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Original Research Article

A Study on Postpartum Haemorrhage Leading to Maternal Mortality and Morbidity among Emergency Admissions at Tertiary Hospital, AP

Dr. Ravella Sowjanya[1], Dr. P. Durga Kumari[2], Dr. Korimilli Nisha[3], Dr. Sharmila Thokala[4]

[1]Professor, Department of Obstetrics & Gynaecology, Government SMC, Vijayawada, Andhra Pradesh, India.
[2]Professor, Department of Obstetrics & Gynaecology, GMC, Guntur, Andhra Pradesh, India.
[3]Postgraduate Resident, Department of Obstetrics & Gynaecology, GMC, Guntur, Andhra Pradesh, India.
Associate Professor, Department of Obstetrics & Gynaecology, Government SMC, Vijayawada, Andhra Pradesh, India.

Corresponding Author
Dr. Sharmila Thokala, Associate Professor, Department of Obstetrics & Gynaecology, Government SMC, Vijayawada, Andhra Pradesh, India.

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ABSTRACT

Background
According to WHO, nearly 5 women die every hour in India due to post partum haemorrhage. Primary postpartum haemorrhage is defined as blood loss within 24 hours of delivery and Secondary postpartum haemorrhage is blood loss after 24 hours of delivery.[1]

The present study is undertaken to study the socio demographic profile, various risk factors and causes of post-partum haemorrhage. It was also aimed to study the various management techniques adopted for the treatment of these patients, maternal complications encountered during the treatment and maternal outcome in these patients.

Methods
The present hospital based prospective study was conducted in GGH Guntur, Andhra Pradesh. The target population includes patients with postpartum haemorrhage being bought to the emergency department of Government General Hospital, Guntur.

Results
Most common age group affected 23–27 years(37%), multigravida women (61%), women from rural areas (52%), unbooked patients (70%), women with low socio economic status (74%), moderate anemia (62%), atonicity being the most common aetiological factor(72%), Lscs being the mode of delivery with postpartum haemorrhage(61%), medical management(41%), morbidity(92%) more than mortality (8%). These results are compared with studies of PGIMS Rohtak, DR. Likitha et al , Cochrane reviews and systemic analysis.

Conclusion
Postpartum haemorrhage possess risk to the life of the mother. Identification of risk factors for atony, evaluation of placenta acreta, proper third stage management, adequate blood provision and timely referral is of utmost importance.

Keywords: maternal mortality, postpartum haemorrhage, risk factors, maternal deaths, maternal morbidity.

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INTRODUCTION

Postpartum hemorrhage is a leading cause of maternal death in both developing and industrialized nations. Postpartum haemorrhage is defined as amount of blood loss that can affect hemodynamic stability of patient[1]. It is theoretically defined as blood loss of more than 500 ml in a normal vaginal birth and more than 1000 ml in caesarean section. Primary PPH is defined as blood loss during the first 24 hours after birth,

whereas secondary PPH is defined as blood loss after the first 24 hours of delivery. It is the most common cause of maternal death, accounting for about 35% of all maternal deaths worldwide[2], in India 30% deaths are due to postpartum haemmorhage[2]. According to WHO, nearly 5 women die every hour in India from complications developed during childbirth, with heavy blood loss caused by haemorrhage being a major factor.[3]

PPH is caused by the "four T's"[3,4]:

1. Tone: uterine atony, distended bladder
2. Trauma: uterine, cervix, or vaginal lacerations.
3. Retained placenta or clots are examples of tissue.
4. Thrombin: coagulopathy, either pre-existing or acquired

The following are the most important strategies for preventing postpartum hemorrhage:[5]

1. Active management of the third stage of labour.
2. Controlled cord traction
3. Massage of the Uterus
4. Oxytocin

According to the latest bulletin of India published in 2011, in the state of Manipur (Regional Institute of Medical Sciences, RIMS), 53.19% died due to haemorrhage and PPH accounts about 21.27% of total deaths.[4] Regionally, in 10 districts of Andhra Pradesh 284 deaths were recorded over 6 months (April-September 2012) of which 193 (75.4 %) could be reviewed. 24% of maternal deaths were due to postpartum haemorrhage[5].

