently, the decrease in the complication of third stage of labor has been attributed to wider judicious use of oxytocin preparations and a change from expectant conservatism to an intelligent active intervention.

Brandt (1983) explained the mechanism of separation and expulsion of the placenta in detail. Brandt's technique consisted of clamping the umbilical cord close to the vulva, immediately after thedelivery of the infant. The uterus is palpated gently without massage to determine whether firm contractions are occurring. After several uterine contractions a change in size and shape of uterus indicates separation of placenta. Then the clamp at the vulva is held firmly with one hand andthe finger tips of the other hand are placed on the abdomen and pressed between the fundus and symphysis pubis to elevate the fundus. On doing so, if placenta is separated the cord will extrude into the vagina. Further elevation of fundus and traction of cord deliver the placenta.

Andrews (1940) working independently described a similar method of expulsion of placenta and obtained good results. Brews (1948) Gibbard (1955) allowed fundal pressure on the uterus as a method of assisting the delivery of separated placenta. Browne and Mccluse (1955) pointed out that Crede's method can cause shock.

The Brandt – Andrews technique was described by De-Lee, Greenhill (1947) and advocated because the Crede's method has potential dangers.

Norman Kimbell modified the technique. Instead of using a hand to grasp the umbilical cord he used forceps. The modified technique is as follows: A pair of forceps is placed on the umbilical cord as close to the vulva. One hand grasps the forceps and the other hand is placed on the abdomen. The uterus is gently pressed backwards and upwards towards umbilicus, at the same time steady traction given on the umbilical cord.

Picton (1951) advocated Brandt Andrew's technique for conducting the normal third stage. He advised IV Ergometrine with the birth of anterior shoulder. Those who have used Brandt-Andrews technique extensively and advocate its routine use are Dee-Lee (1947), Picton (1951), Kimbell (1958), Greenhill (1960), Clyne (1963), Brews(1963), Donald (1964), Hibbard (1964). Others favoring Brandt-Andrews method are Morris (1951), Elwin (1960), Frader and Tatford (1961), Shaw (1949), and Tritch and Schneider (1945). Naidu et al (1955)

described Brandt-Andrews method as safe, simple and free from dangerof inversion.

Spencer (1962) has modified Brandt-Andrews method by combining it with an oxytocin given intravenously at the time of deliveryof the anterior shoulder and replaced the term to controlled cord traction.

Lister (1950) and Martin and Dumoulin (1955) established that intravenous ergometrine given with the birth of head or anterior shoulder reduces the risk of hemorrhage but has some disadvantages. The injection has to be precisely timed and it requires the presence of a second attendant at the time of delivery. Intramuscular ergometrine is less satisfactory mainly because it is slower in action (Embrey, 1961), but it has been advocated by Duly (1951) who reported a considerable improvement on physiological management of third stage.

Kimbell (1954, 1958) added hyaluronidase to the intramuscular injection to speed up the action of ergometrine. He reported very good results and these were confirmed by Dutton (1958).

Embrey and his collegues (1963) have shown that a mixture of syntocinon and ergometrine acts more quickly than ergometrine and hyaluronidase and it is more effective when given by intramuscular injection. There seems to be tendency when ergometrine is given earlier,

for the placenta to be retained either by generalized contraction or an hourglass contraction of uterus. In all reported series the manual removal of placenta is over 1%. Davis and Boynton (1942) met with retained placenta in 0.8% of cases which necessitated manual removal of placenta as Credes's expression. Shaw (1949) did not find any significant difference between control and study cases after administration of ergometrine. Schade (1950) reported an insignificant percentage of complications. Bose (1955) reported retained placenta in 2.5 percent ofhis cases. Naidu (1955) also feels satisfied with the results of this drugas there was almost a complete absence of retained placenta.

Methyl ergometrine (methergin) is a superior drug than ergometrine in reducing the duration of third stage as quoted by Riordan (1950) and Cruden(1953). Methyl ergometrine is one and half times stronger in its oxytocin effects than ergometrine (Gill, 1947).

Leff(1952) used synthetic preparations of oxytocin in combination with methyl ergometrine and a few have used it separately. In the whole series pitocin stands equally but in no way better than methyl ergometrine.

Intravenous ergometrine acts in 45 seconds, intramuscular ergometrine in 7 minutes, and intramuscular ergometrine with hyalse 4 minutes 47 seconds.

Embrey found that after ergometrine, there was a well marked uterine spasm for 45 minutes, followed by evidence of contraction for 3 hours.

Fleigner – JR (1978) compared the advantages and disadvantages of the traditional method versus the use of controlled cord traction. It is recommended that ergometrine (0.25mg) be administered intravenously after delivery of the baby and the exclusion of a second twin.

Vere (1978) recommend the intramuscular use of oxytocin agents for prophylactic management of the third stage oflabor. Van-Coeverden (1982) introduced a revised scheme of management of third stage of labor. Patients received synthetic oxytocin
5 IU intramuscularly with the delivery of the anterior shoulder
and ergometrinemaleate 0.5 mg intramuscularly after delivery of theplacenta. In this study a significant decrease in the incidence of postpartum hemorrhage and retained placenta was observed.

Heinonen et al (1985) stressed upon the pharmacologic management and controlled cord traction in the third stage of labor. The work comprised of active management of the third stage of labor over a period of 15 years, consisted of intramuscularly administered

combination of ergometrine(0.2 mg) and oxytocin(5 units) and controlled cord traction as mechanical assistance in delivery of the placenta

Thornton et al (1988) compared the natural and active management of third stage of labor and plasma oxytocin during third stage of labor. They have recommended routine administration of intramuscular oxytocin during the third stage

Elbourne D(1988) stressed the fact that prophylactic use of oxytocin

reduces the risk of postpartum hemorrhage by about 40% based on the evidence from controlled trials.

Candussi – G (1989) compared the use of oxytocin and ergometrine maleate and stated the usefulness of both drugs in the active management of the third stage of labor.

Poeschman – RP et al made a randomized comparison of oxytocin, sulprostone and placebo in the management of the third stage of labor. The effects on post partum blood loss, following prophylactic administration of oxytocin and sulprostone were compared. Postpartum blood loss was reduced almost equally by about 35% by both oxytocinand sulprostone. Mean length of third stage was short in both groups receiving the active treatment.

Prendiville et al., Harding et al., in 1988 in the Bristol trial compared the efficacy of Active Management of Third stage Labor with Expectant Management. The rate of PPH was high in control than inActive Management of Third stage Labor even in low risk group (17.9% Vs 5.91%). Duration of third stage labor (15min in Expectant Management Vs 5 min in Active Management of Third stage Labor), blood loss in third stage and need for therapeutic oxytocin (2.9.7% Vs 6.4%) was also high.

Rogers et al., Wood et al., (1998) in Hinchingbrooke RCT compared the rate of primary PPH and long term consequences between Active Management of Third stage Labor and EMTL group, in womenat low risk for PPH. They found a significant reduction in the rate of PPH (6.8% in Active Management of Third stage Labor Vs 16.5 % in Expectant Management).

Thilaganathan et al (1993) in U.K. compared Active Management of Third stage Labor Vs Expectant Management in low risk women. The duration of third stage was significantly longer in Physiological group. But there was no significant difference in estimated blood loss.

The Cochrane systemic review (2000) identified 5 RCTscomparing Active Management of Third stage Labor with Expectant

Management. Active Management was associated with a reduced risk of PPH and severe PPH, a shorter third stage, a reduced risk of anemia, a decreased need for blood transfusion and a decreased need for additional uterotonics. It was associated with increased risk of maternal nausea, vomiting and elevated BP.

David Chelmov et al, (2004) studied the efficacy of active management. IV oxytocin given after delivery of placenta were taken as control. Active management significantly reduced the risk of PPH, postpartum hemoglobin level, need for transfusion and additional medication. There was no significant difference in the need for manual removal of placenta.

Joshua et al in 2005 showed that active management of thirdstage labor was effective in reducing the postpartum blood loss, and the rate of PPH in rural American Indian women.

Tsu et al, Mai et al (2006) in Vietnam, studied the effectivenessof Active Management of Third stage Labor using Government midwives. Active Management of Third stage Labor was associated with reduced risk of prolonged third stage beyond 30 min, supplemental oxytocin and bimanual compression. Active Management of Third stage Labor was associated with 34% reduction of PPH.

Maughan et al., in 2006 showed that Active Management of Third stage Labor provides a better balance of benefits and harm (evidence level A) as compared to other conventional methods (giving uterotonics with delivery of anterior shoulder or after delivery of placenta, with evidence level of B)

Fullerton et al., Frick et al., in 2006 in Guatemala and Zambia studied the net benefit of using Active Management of Third stage Labor rather than Expectant Management. A positive net benefit is from Active Management of Third stage Labor with a net saving of $18000 US in Guatemala (with 100 lives saved) & US $ 145000 in Zambia (with 467 lives saved for 100000 births.

Physiology of third stage of labor

The 3rd stage of labor commences with delivery of the infant and ends with delivery of the placenta. Mean length is 6 minutes and the 97 th percentile is 30minutes.

