



## Rising Trend of Abruptio Placenta in a Tertiary Care Centre: An Observational Study

Authors

**Ruby Bhatia MBBS, MD FICOG<sup>1</sup>, Parmjit Kaur MBBS, MD FICOG<sup>2</sup>,  
Dr Santosh Kumari MBBS<sup>3</sup>**

<sup>1</sup>Associate Professor, Deptt of Obstetrics and Gynaecology, Govt Medical College and Rajindera Hospital, Patiala, Punjab

<sup>2</sup>Professor, Deptt of Obstetrics and Gynaecology, Govt Medical College and Rajindera Hospital, Patiala, Punjab

<sup>3</sup>Postgraduate student, Deptt of Obstetrics and Gynaecology, Govt Medical College and Rajindera Hospital, Patiala, Punjab

Corresponding Author

**Dr Ruby Bhatia**

D-8 Medical College Campus, Rajindera Hospital Patiala 147001

Associate Professor, Master Trainer BEMOC Punjab, Deptt of Obstetrics and Gynaecology, Govt Medical College and Rajindera Hospital, Patiala, Punjab 147001.

Contact: 9872277074, 01752220923, Email: [drrubybhatia@yahoo.com](mailto:drrubybhatia@yahoo.com)

### ABSTRACT

*Obstetrical haemorrhage along with hypertension and sepsis forms deadly triad as a direct cause of maternal mortality. Antepartum haemorrhage seen in 2-5% of all pregnancies. Placenta praevia and placental abruption remain the most common causes of Antepartum haemorrhage. Placental abruption occurs in about 0.5 percent or one in 200 pregnancies. Maternal complications of abruptio placentae include massive blood loss, disseminated intravascular coagulopathy, acute renal failure and less commonly maternal death. Perinatal mortality associated with abruption is as high as 60 percent. An observational study was conducted in high dependency unit of Obstetrics and Gynaecology at Govt Medical College and Rajindera Hospital, Patiala to study adverse maternal and fetal outcome and risk factors associated with abruptio Placentae.*

**Keywords:** *Antepartum haemorrhage, abruptio placentae, placenta praevia.*

### Introduction

Obstetrical haemorrhage along with hypertension and sepsis forms deadly triad as a direct cause of maternal mortality<sup>1</sup>. Haemorrhage is the single most important direct cause of maternal deaths

across the globe being responsible for half of all postpartum deaths in developing countries<sup>2</sup>. 20% of all maternal death due to obstetric haemorrhage are attributed to antepartum haemorrhage. Antepartum haemorrhage seen in 2-5% of all

pregnancies<sup>2</sup>. Antepartum haemorrhage (APH) is defined as any bleeding from female genital tract between fetal viability and delivery of the fetus<sup>3</sup>. Placenta praevia and placental abruption remain the most common causes of Antepartum haemorrhage. Placental abruption occurs in about 0.5 percent or one in 200 pregnancies<sup>1</sup>. Perinatal mortality associated with abruption is as high as 60 percent<sup>4-7</sup>. Abruptio placentae accounts for 10-12% of all third trimester still births. Maternal complications of abruptio placentae include massive blood loss, disseminated intravascular coagulopathy, acute renal failure and less commonly maternal death<sup>8,9</sup>

Advanced maternal age, high parity, low socioeconomic status, smoking, cocaine use, multifetal gestation, folic acid deficiency, maternal hypertension/ pre eclampsia, prior abruption, thrombophilia, trauma, preterm premature rupture of the membranes, intrauterine infections, and hydramnion remains important risk factors.<sup>10</sup> To study adverse maternal and fetal outcome and risk factors associated with Placental abruption is the need of the hour so as to improve maternal and perinatal morbidity and mortality by provision of efficient emergency obstetric care.

Aims and objective: 1) To determine incidence of Antepartum haemorrhage 2) Risk factors associated with Antepartum haemorrhage (APH) 3) To study maternal and perinatal outcome in Antepartum haemorrhage.

### Materials and Methods

It is an observational study carried out in high dependency unit of obstetrics at Government Medical College & Rajindera Hospital Patiala for a period of six months w.e.f from 1st November 2015 to 31<sup>st</sup> may 2016. Antenatal women with chief complaint of bleeding per vaginum after the period of viability ( $\geq 24$  weeks of gestation) admitted to high dependency unit were included in the study. A detailed history, thorough clinical examination with special reference to abdominal examination, laboratory test, and ultrasound examination of pelvis for fetal well being,

placental localization, any evidence of placenta accreta and retroplacental haemorrhage, carried out in all the cases. Immediate resuscitative measures in the form of two wide bore 14 gauze cannulas for transfusion of crystalloids and colloid were taken in all the cases of Antepartum haemorrhage. Adequate quantity of blood transfused and arranged in all the cases of Antepartum haemorrhage.