The present study is undertaken to study the socio demographic profile, various risk factors and causes of post-partum haemorrhage. It was also aimed to study the various management techniques adopted for the treatment of these patients, maternal complications encountered during the treatment and maternal outcome in these patients.

Indicators of morbidity following postpartum hemorrhage are

- Admission to the ICU
- Sepsis[2]
- DIC
- ARF
- Dialysis
- Devascularization
- Ligation of the internal iliac Artery
- Hysterectomy
- MODS
- ARDS
- Embolization of the uterine artery
- Respiratory failure
- Near miss

The identification of risk factors, early detection, and appropriate management can

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assist to reduce considerable maternal morbidity and death related to postpartum hemorrhage. The current study is being conducted to investigate the sociodemographic profile, numerous risk factors, and causes of postpartum hemorrhage. It was also intended to investigate the various management approaches used to treat these individuals, as well as the maternal problems encountered during therapy and the maternal outcome in these patients.

AIMS AND OBJECTIVES

1. To study maternal outcome in patients suffering from post-partum hemorrhage.
2. To study the various risk factors and cause of postpartum haemorrhage.
3. To study socio-demographic profile of patients admitted in the emergency set up/labor room and measures taken to prevent and treat patient with postpartum hemorrhage

MATERIALS & METHODS

This is a hospital based prospective study was conducted on patients admitted in department of Obstetrics and Gynecology at GGH, Guntur, during 2021-2022. Study sample of 100 patients and the inclusion criteria are all antenatal cases >28 weeks till 42 days post delivery with hemorrhage. Aetiological factors like placenta acreta modality of multispeciality treatment was also evaluated.

The patient is evaluated for following parameters:

1. Etiology of PPH
2. Type of treatment patient received
3. Maternal outcome of PPH.

The patient will be submitted for history examination and relevant investigations .Various risk factors, etiology of postpartum hemorrhage and mode of delivery, type of management viz. medical management, surgical management or combined (Medical and Surgical) management, maternal complications etc. will be studied in detail. The maternal outcome will also be analysed as patient will be followed till delivery and discharge.

Statistical Analysis

All the statistical analysis will be compiled by SPSS software trial version 20.0 and MSExcell-2010. All descriptive data will be presented as Mean +/- Standard deviation and Percentages.

Results and Analysis

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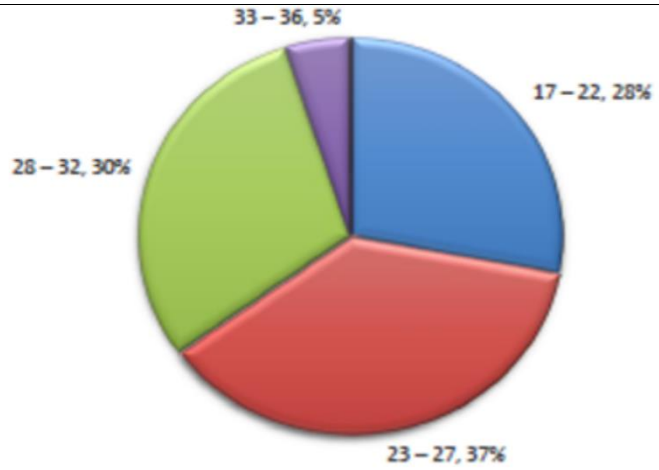

Graph 1: Age group distribution

In the study, 28% belong to 17-22 years age group, 37% belong to 23-27 years age group, 30% belong to 28-32 years age group, 5% belong to 33-36 years age group

Graph 2: Distribution of Parity

39% were Primigravida, 61% were multigravida identifying multiparity also as a risk factor as established in studies.