Physiological mechanism in the delivery of the placenta

Uterine contractions continue after the birth of infant and intrauterine pressure continues to be rhythmically raised. After delivery of the infant the uterine muscle contract and retract with resultant shortening of the upper segment. This shortening reduces the area of the uterine surface to which the relatively incompressible placenta isattached. Separation of placenta occurs as a result of retraction and the consequent reduction in intrauterine volume tends to force the placenta in to the relaxed lower segment (Mac person & Wilson 1965). When the separation is complete, placenta is forced into the vagina and it may be delivered spontaneously by maternal efforts.

The continued retraction of the uterine muscle is of paramountimportance in minimizing the blood loss. The blood vessels supplying the placenta site are compressed by the oblique fibers of the middle layer of myometrium,

"the living ligatures" (Basket, 1999).Blood flow through the placenta at term is 700 ml/mt. This has to be arrested within seconds following placenta separation otherwise serious hemorrhage will occur.

Any factor that hinders uterine contraction and retraction, predisposes to hemorrhage. E.g. atony of uterus, due to antepartum hemorrhage, over distended uterus and prolonged labor.

Mechanism of placental separation

In Matthew Duncan method the lower edge of placenta present first at the vulva, there is marginal separation of placenta.

In Schultz method (more common) the placenta is delivered like an inverted umbrella the fetal surface appearing first with membrane covering the maternal surface.

Signs of placental Separation

(Sleep 1993, Cunningham 2001)

a) The most reliable sign is lengthening of the umbilical cord asthe placenta separates & is pushed into the lower segment by progressive uterine retraction.

b) The uterus becomes more globular and firmer.

c) The uterus raises in the abdomen .The descent of placenta into lower segment and into vagina, displaces the uterus upward.

d) The gush of blood occurs.

Management of III stage of labor

1. Expectant Management (Physiological)

- awaiting the spontaneous separation of placenta, ensure thatuterus is firmly contracted.
- Mother is asked to bear down & placenta is delivered by gravity
- oxytocin are not used or used after delivery of placenta.
- If placenta is not delivered spontaneously, wait and try puttingbaby to breast & encourage maternal effort.
- Measures such as nipple stimulation or postural changes may be employed.

2. Active Management. (Reproductive Health Research, WHO, 2003), [FIGO, 2005]

- Administration of uterotonic agents within 1min of delivery ofbaby.

- Controlled cord traction with counter traction.

- Uterine massage after delivery of placenta.

Active management was first described by Thilaganathan & collegues in 1998.

Components of active management

1. Uterotonic agents.

Within one min of delivery of baby palpate the abdomen to rule out additional baby and give any one of these

a. Oxytocin 10 1U IM

b. Ergometrine 0.2mg IM/IV

c. Syntometrine (1ampule) IM [0.5mg of ergometrine +5u oxytocin]

d. Misoprostol 40-600 mcg orally

Prophylactic Methylergometrine is known to increase BP, hence avoided in PIH & cardiac disease.

2. Controlled cord traction:

- Clamp the cord close to the perineum using sponge forceps. Hold the clamped cord and the end of forceps with one hand.

- Place the other hand just above the woman's pubic symphysis and stabilize the uterus by applying counter traction during Cord traction. This helps prevent inversion of uterus.

- Keep slight tension on the cord and wait for a strong uterine contraction (2-3min)

- When uterus becomes rounded or cord lengthens, very gentlypull downward and backward on the cord to deliver the placenta. Do not wait for gush of blood before applying traction on the cord. Continue to apply counter traction to the uteruswith other hand.

- If placenta does not descend during 30-40 seconds of Controlled Cord Traction (i.e. no signs of separation) do not continue to pull the cord. Wait for next contraction.

- With next contraction, repeat Cord traction with countertraction.

- As placenta delivers, the thin membranes can tear off. Hold the placenta in two hands and gently turn it until the membranes are twisted. Slowly pull to complete the delivery.

- If membranes tear, gently examine the upper vagina & cervix wearing high-level disinfected gloves & use a sponge forceps to remove any pieces of membrane that are present. Carefully examine the placenta for missing cotyledons or membranes

If delivery of placenta is not achieved within 20-30mins, one should be ready for manual removal of placenta.

If portion of maternal surface is missing or there are torn membranes with vessels suspect retained placenta.

3. Uterine massage

- Immediately after delivery of the placenta, massage the fundus of uterus until the uterus is contracted.
- Palpate for a contracted uterus every 15min & repeat uterine massage as needed during the first 2 hrs.
- Ensure that uterus does not become relaxed (soft) after uterine massage is stopped.

When the oxytocin is not given until after the delivery of the placenta, it is necessary to relay on spontaneous uterine contraction for the complete separation from its attachment & then expel into vagina. Contractions are ineffective sometimes, hence there is a risk of hemorrhage with partial separation of placenta.

NHM guidelines

Obstetric Hemorrhage Emergency Plan Checklist				
Admission hemorrhage Risk Factor Evaluation				
LOW RISK		**MEDIUM RISK**		**HIGH RISK**
Singleton Pregnancy		Multiple Gestation		Placenta previa, low lying placenta
No previous uterine scar		Previous CS or uterine scar		Suspected placenta accreta, percreta
Not a Higher Order Birth		HOB		Anemia, severe pe and other risk factors
No previous h/o PPH		Previous h/o PPH		Platelets <100,000
No known bleeding disorder		Chorioamnionitis		Active bleeding on admission - aph
		Large/multiple uterine fibroids		Known coagulopathy
Stage 0 All Pregnancies Prevention and recognition of obstetric hemorrhage				

ACOG RISK ASSESSMENT TOOLS

OBSTETRIC HEMORRHAGE

Risk Assessment Tables

LABOR & DELIVERY ADMISSION		
	MEDIUM RISK	HIGH RISK
RISK FACTORS	☐ Prior cesarean, uterine surgery, or multiple laparotomies	☐ Placenta previa/low lying
	☐ Multiple gestation	☐ Suspected accreta/percreta
	☐ > 4 prior births	☐ Platelet count < 70,000
	☐ Prior PPH	☐ Active bleeding
	☐ Large myomas	☐ Known coagulopathy
	☐ EFW > 4000 g	☐ 2 or more medium risk factors
	☐ Obesity (BMI > 40)	/
	☐ Hematocrit < 30% & other risk	/
INTERVENTION	☐ Type & SCREEN, review protocol	☐ Type & CROSS, review protocol

INTRAPARTUM

	MEDIUM RISK	HIGH RISK
RISK FACTORS	☐ Chorioamnionitis	☐ New active bleeding
	☐ Prolonged oxytocin > 24 hours	☐ 2 or more medium (admission and/or intrapartum) risk factors
	☐ Prolonged 2nd stage	/
	☐ Magnesium sulfate	/
INTERVENTION	☐ Type & SCREEN, review protocol	☐ Type & CROSS, review protocol

** Establish a culture of huddles for high-risk patients and post-event debriefing **

REVISED OCTOBER 2015

Safe Motherhood Initiative

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Stage 1: Blood loss > 500 mL vaginal OR blood loss > 1000 mL cesarean with normal vital signs and lab values

Initial Steps:

- ☐ Ensure 16G or 18G IV Access
- ☐ Increase IV fluid (crystalloid without oxytocin)
- ☐ Insert indwelling urinary catheter
- ☐ Fundal massage

Medications:

- ☐ Ensure appropriate medications given patient history
- ☐ Increase oxytocin, additional uterotonics

Blood Bank:

- ☐ Type and Crossmatch 2 units RBCs

Action:

- ☐ Determine etiology and treat
- ☐ Prepare OR, if clinically indicated (optimize visualization/examination)

Oxytocin (Pitocin):
10-40 units per 500-1000mL solution

Methylergonovine (Methergine):
0.2 milligrams IM (may repeat);
Avoid with hypertension

15-methyl $PGF_2\alpha$ (Hemabate, Carboprost):
250 micrograms IM (may repeat in q15 minutes, maximum 8 doses); **Avoid with asthma; use with caution with hypertension**

Misoprostol (Cytotec):
800-1000 micrograms PR
600 micrograms PO or 800 micrograms SL

Tone (i.e., atony)
Trauma (i.e., laceration)
Tissue (i.e., retained products)
Thrombin (i.e., coagulation dysfunction)

Stage 2: Continued Bleeding (EBL up to 1500mL OR > 2 uterotonics) with normal vital signs and lab values

Initial Steps:

- ☐ Mobilize additional help
- ☐ Place 2nd IV (16-18G)
- ☐ Draw STAT labs (CBC, Coags, Fibrinogen)
- ☐ Prepare OR

Medications:

- ☐ Continue Stage 1 medications; consider TXA

Tranexamic Acid (TXA)
1 gram IV over 10 min (add 1 gram vial to 100mL NS & give over 10 min; may be repeated once after 30 min)

Blood Bank:

- ☐ Obtain 2 units RBCs (DO NOT wait for labs. Transfuse per clinical signs/symptoms)
- ☐ Thaw 2 units FFP

Action:

- ☐ For uterine atony --> consider uterine balloon or packing, possible surgical interventions
- ☐ Consider moving patient to OR
- ☐ Escalate therapy with goal of hemostasis