Sociodemographic characteristics were noted. Patients were grouped as abruptio placentae, placenta praevia, combined (placenta previa and abruption placenta both), local cause and indeterminate cause. Risk factors such as unbooked pregnancy, age, parity, socio economic status pre eclampsia, malpresentation, polyhydramnios, multiple pregnancy and smoking in present pregnancy were recorded. Past history of scarred uterus (previous cesarean- one, two or more, myomectomy, check curettage, medical termination of pregnancy), placenta praevia, abruptio placenta or any other risk factors evaluated. Maternal complications in the form of anaemia, hypovolemic shock, intrapartum haemorrhage, need for blood transfusion and cesarean section, postpartum haemorrhage, peripartum hysterectomy, acute renal injury, DIC and maternal death were recorded. Perinatal outcome was evaluated in relation to prematurity, fetal growth restriction, low birth weight, low apgar score at one and five minutes, admission to Neonatal intensive care unit and still births in relation to abruptio placentae.

### Results

Abruptio placenta was encountered in 2.54% (52 patients) while placenta praevia in 1.81% (37 cases) thereby prevalence of Antepartum haemorrhage in our hospital was found to be 4.55% (93 cases) with a total of 2040 births in the study period (Table 1). Majority of the APH cases (81.72%) were unbooked. 47.31% in abruptio placentae & 31.18% in placenta previa. Majority of the patients (80.64%) were from lower socioeconomic status and 61.29% from rural

areas. 77.41% of the women with Antepartum haemorrhage were in 20-30 years of age group, 40% (43.01%) cases with abruptio and 31.18% in placenta previa group. 49.46% cases were gravida 2-3 while 20 cases (21.50%) with APH were grandmultipara. 12 cases (12.90%) with abruptio placentae and 8 cases (8.60%) with placenta previa were grand multipara (Table2). Out of total 37 cases, 91.90% (34) were placenta praevia while three (8.10%) cases had low lying placenta, as per National Institute of Health, Dashe Terminology for Placental Location (Table3) <sup>11</sup>.

Severe pre eclampsia and Eclampsia was encountered in 19 (20.43%) patients with Antepartum haemorrhage. 16.12% (15 cases) in abruptio placentae group while only in four cases (4.30%) with placenta previa. A total of 12.90% (12 cases) with abruptio placentae & 8.60% (8 cases) with placenta previa were grandmultipara. Four cases (4.30%) with abruptio placentae and three cases (3.22%) with placenta previa were more than 35 years of age. Two cases of abruptio placentae had placental abruption in previous pregnancy too while placenta previa in previous pregnancy was present in four (4.30%) patients in placenta previa group. History of previous one/two/three LSCS and previous MTP/curettage was present in 13 (13.97%) cases and six (6.45%) cases respectively in placenta previa group (Table 4).

Severe anemia Hb <7% (34.40%) was reported in 18(19.35%) cases with abruptio placenta and 14 (15.05%) patients with placenta previa. Blood

transfusion ranging from one to ten units was required in all cases of APH with severe anemia. A total of 11 patients (11.82%) had atonic postpartum haemorrhage. Peripartum hysterectomy as a life saving measure was done in three (3.22%) cases i.e. in two cases (2.15%) of abruptio placentae and one case (1.07%) with placenta previa (Table 5). DIC and acute renal injury were reported in 2.15% of the cases each (Table 5). One patient with major degree placenta previa and placenta accreta with previous two LSCS was lost due to intractable atonic postpartum haemorrhage during cesarean delivery inspite of best efforts.