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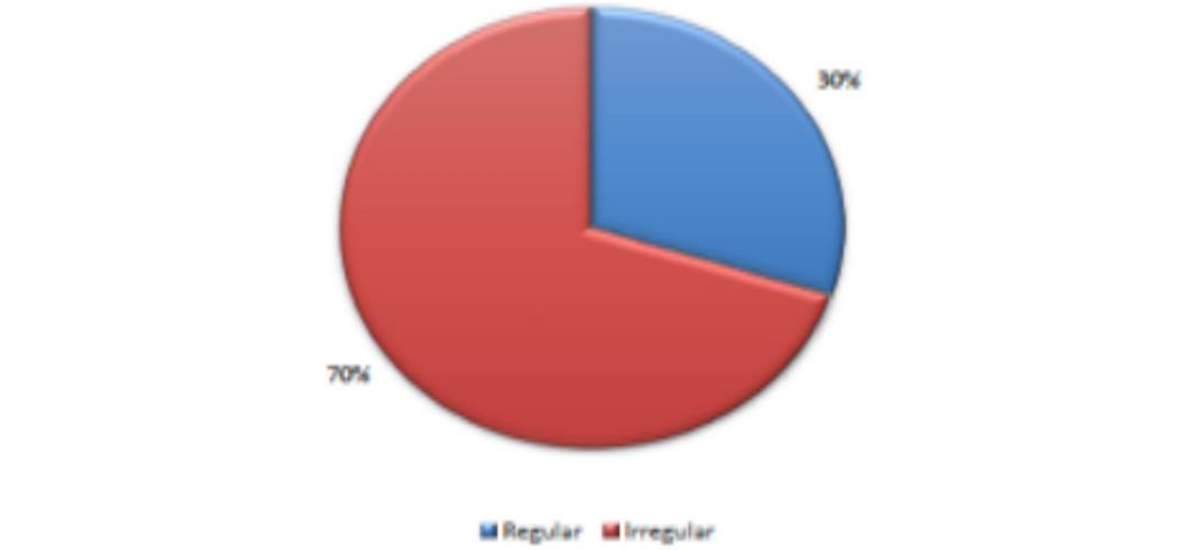

Graph 3: Distribution of regularity of antenatal visits

30% had regular antenatal check-up and 70% had Irregular check-
52% belong to rural area and 44% to urban area

According to B G Prasad socio economic status classification, 74% belong to lower class, 26% belong to Middle class.

In the study, 36% were Illiterate, 32% had primary education, 28% studied till high school and 14% studied till college.

	Frequency	**Percentage**
Atonicity	72	72%
Genital tract trauma	14	14%
Retained placenta	10	10%
Ruptured uterus	4	4%
Total	100	100%

Table- 1 – Distribution of etiology of PPH

Most common cause is atonicity contributes to 72% and next is trauma contributes to 14%

	Frequency	**Percentage**
Primary Emergency LSCS	36	36%
Vaginal Delivery	30	30%
Instrumental Delivery	9	9%
Repeat Emergency LSCS	25	25%
Total	100	100%

Table- 2 – Distribution based on mode of delivery

Majority of cases are due to LSCS which is 61%

42% of cases are multiparity, Prolonged labor and PE contributes 16 and 15% respectively

	Frequency	**Percenta**
APH (Placenta previa+PAD+Abruption)	10	10%
Multiparity	42	42%

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Pre eclampsia + Eclampsia	15	15%
Big baby	3	3%
Prolonged labor	16	16%
Multiple pregnancy	6	6%
Polyhydramnios	5	5%
Jaundice	3	3%

Table 3: Distribution of Risk Factors - (Antepartum and Intrapartum evaluation)

	Frequency	**Percentage**
Medical	41	41%
Surgical	25	25%
Balloon temponade	16	16%
Correction of Etiology	18	18%

Table 4: Based on management

Majority of cases controlled by medical management which is 41%

	Frequency	**Percentages**
B- Lynch	8	32%
Other compression sutures	4	16
Bil.Internal iliac artery ligation	5	20
Manual removal of Placenta	3	8
Peripartum Hysterectomy	6	24

Table 5: Surgical management of PPH

Most common procedures are B-Lynch and Internal iliac artery 32% and 20% respectively and peripartum hysterectomy is 24%

	Frequency	**percentage**
Nil complications	18	18%
AKI	5	5%
DIC	4	4%
Death	8	8%
Severe blood loss	56	56%
others	9	9%

Table 6: Distribution based on complications

56% are shock due to severe blood loss

	Frequency	**Percentage**
yes	8	8%
No	92	92%
Total	100	100%

Table 7: Distribution of maternal mortality

Mortality is 8% in the study.