Possible interventions:
- Bakri balloon
- Compression suture/B-Lynch suture
- Uterine artery ligation
- Hysterectomy

Huddle and move to Stage 3 if continued blood loss and/or abnormal VS

Safe Motherhood Initiative

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Stage 3: Continued Bleeding (EBL > 1500mL OR > 2 RBCs given OR at risk for occult bleeding/coagulopathy OR any patient with abnormal vital signs/labs/oliguria)

Initial Steps:

- ☐ Mobilize additional help
- ☐ Move to OR
- ☐ Announce clinical status (vital signs, cumulative blood loss, etiology)
- ☐ Outline and communicate plan

Medicatons:

- ☐ Continue Stage 1 medications; consider TXA

Blood Bank:

- ☐ Initiate Massive Transfusion Protocol (If clinical coagulopathy: add cryoprecipitate, consult for additional agents)

Action:

- ☐ Achieve hemostasis, intervention based on etiology
- ☐ Escalate interventions

Oxytocin (Pitocin):
10-40 units per 500-1000mL solution

Methylergonovine (Methergine):
0.2 milligrams IM (may repeat);
Avoid with hypertension

15-methyl PGF$_{2\alpha}$ (Hemabate, Carboprost):
250 micrograms IM
(may repeat in q15 minutes, maximum 8 doses)
Avoid with asthma;
use with caution with hypertension

Misoprostol (Cytotec):
800-1000 micrograms PR
600 micrograms PO or 800 micrograms SL

Tranexamic Acid (TXA)
1 gram IV over 10 min (add 1 gram vial to 100mL NS & give over 10 min; may be repeated once after 30 min)

Possible Interventions:
- Bakri balloon
- Compression suture/B-Lynch suture
- Uterine artery ligation
- Hysterectomy

Stage 4: Cardiovascular Collapse (massive hemorrhage, profound hypovolemic shock, or amniotic fluid embolism)

Initial Step:

- ☐ Mobilize additional resources

Medications:

- ☐ ACLS

Blood Bank:

- ☐ Simultaneous aggressive massive transfusion

Action:

- ☐ Immediate surgical intervention to ensure hemostasis (hysterectomy)

Post-Hemorrhage Management

- Determine disposition of patient
- Debrief with the whole obstetric care team
- Debrief with patient and family
- Document

Revised July 2018

Safe Motherhood Initiative

ACOG

AIM&OBJECTIVES OF THE STUDY

AIM & OBJECTIVES OF THE STUDY

AIM

To study the impact of risk stratification of antenatal mothers onprimary postpartum hemorrhage and the level of management in each risk group

OBJECTIVES

1. To stratify AN patients into risk groups based on maternalclinical characteristics and medical history

To study it's impact on postpartum hemorrhage (PPH) and followup the patients in each risk group and study the levels of management needed for the control of PPH.

MATERIALS AND METHODS

MATERIALS AND METHODS

Study design : **Descriptive- longitudinal study**

Place of Study : Department of Obstetrics and Gynecology at the Govt. RSRM Lying in Hospital,Chennai.

Study period : November 2020 to October 2021.

The study was approved by the hospital ethical committee.

- All antenatal mothers admitted at term during my study period are included in this study and Risk factor evaluation based on history and clinical characteristics is done
- Singleton pregnancy, no previous uterine scar, not a higher order birth, no previous h/o of PPH, no known bleeding disorder are categorized as low risk.

- Multiple gestation, previous c-section or uterine scar,HOB,previous h/o PPH, chorioamnioitis, large/multiple uterine fibroid are categorized as medium risk.

- Placenta previa, low lying placenta,suspected placenta accreta/ placentapercreta, anaemia, severe preeclampsia , platelets<1 lakh,active bleeding on admission-APH,known coagulopathy are categorized as high risk.

On admission ABO grouping and Rh typing is verified from AN records,if not done/records not available,propergrouping and typing is done.

For medium risk patients 1 unit PRBC crossmatched and kept ready

- For High risk patients-2 units PRBC reserved,OT staffs and Anaesthesiologist are informed prior.

The development of additional risk factors during labour- prolonged 2nd stage, prolonged oxytocin use, active bleeding,chorioamnioitis if present increases the risk level.

- Multiple risk factors also considered as high risk.

- Quantitative evaluation of blood loss(using blood drape or other measuring techniques)is done and vitals are monitored.
-
- Blood loss more than 500ml in vaginal delivery /1000 ml for CS in non anaemic mothers/ alteration in vitals- tachycardia,BP <90/60mmHg is considered to be primary PPH.

LEVELS OF MANAGEMENT

Level 1

1. Establish IV access

2.start oxytocin 20units in 500ml RL@ 40drops/min

3.0.2mg methlergometrine (if patient is not hypertensive/cardiac disease)

4.Inj.carboprost 250mcg IM,

5.T.misoprostol 800-1000microgmPR

6.Monitor vitals

7.Empty bladder and continuous bladder drainage,

8.Start o2@6-8 l through mask

9.Get crossmatched blood

10.Rule out retained placenta,traumatic PPH,consider otheretiology

11.If bleeding continues move on to level 2

Level 2 management-

1.Continue oxytocin infusion

2.Repeat inj.carboprost 250mcg IM

3.Start blood

4. IV blood and blood products as per massive transfusionprotocol

5. if uterus atonic perform uterine balloon tamponade

6. If there are retained placental bits- do MVA/D&C

7. 7.If traumatic PPH is identified repair laceration

8. 8.if PPH after Csection-perform B-Lynch suturing

9.If PPH due to uterine inversion uterine inversion-performrepositioning

Level 3

- -if cumulative blood loss >1500ml, vitals sign unstable and if cases of suspected DIC, level 3 management started
- Massive blood transfusion in the range of 1:1:1 PRBC:FFP:platelets
- 2.ABG analysis

3.Early intubation and ventilatory support

- 4.Ensurance of CVP lines
- 5.Ionotrophic support
- 6.Monitoring of electrolytes level
- 7.perform uterine artery ligation

8.if PPH not controlled perform hysterectomy.

Inclusion criteria

All mothers who are admitted at term during study period

Exclusion criteria

Mothers who are not able to communicate the consent forstudy

critically ill/sick mothers at the time of data collection

Sample size

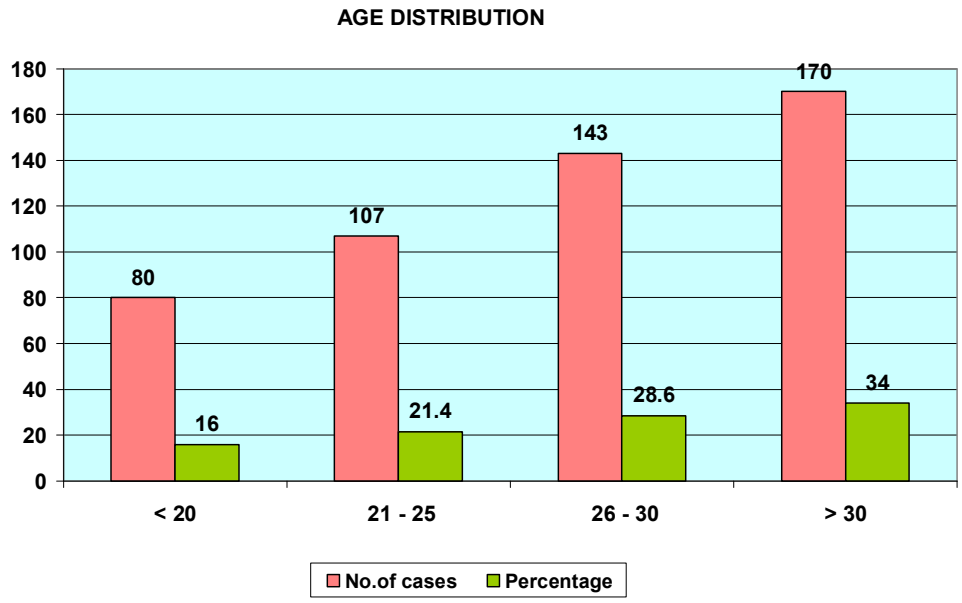
All antenatal mothers who are admitted at term during my studyperiod.I stop my study once I reach a sample size of 500

OBSERVATION AND RESULTS

OBSERVATION AND RESULTS

TABLE I: AGE DISTRIBUTION

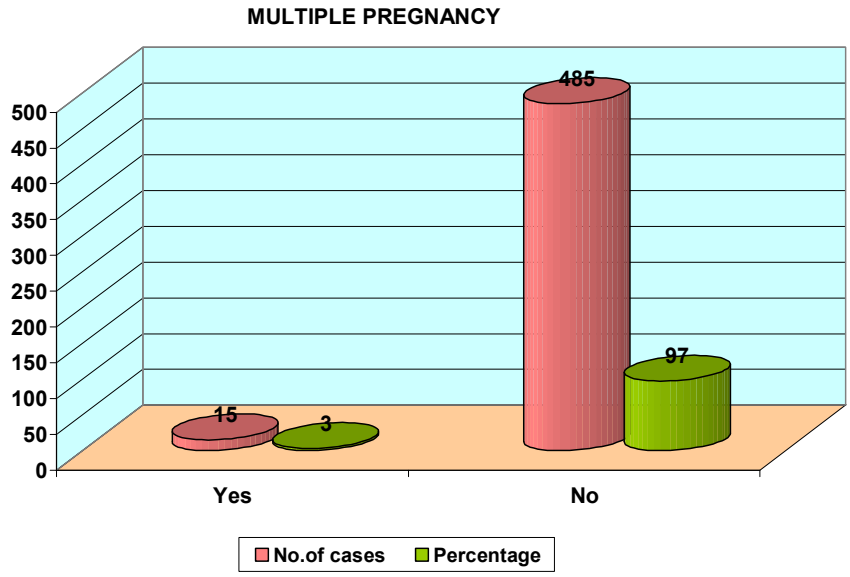
Age in years	No.of cases	Percentage
≤ 20	80	16
21 - 25	107	21.4
26 - 30	143	28.6
> 30	170	34
Total	500	100



34**%** lies in age group >30, followed by 28% lies in age group 26-30.