A total of (24.73%) 23 still births were reported in the study group. Majority of still births 16 (17.20%) occurred in abruptio placentae group with only 7 (7.52%) in placenta previa. A total of 14 (15.05%) births were <34 weeks, majority 10 (10.75%) being in abruptio placentae group. Premature termination of pregnancy before 37 weeks was required in 65.58% cases to manage Antepartum haemorrhage. Almost half of APH cases (50.53%) had preterm delivery between 34 to 36 weeks 6 days. 34.40% APH cases had delivery at  $\geq 37$  weeks, majority of these (24.73%) 23 cases with abruptio placentae. Birth weight >2.5kg was encountered in 33 (35.48%) cases of APH. 23.65% babies required NICU admission (Table 6). Almost quarter of the patients (24.73%) with Antepartum haemorrhage had still birth, incidence being significantly higher 17.20% in abruptio placentae group (Table6)

## Observation

**Table 1:** Incidence of Antepartum Hemorrhage (Total 93=100%)

	TOTAL BIRTHS	total APH	ABRUPTIO PLACENTA	PLACENTA PRAEVIA	COMBINED	INDETERMINATE CAUSES	LOCAL CAUSE
NO	2040	93	52	37	1	3	0
%	100%	4.55%	2.54%	1.81%	0.04%	0.14%	0

**Table 2: Sociodemographic Characteristics in Antepartum Hemorrhage ( total 93 =100%)**

	Sociodemographic factors	No of APH cases	% among APH cases	Abruptio placenta		Placenta praevia		Indeterminate cause		Combined	
		NN	%age	N	%age	N	%age	N	%age	N	%age
A	BOOKED	17	18.27%	8	8.60%	8	8.60%	1	1.07%	0	0
	UNBOOKED	76	81.72%	44	47.311%	29	31.18%	2	2.15%	1	1.07%
B	AGE										
	<20	3	3.22%	3	3.22%	0	0	0	0	0	0
	20-30	72	77.41%	40	43.01%	29	31.18%	2	2.15%	1	1.07%
	>30	18	19.35%	9	9.67%	8	8.60%	1	1.07%	0	0
C	PARITY										
	Primi gravid	27	29.03%	14	15.05%	11	11.82%	1	1.07%	1	1.07%
	Gravida 2-3	46	49.46%	26	27.95%	18	19.35%	2	2.15%	0	0
	Grandmultipara (gravida >4)	20	21.50%	12	12.90%	8	8.60%	0	0	0	0
D	SOCIOECONOMIC STATUS										
	Lower	75	80.64%	44	47.31%	28	30.10%	2	2.15%	1	1.07%
	Middle	14	15.05%	6	6.45%	7	7.52%	1	1.07%	0	0
	Upper	4	4.30%	2	2.15%	2	2.15%	0	0	0	0
E)	RESIDENCE										
	RURAL	57	61.29%	32	34.40%	22	23.65%	2	2.15%	1	1.07%
	URBAN	36	38.70%	20	21.50%	15	16.12%	1	1.07%	0	0

**Table 3: Distribution According to the Type of Placenta Praevia: (Total 37=100%)**

TYPES OF PLACENTA PRAEVIA	NO	%
PLACENTA PRAEVIA	34	91.90%
PLACENTA ACCRETA	2	5.40%
LOW LYING PLACENTA	3	8.10%

(NATIONAL INSTITUTE OF HEALTH DASHE TERMINOLOGY 2013)

**Table 4: Risk Factors for Antepartum Haemorrhage: (Total 93 =100%)**

Risk factors	No of APH cases	% among APH cases	Abruptio placenta		Placenta praevia		Unknown cause		Combined	
	N	%age	N	%age	N	%age	N	%age	N	%age
PRESENT PREGNANCY										
Grand multi para	20	21.50%	12	12.90%	8	8.60%	0	0	0	0
Severe Pre eclampsia/ eclampsia	19	20.43%	15	16.12%	4	4.30%	0	0	0	0
Maternal age (>35)	8	8.60%	4	4.30%	3	3.22%	1	1.07%	0	0
Malpresentation	6	6.45%	2	2.15%	4	4.30%	0	0	0	0
Polyhydramnios	2	2.15%	2	2.15%	0	0	0	0	0	0
PROM	2	2.15%	2	2.15%	0	0	0	0	0	0
Trauma	0	0	0	0	0	0	0	0	0	0
Smoking/ drug misuse	0	0	0	0	0	0	0	0	0	0
First trimester bleeding	1	1.07%	0	0	1	1.70%	0	0	0	0
PAST HISTORY										
H/O previous LSCS	18	19.34%	4	4.30%	13	13.97%	1	1.07%	0	0
a)Previous 1 LSCS	13	13.97%	4	4.30%	8	8.60%	1	1.07%	0	0
b)Previous 2 LSCS	4	4.30%	0	0	4	4.30%	0	0	0	0
c)Previous 3 LSCS	1	1.07%	0	0	1	1.07%	0	0	0	0
H/O previous MTP/ check curettage	10	10.75%	3	3.22%	6	6.45%	1	1.07%	0	0
H/O abruptio placenta	2	2.15%	2	2.15%	0	0	0	0	0	0
H/O placenta previa	4	4.30%	0	0	4	4.30%	0	0	0	0
H/o previous MRDP	0	0	0	0	0	0	0	0	0	0