DISCUSSION

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This study focuses on the socio demographic factors, various etiological factors, risk factors associated and the various management modalities compared with other studies PGIMS Rohtak, DR. Likitha et al, Cochrane reviews and systemic analysis

Age wise distribution of cases

In our study, majority 37% belong to 23-27 years age group [Graph 1]. These were consistent with a similar study conducted in PGIMS Rohtak by DR. Likitha et al study. The mean age in this study was 25.5 ±4.14, which accounts to 49.56% which was comparable to Al-Zirqi et al (37.8%).[6]

Social Status

52% belong to rural area and 44% to urban area these were consistent with DR. Likitha et al study. 74% belong to lower class a 36% were Illiterate, 32% had primary education.

Prevalence

Worldwide estimates of incidence vary from 7% to 25%. Incidence of PPH in INDIA is 2.5-3%. In this study it was around 3-5 % over a span of 18 months. In this study measurement was based on visual estimation of blood loss.

Antenatal care

Our study had 70% of women with irregular check-up and unbooked cases of which some were referred late and some were referred after delivery in view of PPH as our hospital is a higher centre, stressing the importance of identification and follow up of the high risk women which is one of the measure to prevent pph. As 85.2% of the patients in study were unbooked. The current level of antenatal care in our country is 43.8% (WHO 1999)[7] which is more than twice the level than in our study, which is 14.7%. This reflects the very poor standard of An care in our region and government strategies area.

Parity

Our Study 61% were multigravida identifying multiparity also as a risk factor as established in studies. A large proportion of the patients (62%) were multipara which was comparable to Al-Zirqi et al.[6] It was seen that occurrence of postpartum hemorrhage increased with increasing parity.

Hemodynamic stability on admission

In our study 40.86% cases were hemodynamically unstable which was more compared to Limaye et al, (18.8%) patients were in hemodynamically unstable condition probably due to high number of referrals & delay in referral in irreversible state.

Cause wise distribution of cases

Most common cause of obstetric haemorrhage in this study was uterine atonic pph which contributed to 33.91% comparable to Al-Zirqi, et al which was 30%.[6] In India (WHO 2004) the 2004 incidence of PPH was 3.2/1000 live births & in 2005 4.5/1000 live births. In our study genital tract trauma 4.34%, coagulopathy 5.21%, 9.4% uterine rupture & according to Mark Waterstone et al, 5.9% of severe sepsis, and 4.4% of uterine rupture.

Maternal condition at admission 89% were compromised and 11% had severe morbidity. Anemia at admission 32% had mild anemia, 62% had moderate anemia, 6% had severe anemia.

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Aetiology of PPH

72% had Atonicity, 14% had genital tract trauma, 10% had retained placenta, 4% had ruptured uterus. These findings were consistent with various studies where atonicity was known to be the most common cause of pph followed by trauma.

Based on secondary analysis of randomized trial[8] 1,798 patients from randomized trial had prophylactic oxytocin after vaginal delivery and evaluated for uterine atony and postpartum hemorrhage 118 patients (7%) had uterine atony and hemorrhage, factors associated with increased risk for uterine atony and hemorrhage included

- preeclampsia (odds ratio 3.2, 95% CI 2-4.9)
- chorioamnionitis (odds ratio 2.8, 95% CI 1.6-5)

Risk factors

10% had APH, 42% had Multiparty, 15% had pre-eclampsia + Eclampsia, 3% had Big baby, 16% had prolonged labour(induction of labor > spontaneous onset of labor), 6% had multiple pregnancy, 5% had Polyhydramnios, and 3% of the patients had Jaundice[9]. In this study it was found that prolonged labor (induction of labor > spontaneous onset of labor) has contributed significantly for pph which was also found in several other studies, and various studies have also identified APH as an important risk factor for pph ; in this study 3 cases were due to placenta previa, 4 cases were associated with placenta accreta spectrum so hysterectomy was performed in many cases to overcome bleeding and 3 cases were abruption. The increasing trend of PAS can be attributed to the increase in the number of caesarean sections and increase in post caesarean pregnancies; but most common risk factor identified in this study was multiparity.