TABLE 2

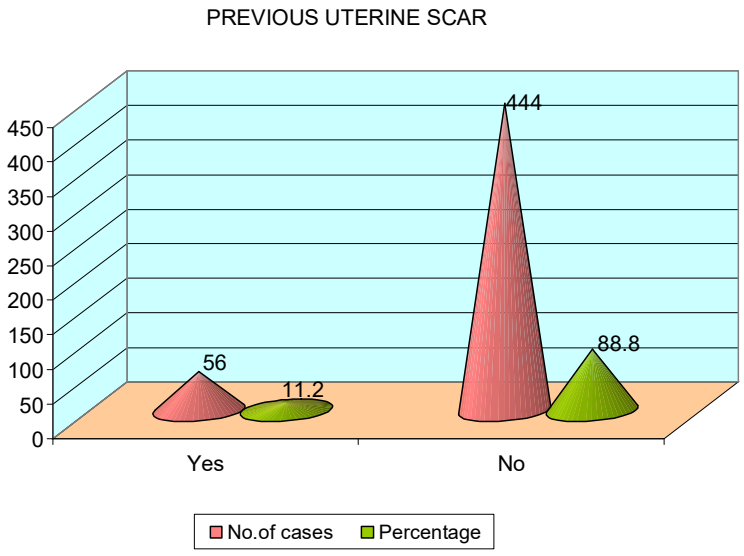
Multiple pregnancy	No.of cases	Percentage
Yes	15	3
No	485	97
Total	500	100



Out of 500 ,15 cases(3%) are multiple pregnancy

TABLE - 3

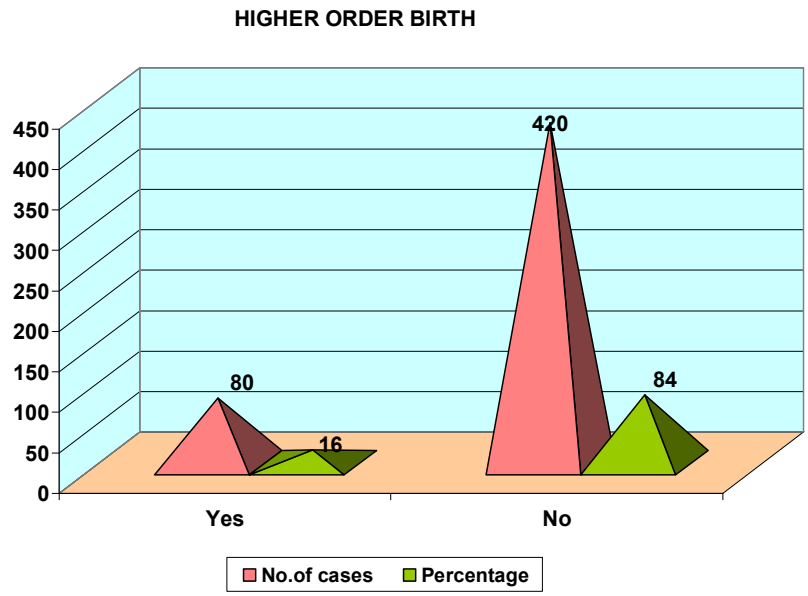
Prev. Ute.scar	No.of cases	Percentage
Yes	56	11.2
No	444	88.8
Total	500	100



Out of 500 cases, 56 cases(11.2%) had previous uterine scar

TABLE - 4

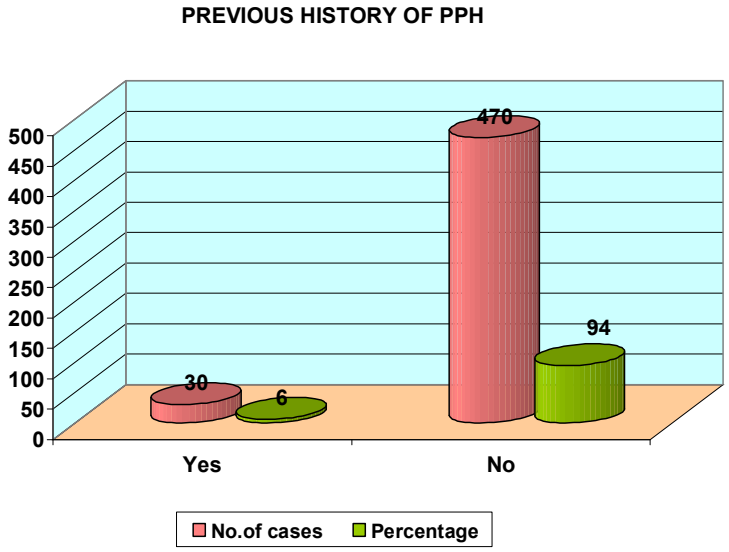
Hr order Birth	No.of cases	Percentage
Yes	80	16
No	420	84
Total	500	100



Out of 500 cases, 80 cases(16%) are higher order birth

TABLE - 5

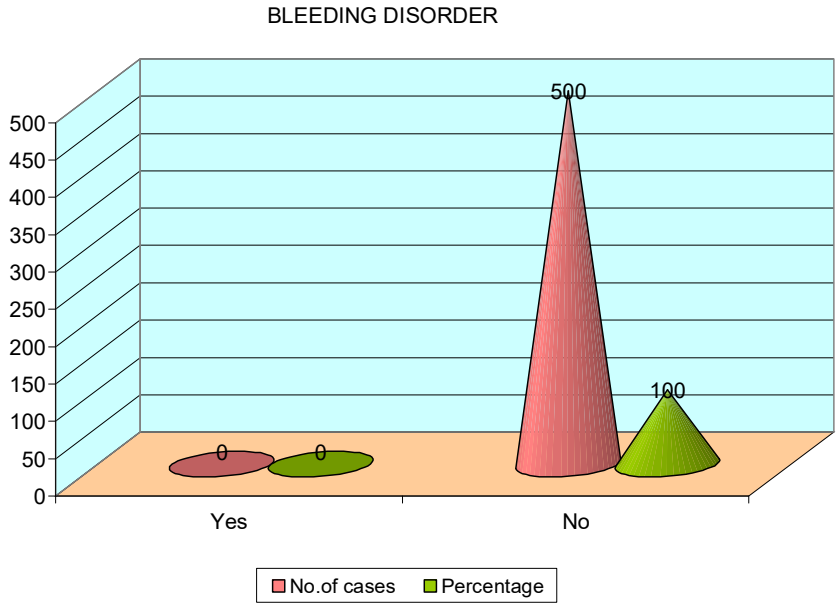
Prev.H/o PPH	No.of cases	Percentage
Yes	30	6
No	470	94
Total	500	100



Out of 500 cases, 30 cases (6%) had previous history of PPH

TABLE - 6

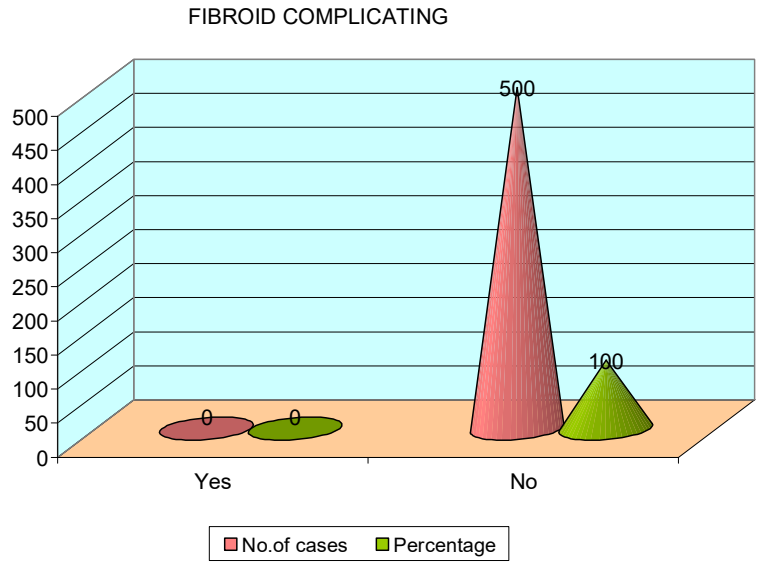
Bleeding disorder	No.of cases	Percentage
Yes	0	0
No	500	100
Total	500	100



None of the case had bleeding disorder

TABLE - 7

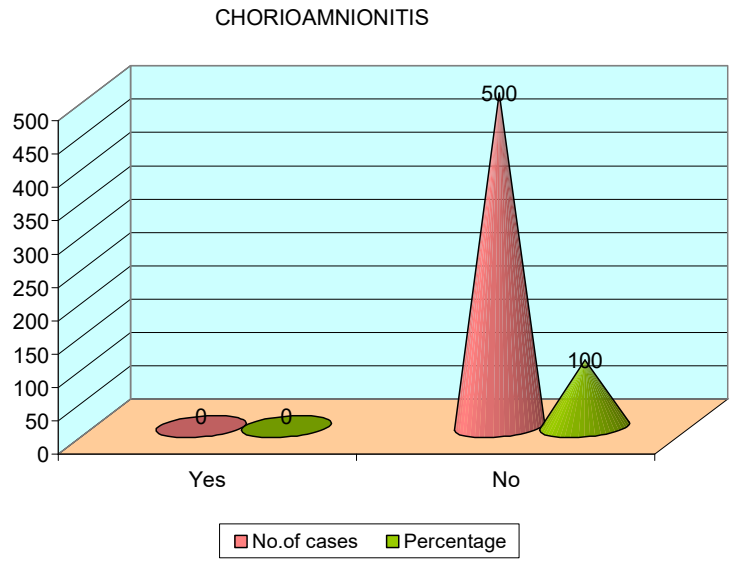
fibroid complicating	No.of cases	Percentage
Yes	0	0
No	500	100
Total	500	100



None of the cases had fibroid complicating

TABLE - 8

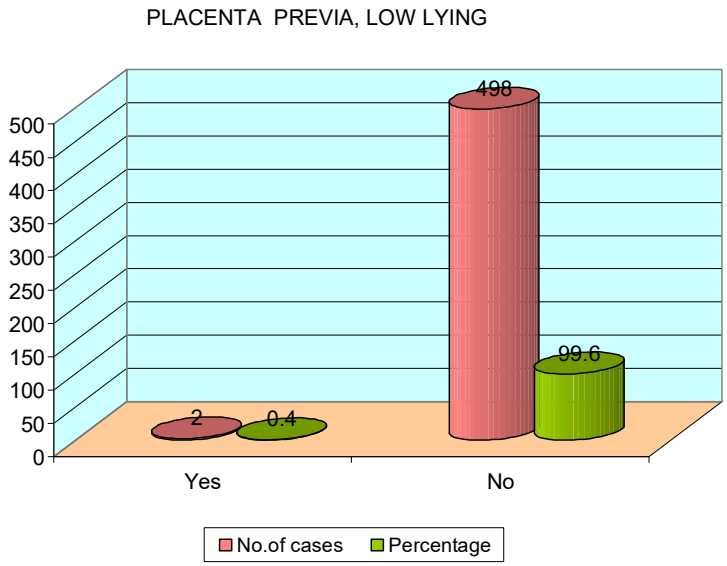
Chorioamnionitis	No.of cases	Percentage
Yes	0	0
No	500	100
Total	500	100



None of the case had chorioamnionitis

TABLE - 9

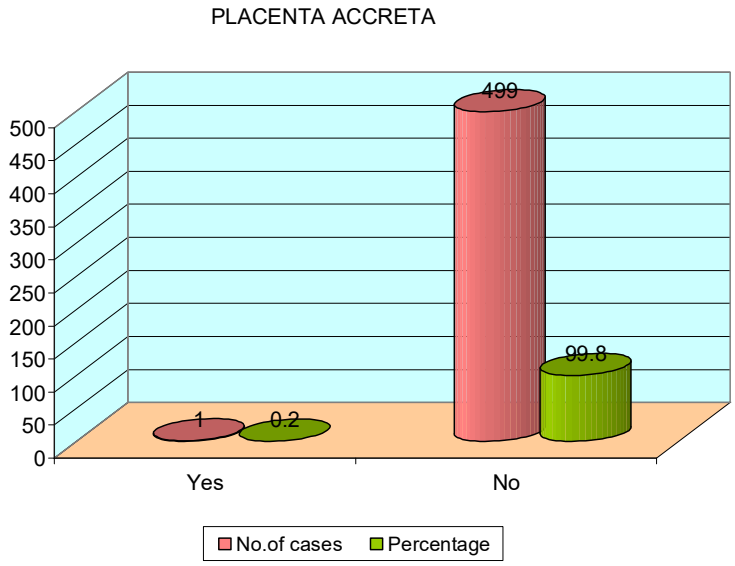
Placenta previa, low lying	No.of cases	Percentage
Yes	2	0.4
No	498	99.6
Total	500	100



Out of 500 ,2 cases(0.4%) are placenta previa

TABLE - 11

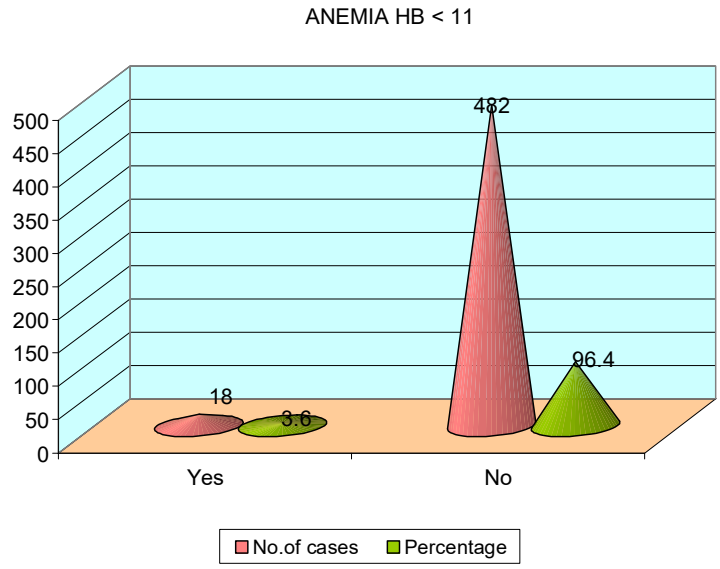
Placenta accreta	No.of cases	Percentage
Yes	1	0.2
No	499	99.8
Total	500	100



Out of 500 cases, 1 case (0.2%) had placenta previa

TABLE - 13

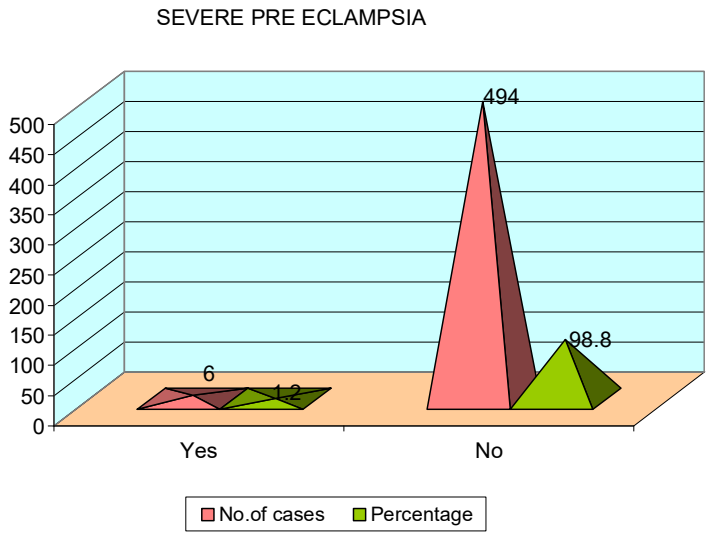
Anemia Hb < 11	No.of cases	Percentage
Yes	18	3.6
No	482	96.4
Total	500	100



Out of 500 cases, 18 case(3.6%) had anaemia

TABLE - 14

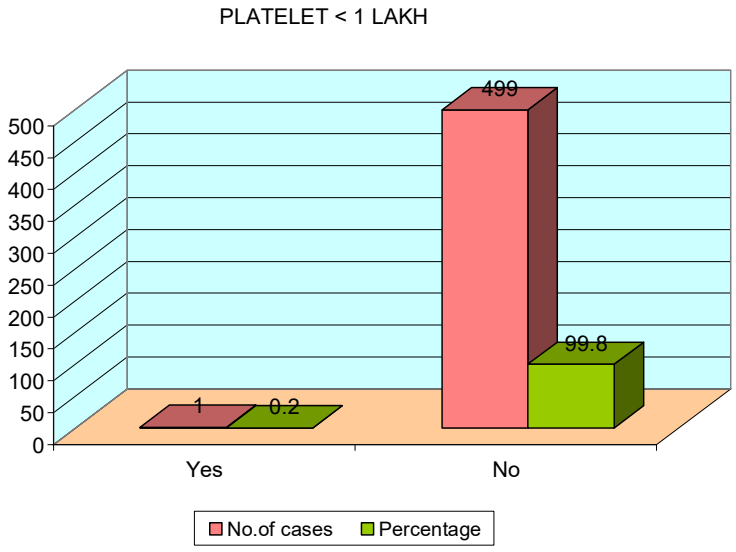
Severe pre eclampsia	No.of cases	Percentage
Yes	6	1.2
No	494	98.8
Total	500	100