Based on prospective cohort study, 11,323 vaginal deliveries in 24 facilities in Argentina and Uruguay evaluated from 2003-2005 were evaluated for severe postpartum hemorrhage (PPH; ≥ 1,000 mL)[8]

Severe PPH in 1.9% deliveries, Risk for severe PPH associated with specific causes

- retained placenta (adjusted odds ratio [OR] 16.04, 95% CI 7.15-35.99)
- multiple pregnancy (adjusted OR 4.34, 95% CI 1.46-12.87)
- macrosomia (adjusted OR 3.48, 95% CI 2.27-5.36)
- need for perineal sutures (adjusted OR 2.5, 95% CI 1.87-3.36)
- induced labor (adjusted OR 2, 95% CI 1.3-3.09)

Maternal condition at admission - 89% were compromised and 11% had severe morbidity. Compared with normal maternal weight, BMI ≥ 40 associated with increased risk of atonic postpartum hemorrhage > 1,000 mL

Mode of delivery

In this study 30% of the women delivered via normal vaginal delivery; 9% by instrumental delivery and 61% underwent LSCS of which 36% had primary caesarean section and 25% had Repeat caesarean sections.

Management

41% had medical management, 25% had surgical management, 16% were managed with Balloon tamponade and 18% had correction of aetiology.

It has been observed that most of the patients recovered well with medical management with drugs like oxytocin, methergine, misoprostol and carboprost[7,10-13].

Surgical management were needed in situations where medical methods failed. Correction of aetiology included repairing the genital tract trauma like suturing for lacerations of vagina, perineum, cervical exploration and repair of tears in the cervix, forniceal lacerations,

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exploratory laparotomy for any extension of tear or hematomas, exploring and treating vulval and vaginal hematomas and also repairing uterine ruptures.

Surgical management for PPH

Uterine compression sutures like B-Lynch were applied in 32%, Modified B-Lynch like Hayman along with CHO sutures were used in 16%, B/L Internal Iliac Artery ligation were performed in 20% of cases of post caesarean pregnancy which were complicated with placenta previa with or without adherent placenta to control bleeding, Manual removal of placenta was done in 8% of cases, Peripartum hysterectomy in 24% as a last resort.

B-Lynch and Modified B-Lynch sutures being compression sutures were very effective in controlling pph due to atonicity in the operation theatre[14-16] and were easy to perform and were the most used surgical modalities in this study. Ligation of B/L Internal Iliac arteries stopped bleeding there by limiting the need to perform hysterectomy.[17,18] Hysterectomy was performed as a last resort as mentioned earlier mainly in post caesarean pregnancies complicated with PAS with or without placenta previa.[19]

A Cochrane review[9,20] reported that modified B-Lynch compression suture may reduce blood loss and risk of hysterectomy to control bleeding compared to standard B-Lynch compression suture in patients with primary postpartum haemorrhage. This is a systematic review of 9 randomized trials evaluating mechanical or surgical interventions in 944 patients with primary postpartum haemorrhage.

Interventions included external uterine compression, intrauterine balloon tamponade, uterine arterial embolization, condom-loaded catheter, and uterine compression suture.[21]

1 trial compared modified B-Lynch compression suture vs. standard B-Lynch compression suture in 160 patients

- Modified approach included compression of uterus and tying off of main uterine vessel
- Comparing modified B-Lynch compression suture vs. standard B-Lynch compression suture

✓ Mean blood loss 324 mL vs. 568 mL ($p < 0.0001$)

✓ Hysterectomy to control bleeding in 5% vs. 15% (risk ratio 0.33, 95% CI 0.11- 0.99), significant.

This study concluded that Uterine compression sutures to control postpartum haemorrhage at first caesarean delivery do not appear to affect subsequent pregnancy outcomes, but may be associated with increased risk of pelvic adhesions.

Based on prospective cohort study[14] 211 patients had uterine compression sutures for postpartum haemorrhage. Uterine compression suture failure defined as haemorrhage requiring hysterectomy in 25%. No significant differences in failure rates among B-Lynch sutures, modified B-Lynch sutures and other suture techniques.

IIAL successfully controlled haemorrhage and prevented need for hysterectomy in

✓ 63.8% with atony

✓ 85.7% with placenta previa

✓ 21% with uterine rupture

✓ 100% with placental abruption

✓ 66.6% with uterine inversion

✓ 0% with HELLP syndrome This study concluded that Bilateral internal iliac (uterine) artery ligation may reduce need for hysterectomy in patients with postpartum haemorrhage.

Based on retrospective cohort study[15]101 patients had pelvic arterial embolization for postpartum haemorrhage. Successful embolization in 89%.

Complications in all patients regardless of success or failure: Early (≤ 7 days after procedure)

✓ Pulmonary edema in 11 patients (25.6%)

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- ✓ Febrile morbidity in 10 patients (23.3%)
- ✓ Wound dehiscence at episiotomy site in 1 patient (2.3%) Late (≥ 8 days after procedure)
- ✓ Amenorrhea or oligomenorrhea in 2 patients (4.7%)
- ✓ Pain in 4 patients (9.3%)

Based on prospective cohort study[16] 186 caesarean hysterectomies performed at 13 academic medical centres from 1999-2000 Leading indications for hysterectomy in patients with postpartum haemorrhage included

- ✓ Placenta accreta in 38%
- ✓ Uterine atony in 34%

Major maternal complications of caesarean hysterectomy

Based on systematic review 86 of 24 studies evaluating hysterectomy for uncontrolled postpartum bleeding in 981 patients

- ✓ Incidence of emergency postpartum hysterectomy ranged from 0.2-5 per 1,000
- ✓ Mortality 2.6%.

Duration of stay in hospital - 86% had duration of stay for <10 days and 14% had duration of stay for >10 days.

Maternal complications

56% had Anaemia, 5% had AKI, 4% had DIC, 18% had no complications, 9% had other complications like transfusion related complications, Sepsis, Ventilatory support and use of vasopressors, ARDS and near miss cases, and Mortality was seen in 8%.[22]

In the study most common complication noted was anaemia which included 56% which was attributed to excessive loss of blood requiring transfusion with blood and blood products ranging from single PRBC transfusion to massive transfusion protocols

Maternal mortality

Maternal mortality observed in the study was 8%. Based on retrospective cohort study[22] 9,150 live births (including 59 maternal deaths) in Nigeria from 2005-2010 were evaluated most common causes of maternal death

- obstetric haemorrhage in 23.7% (including postpartum haemorrhage in 84.5%)
- eclampsia in 18.6%
- puerperal sepsis in 11.9%
- obstructed labour/ruptured uterus in 11.9%

Based on prognostic cohort study[18] 233 patients with postpartum haemorrhage ≥ 1,500 mL were evaluated by ratio of heart rate to systolic blood pressure (shock index) and conventional vital signs for prediction of adverse outcomes 5.1% were admitted to intensive care unit (ICU), 17.5% had blood transfusion ≥ 4 units, 26.9% had haemoglobin < 7 g/dL, and 5.1% had invasive surgical intervention.

Based on cohort study on Delay in seeking care for PPH 89 4,550 patients with postpartum haemorrhage (PPH) due to uterine atony after vaginal delivery evaluated: 20.9% had severe PPH (defined as peripartum change in haemoglobin of ≥ 4 g/dL) delay in initial care for PPH associated with increased risk of severe PPH, including oxytocin administered > 10 minutes

CONCLUSION

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Postpartum haemorrhage is one of the dangerous complication of 3rd stage of labor and also possess risk to the life of the mother particularly in developing countries. In this study it was observed that most of the cases were multiparous, with younger age group, belonging to low socio economic status having irregular antenatal checkup and belonging rural background.

Almost all the women were anemic ranging from mild to severe and most of them were delivered by caesarean section.

The most common aetiology being Atony followed by Trauma; most common risk factor being multiparity followed by prolonged labour (induction of labor > spontaneous onset of labor),most dangerous complication being placenta previa with placenta accreta spectrum with post caesarean pregnancy.

Most of the cases were managed conservatively with both medical and surgical methods avoiding the need for hysterectomy; majority were controlled with medical management and anemia has been observed as a most common complication with 8% of the total women in the study died despite all the measures of control were taken.

Promoting regular antenatal check ups, identifying high risk mothers and timely referral to higher centres, conducting mock pph drills and educating the health care workers regarding the adverse out comes of pph and also educating the pregnant female and her attenders regarding the same and timely intervention along with ATMSL can save many lives.

Other aspects of prevention include reducing the rates of primary caesarean section as there is an increasing trends of caesarean scar ruptures as well as placenta accreta spectrum / placenta previa. If at all any low lying placenta is observed in post caesarean pregnancy MRI pelvis should be done to rule out PAS.

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