Out of 500 cases ,6 cases(1.2%) are severe pre eclampsia

TABLE - 15

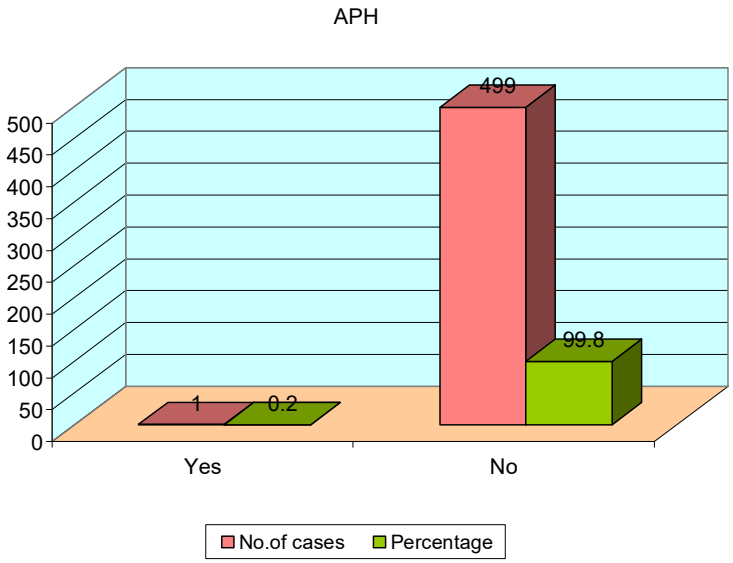
Platelet < 1 lakh	No.of cases	Percentage
Yes	1	0.2
No	499	99.8
Total	500	100



Out of 500 cases, only one case(0.2%) had thrombocytopenia

TABLE - 16

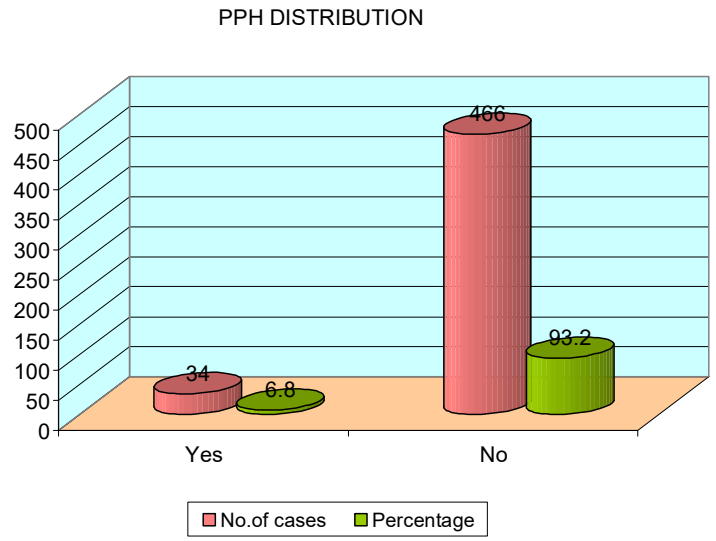
APH	No.of cases	Percentage
Yes	1	0.2
No	499	99.8
Total	500	100



Out of 500 cases, only one case(0.2%) had APH

TABLE - 17

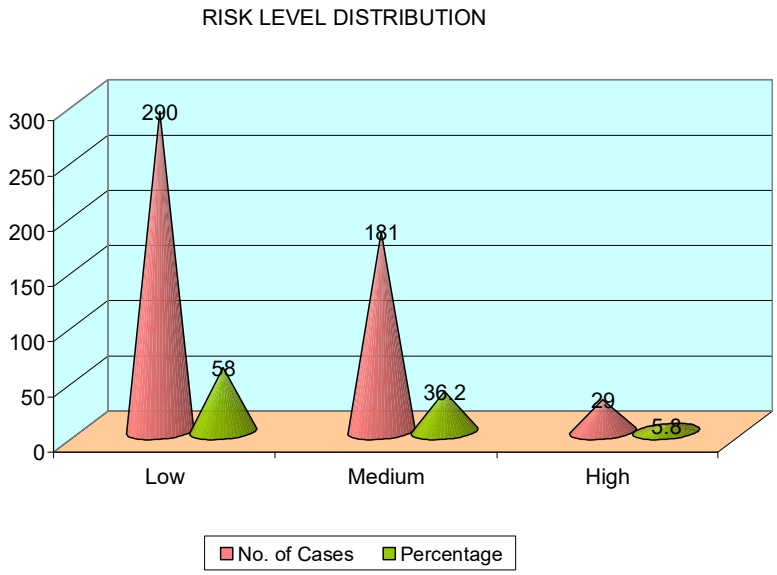
PPH	No.of cases	Percentage
Yes	34	6.8
No	466	93.2
Total	500	100



Out of 500 cases, PPH occurred in 34 cases(6%)

TABLE - 18

Risk Level	No. of Cases	Percentage
Low	290	58
Medium	181	36.2
High	29	5.8
Total	500	100

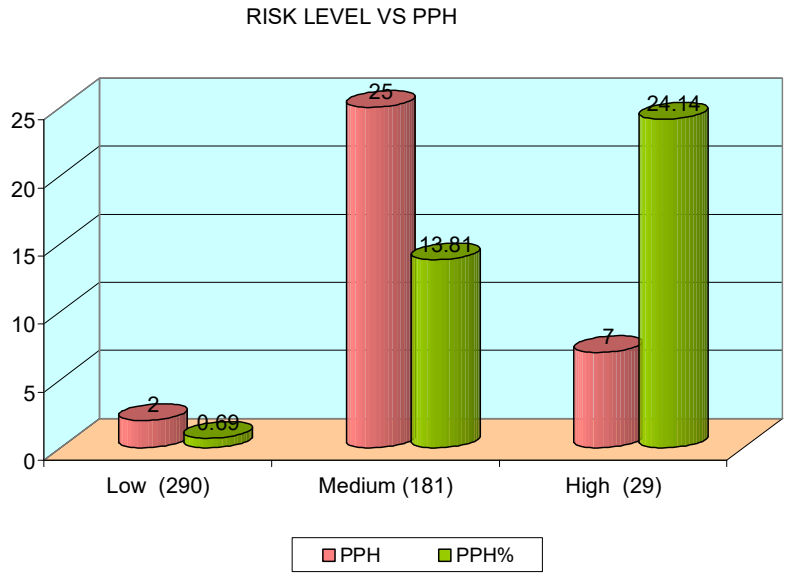


Out of 500 cases, 290 cases(58%) are low risk,181 cases (36.2%) are medium risk, 29 cases(5.8%) are high risk

TABLE - 19

Risk Level	PPH	PPH%
Low (290)	2	0.69
Medium (181)	25	13.81
High (29)	7	24.14
Total(500)	34	6.8

P value <0.001 Significant



In low risk group, 2 cases had PPH (0.69%)

In medium risk group,25 cases had PPH (13.81%)

In high risk group, 7 cases had PPH(**24.14%**)

TABLE - 20

Risk Level	PPH	Level 1	Level 2	Level 3
Low (290)	2	2	0	0
Medium (181)	25	19	6	0
High (29)	7	5	1	1
Total	34	26	7	1

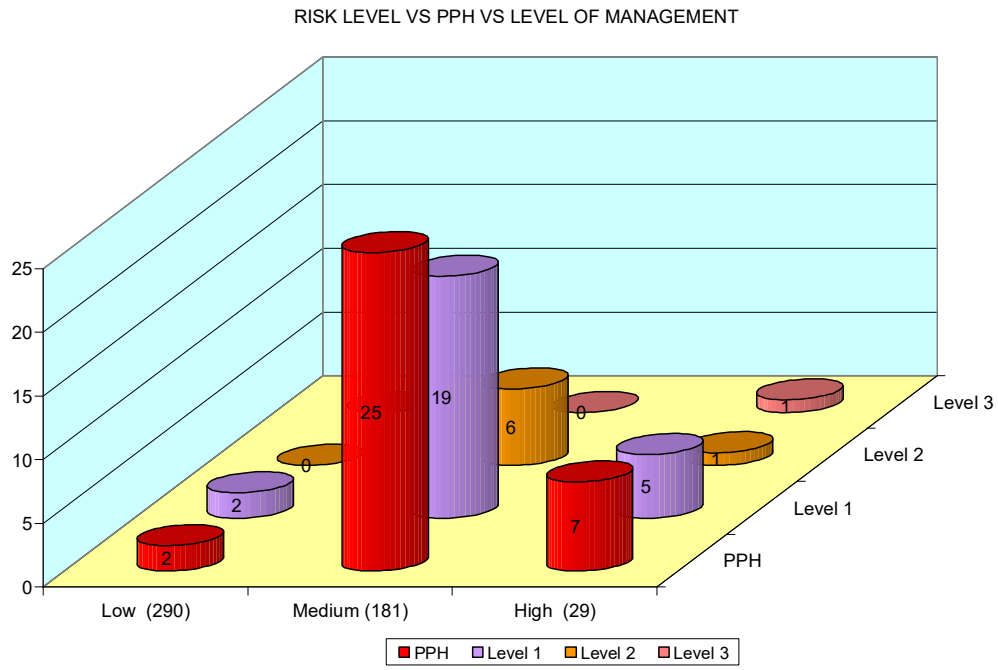
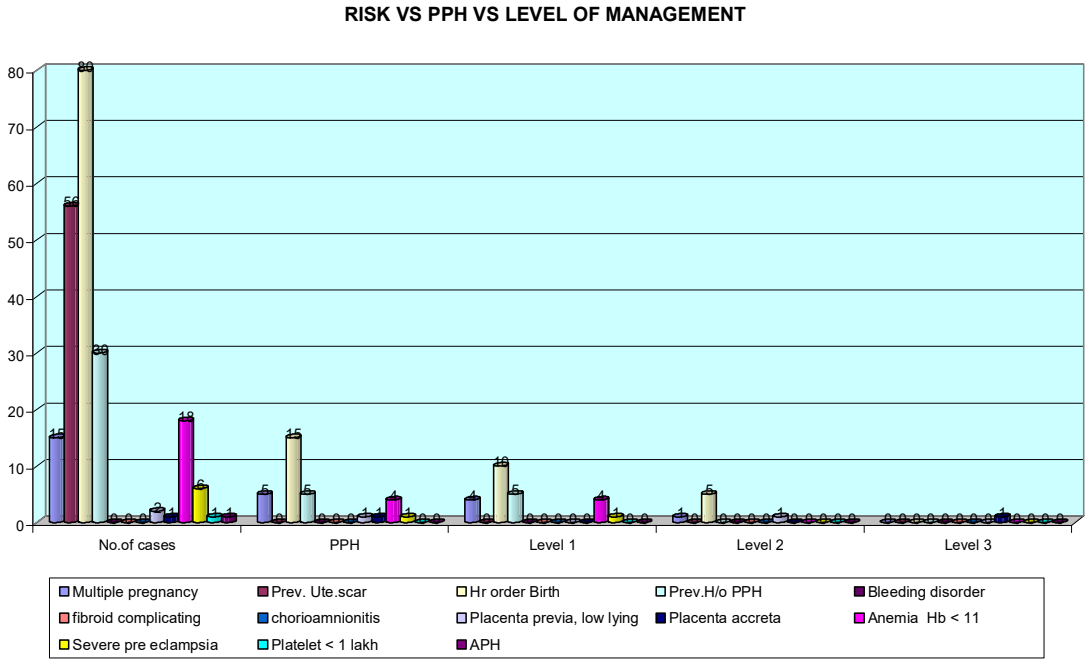


TABLE - 21

Risk	No.of cases	PPH	Level 1	Level 2	Level 3
Multiple pregnancy	15	5	4	1	0
Prev. Ute.scar	56	0	0	0	0
Hr order Birth	80	15	10	5	0
Prev.H/o PPH	30	5	5	0	0
Bleeding disorder	0	0	0	0	0
fibroid complicating	0	0	0	0	0
chorioamnionitis	0	0	0	0	0
Placenta previa, low lying	2	1	0	1	0
Placenta accreta	1	1	0	0	1
Anemia Hb < 11	18	4	4	0	0
Severe pre eclampsia	6	1	1	0	0
Platelet < 1 lakh	1	0	0	0	0
APH	1	0	0	0	0
Others(Low Risk)	290	2	2	0	0



DISCUSSION

DISCUSSION

500 antenatal mothers admitted at term during my study period are included in this study done at Department of Obstetrics and Gynecology at the Govt. RSRM Lying in Hospital,Chennai during the Study period from November 2020 to October 2021. The study was approved by the hospital ethical committee**.**

Out of 500 cases, 34% of the cases are in the age of age group of >30 years ,28.6% of the cases are in the age of group of 26-30 years.21% of the cases are in the age group of 21-25 and 16% of the cases are in the age group of <20yrs.

As per National Health Mission Guideline mentioned above antenatal mothers admitted at term are stratified. My study includes 500 patients. Out of 500 cases,medium risk group includes 181 cases (36%) of which 15 cases (3%) are multiple pregnancy ,56 cases(11%) had previous uretine scar, 80 cases(16%) are higher order birth, 30cases(6%) had risk of previous history of PPH. None of the cases had chorioamniotis, fibroid complicating and coagulation disorders.

Out of 500 cases,high risk group includes 29 cases(5%) of which 2 cases(0.4%) are placenta previa , 1 case(0.2%) had placenta accreta , 18 cases (3.6%) cases are in the anemia group hb (<11), 6 cases(1.2%) had severe pre eclampsia, one patient(0.2%) had very low platelet value ie. < 100000, one patient(0.2%) had a risk factor for APH out of 500 cases.

Remaining 290 cases are under low risk who are singleton pregnancy, no previous uterine scar, not a higher order birth, no prev h/o PPH, no known bleeding disorder.

In my study, out of 500 cases, 34 cases (6.8%) had PPH.

Out of 34 PPH cases, 7 cases(24%) are high risk patients, 25 cases(13%) are in the medium risk category only 2 (0.69%)cases are in the low risk category.

In the low risk category, out of 290 cases only 2 had PPH and that cases treated with level 1 management.

In the medium risk category, out of 181 cases 25 had PPH and 19 cases treated with level 1 management and 6 cases treated with level 2 management.

In the high risk category, out of 29 cases , 7 had PPH and 5 cases treated with level 1 management, one case treated with level 2 management and only one cases goes to level 3 management.

Thus in high risk group there was increased risk of PPH compared to medium and low risk patients. In my study only one case had gone for level 3 management. Therefore high risk patients should be identified earlier, promptly treated and early refferal to tertiary care centre. Since my hospital is a tertiary care centre where senior obstetrician , anaesthesiologist, OT setup, Blood bank facility are available round the clock . Here high risk patients are identified and we anticipate PPH in those patients and 2 unit PC would be crossmatched and kept ready and anaesthesiologist and OT staffs are informed prior .Thus reducing occurence of PPH and its complications and maternal mortality.

CONCLUSION

Conclusion

PPH remains one of the leading causes of maternal morbidity and mortality globally. It is often possible to anticipate and take steps in preventing it. The effective management of PPH requires prompt recognition, rapid response and mobilization of the multi-disciplinary team. Patient resuscitation to maintain blood volume and haemodynamic stability and the simultaneous identification and treatment of the source of bleeding remain the corner- stones of management of PPH.

- Active management of of labor should be the routine management of choice for every women expecting to deliver a baby by vaginal route in a maternity hospital.
- IV oxytocin given immediately after delivery of baby is more effective than when given after delivery of placenta in preventing the postpartum hemorrhage. This can easily be timed even by paramedical personnel.
- Controlled cord traction with counter traction is effective in preventing uterine inversion and entrapment of the placenta.
- The need for additional intervention is reduced by giving oxytocin before delivery of placenta.s
- The side effects of methyl ergometrine, rise in blood pressure and nausea and vomiting is not so severe as compared to its benefits and can be well tolerated and controlled.
- Methyl ergometrine is to be avoided in patients with PIH and cardiac patients.

So, in countries with high maternal mortality rate especially due to PPH and higher morbidity, evidence based practices that prevent PPHand its associated mortality and morbidity is an important way to improve women's health.

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PROFORMA

"A STUDY ON RISK STRATIFICATION OF ANTENATAL MOTHERS AT TERMAND IT'S IMPACT ON PRIMARY POSTPARTUM HEMORRHAGE AND LEVEL OF MANAGEMENT IN EACH RISK GROUP "

NAME: AGE: IP NO:

ADDRESS:

CONTACT NO: :

LMP:

EDD:

Gestational age by LMP Gestational age

bu USGOBSTETRIC SCORE

Admitted for

MENSTRUAL

HISTORY :MARITAL.HISTORY

OBSTETRIC HISTORY :

PAST HISTORY :

FAMILY HISTORY :

PERSONAL HISTORY :TREATMENT HISTORY:

GENERAL EXAMINATION:

PALLOR :

PEDAL EDEMA :

TEMPERATURE :

PULSE RATE :

BP :

RR

SpO2

CVS :

RS :

ON EXAMINATION:

P/A EXAMINATION:

P/S EXAMINATION :

P/V EXAMINATION: I'll be licensed

DIAGNOSIS

HIGH RISK

HAEMOGLOBIN :

I trimester II trimesterIII trimester

Blood grouping

COAGULATION

PROFILE:

BT

CT

RISK CATEGORY:

DEVELOPMENT OF ADDITIONAL RISK FACTORS

DURING LABOURFINAL RISK CATEGORY

LEVEL OF MANAGEMENT

Informed Consent form

"A STUDY ON RISK STRATIFICATION OF ANTENATAL MOTHERS AT TERM AND
IT'S IMPACT ON PRIMARY POSTPARTUM HEMORRHAGE AND LEVEL OF MANAGEMENT IN EACH RISK GROUP "

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

I have completely understood the details of the study.

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

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

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

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

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

Name of the participant :

Signature / Left thumb print:

Date :

Name of the investigator: Dr B.Pradeepa
Signature of investigator :

தகவல்நகல்

இந்த ஆராய்ச்சியில் உங்களிடம் கேட்கப்படும் கேள்விகளுக்கு உங்கள் முழுமனதுடன் பதிலளிக்க வேண்டும்.

இந்த ஆராய்ச்சியில் உங்களுக்கு எந்தபின் விளைவும் ஏற்படாது என்பதை நான் உறுதியளிக்கிறேன்.

உங்களுக்கு பணம் எதுவும் அளிக்கப்படாது என்பதை இதன்மூலம் தெரிவிக்கிறேன்.

இந்த ஆய்வில் உங்களுக்கு எந்த நேரடி பயன் எதுவும் இல்லை. நீங்கள் அளிக்கும் தகவல் மூலம் புதுயுக்திகள் வகுக்கப்படலாம்.

அதன் மூலம் வருங்காலத்தில் உங்களுக்கோ அல்லது உங்களை போன்ற மக்களுக்கு பயன்படலாம்.

நீங்கள் எப்போது வேண்டுமானாலும் இந்த ஆய்விலிருந்து விலகிக் கொள்ளலாம் .அதனால் உங்களின் விபரங்கள் எதுவும் தெரிவிக்கப்படாது என்பதை உறுதியளிக்கிறேன்.

இந்த ஆராய்ச்சியின் முடிவுகள் பத்திரிக்கைகளில் பிரசுரிக்கப்படலாம். ஆனால் உங்களின் அடையாளம் எதுவும் தெரிவிக்கப்படாது.

ஆராய்ச்சிஒப்புதல்படிவம்

"A STUDY ON RISK STRATIFICATION OF ANTENATAL MOTHERS AT TERM AND IT'S IMPACT ON PRIMARY POSTPARTUM HEMORRHAGE AND LEVEL OF MANAGEMENT IN EACH RISK GROUP "

ஆய்வுநிலையம்: **RSRM** மற்றும் ஸ்டான்லி மருத்துவ கல்லூரி

ஆராய்ச்சியாளர்பெயர் : மருத்துவர்.

பங்கேற்பாளர்பெயர்:

பங்கேற்பாளர்எண் :

மேலேகுறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களைகேட்கவும், அதற்கானதகுந்த விளக்கங்களை பெறவும்வாய்ப்பளிக்கப்பட்டது.

நான்இவ்வாய்வில் தன்னிச்சையாகத்தான் பங்கேற்கிறேன். எந்த காரணத்தினாலோ எந்த கட்டத்திலும்எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகிகொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

இந்தஆய்வு சம்மந்தமாகவோஇதை சார்ந்த மேலும் ஆய்வுமேற்கொள்ளும் போதும் இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளைபார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்து கொள்கிறேன். நான் ஆய்வில் இருந்து விலகிகொண்டாலும் இது பொருந்தும் என அறிகிறேன்.

இந்தஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பானதகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயப்படுத்திக்கொள்ளவும் அதை பிரசுரிக்கவும்என் முழுமனதுடன் சம்மதிக்கின்றேன்

இந்தஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன்.எனக்கு கொடுக்கப்பட்ட அறிவுரைகளின்படி நடந்துகொள்வதுடன் இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்று உறுதியளிக்கிறேன்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி

ABBREVIATIONS

PPH	Postpartum hemorrhage
APH	Antepartum hemorrhage
GHTN	Gestational hypertension
GDM	Gestational diabetes
LSCS	Lower segment cesarean section
NVD	Normal vaginal delivery
GA	Gestational age
AN	Antenatal
RCT	Randomized control trial
QBL	Quantitative blood loss
WHO	World health organization
BMI	Body mass index
MMR	Maternal mortality rate

GOVERNMENT STANLEY MEDICAL COLLEGE & HOSPITAL,CHENNAI_-01

INSTITUTIONAL ETHICS COMMITTEE

TITLE OF THE WORK	: "A STUDY ON RISK STRATIFICATION OF ANTENATAL MOTHERS AT TERM AND IT'S IMPACT ON PRIMARY POSTPARTUM HEMORRHAGE AND LEVEL OF MANAGEMENT IN EACH RISK GROUP"
PRINCIPAL INVESTIGATOR	: DR.B.PRADEEPA,
DESIGNATION	: PG IN OBSTETRICS AND GYNAECOLOGY ,
DEPARTMENT	: DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY, GOVT. STANLEY MEDICAL COLLEGE.

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

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

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

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

MEMBER SECRETARY,
IEC, SMC, CHENNAI

MASTER CHART

S. No.	Name	Age	multiple pregnancy	Prev. Ute.scar	Hr order Birth	Prev.H/o PPH	Bleeding disorder	fibroid complicating	chorioamnionitis	Placenta previa, low lying	Placenta accreta	Anemia Hb < 11	Severe pre eclampsia	Platelet < 1 lakh	APH	Risk	PPH	Level of management
1		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	Yes	1
2		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	Yes	1
3		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
4		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
5		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
6		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
7		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
8		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
9		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
10		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
11		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
12		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
13		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
14		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
15		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
16		24	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
17		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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22		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
23		25	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
24		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
25		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
26		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
27		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
28		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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45		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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47		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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57		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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129		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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211		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
212		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
213		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
214		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
215		25	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
216		24	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
217		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
218		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
219		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
220		27	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
221		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
222		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
223		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
224		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
225		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
226		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
227		25	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
228		19	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
229		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
230		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
231		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
232		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
233		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
234		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
235		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
236		19	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
237		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
238		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
239		23	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
240		25	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
241		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
242		19	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
243		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
244		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
245		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
246		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
247		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
248		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
249		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
250		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
251		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
252		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
253		23	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
254		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
255		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
256		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
257		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
258		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
259		21	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
260		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
261		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
262		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
263		34	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
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265		32	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
266		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
267		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
268		27	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
269		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
270		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
271		22	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
272		20	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
273		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
274		19	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
275		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
276		28	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
277		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
278		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	

279		31	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
280		25	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
281		29	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
282		30	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
283		27	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
284		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
285		27	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
286		35	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
287		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
288		19	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
289		33	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
290		26	No	No	No	No	No	No	No	No	No	No	No	No	No	Low	No	
291		18	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
292		24	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
293		32	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
294		19	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
295		24	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2
296		29	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
297		22	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
298		19	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
299		31	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
300		32	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
301		33	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
302		33	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
303		33	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
304		27	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
305		27	Yes	No	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
306		31	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
307		25	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
308		24	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
309		27	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
310		28	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
311		27	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
312		19	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
313		33	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
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315		31	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
316		33	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
317		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
318		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
319		25	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
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321		22	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
322		32	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
323		24	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
324		24	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
325		22	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
326		31	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
327		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
328		19	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
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331		20	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
332		20	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
333		24	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
334		18	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
335		32	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
336		25	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
337		34	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
338		30	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
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340		34	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
341		21	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
342		26	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
343		35	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
344		20	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
345		34	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
346		23	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
347		27	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
348		31	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
349		21	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
350		23	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
351		19	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
352		19	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
353		27	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
354		34	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
355		33	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
356		35	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
357		26	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
358		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
359		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
360		21	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
361		29	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Medium	No	
362		29	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
363		31	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
364		34	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
365		28	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
366		34	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
367		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
368		28	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
369		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
370		26	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
371		21	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	1
372		26	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2

373		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2
374		30	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2
375		31	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2
376		21	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	Yes	2
377		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
378		31	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
379		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
380		34	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
381		34	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
382		25	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
383		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
384		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
385		20	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
386		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
387		23	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
388		30	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
389		25	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
390		26	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
391		21	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
392		21	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
393		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
394		20	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
395		29	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
396		24	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
397		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
398		32	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
399		25	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
400		20	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
401		25	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
402		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
403		18	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
404		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
405		31	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
406		28	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
407		26	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
408		18	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
409		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
410		23	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
411		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
412		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
413		34	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
414		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
415		22	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
416		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
417		32	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
418		24	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
419		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
420		18	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
421		35	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
422		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
423		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
424		27	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
425		30	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
426		20	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
427		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
428		21	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
429		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
430		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
431		29	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
432		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
433		26	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
434		19	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
435		33	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
436		29	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
437		31	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
438		32	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
439		24	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
440		24	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
441		18	No	No	Yes	No	No	No	No	No	No	No	No	No	No	Medium	No	
442		27	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	Yes	1
443		32	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	Yes	1
444		20	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	Yes	1
445		24	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	Yes	1
446		23	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	Yes	1
447		32	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
448		26	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
449		33	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
450		35	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
451		32	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
452		29	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
453		31	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
454		24	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
455		29	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
456		22	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
457		22	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
458		27	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
459		30	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
460		33	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
461		33	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
462		30	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
463		32	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
464		35	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
465		33	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	
466		32	No	No	No	Yes	No	No	No	No	No	No	No	No	No	Medium	No	