**Table 5: Maternal Outcome in Antepartum Hemorrhage (TOTAL 93 = 100%)**

Maternal outcome	APH		Abruptio placenta		Placenta praevia		Indeterminate cause		Combined	
	N	%age	N	%age	N	%age	N	%age	N	%age
Severe Anaemia (<7g%)	32	34.40%	18	19.35	14	15.05	0	0	0	0
Units of blood transfused										
Nil	61	65.59%	34	36.55%	23	24.73%	3	3.22%	1	1.07%
1-4	27	29.03%	15	16.12%	12	12.90%	0	0	0	0
5-10	5	5.37%	3	3.22%	2	2.15%	0	0	0	0
PPH	11	11.82%	6	6.45%	5	5.37%	0	0	0	0
Intrapartum haemorrhage	3	3.22%	2	2.15%	1	1.07%	0	0	0	0
Peripartum hysterectomy	3	3.22%	2	2.15%	1	1.07%	0	0	0	0
DIC	2	2.15%	1	1.07%	1	1.07%	0	0	0	0
Acute renal injury	2	2.15%	1	1.07%	1	1.07%	0	0	0	0
MROP	1	1.07%	1	1.07%	0	0	0	0	0	0
Maternal mortality	1	1.07%	0	0	1	1.07%	0	0	0	0

**Table 6: Perinatal Outcome in Antepartum Hemorrhage: (Total 93 =100%)**

	Perinatal outcome	APH		Abruptio placenta		Placenta praevia		Indeterminate causes		Combined	
		N	%age	N	%age	N	%age	N	%age	N	%age
A	Maturity										
	Preterm										
	<34 weeks	14	15.05%	10	10.75%	3	3.22%	1	1.07%	0	0
	34-36 <sup>+6</sup> weeks	47	50.53%	19	20.43%	26	27.95%	1	1.07%	1	1.07%
C	Term										
	> 37 weeks	32	34.40%	23	24.73%	8	8.60%	1	1.07%	0	0
B	Birth weight										
	<1.5 kg	14	15.05%	09	9.67%	4	4.30%	1	1.07%	0	0
	1.5 -2.5kg	46	49.46%	22	23.65%	23	24.73%	1	1.07%	0	0
	> 2.5kg	33	35.48%	21	22.58%	10	10.75%	1	1.07%	1	1.07%
C	APGAR in 1 and 5 mins										
	<7	10	10.75%	8	8.60%	2	2.15%	0			
	7-9	10	10.75%	3	3.22%	6	6.45%	1	1.07%		
	>9	49	52.68%	17	18.27%	29	31.18%	2	2.15%	1	1.07%
D	NICU admission	22	23.65%	12	12.90%	9	9.67%	1	1.07%	0	0
E	Still birth	23	24.73%	16	17.20%	7	7.52%	0	0	0	0

## Discussion

The prevalence of antepartum hemorrhage in our study was 4.55%. APH complicates 2-5 % of all pregnancies<sup>2</sup>. Our study is comparable to prevalence of 3% as reported by Archana M et al<sup>12</sup> and Singhal et al<sup>13</sup>. Abruptio placentae was reported in 2.54% cases while 1.81% had placenta praevia. Incidence of abruptio placentae averages 0.5% or 1 in 200 deliveries. In developed countries it has declined further in 2012 to 0.048% or one in 2060 births<sup>1</sup>. Salihu and colleagues reported an incidence of 0.6% or one in 165 births<sup>14</sup>. Our incidence of abruptio placentae 2.54% is remarkably high, being a tertiary care referral hospital in a developing country- India. In our study 81.72% of cases were unbooked and

80.64% belonged to poor socioeconomic status. Unbooked pregnancy and poor socioeconomic status remains significant risk factors<sup>10</sup>. Majority were in the age group 20-30 year (77.41%) with 49.46% being multiparous which is similar to Archana M et al, Singhal et al and Das B<sup>12,13,15</sup>. Grandmultiparity is a significant risk factor for APH<sup>10</sup>. 21.50% patients were grandmultipara, Incidence was higher in abruptio placentae 12.90% compared to 8.6% in placenta praevia. In our study one-fifth cases 20.43% of cases had severe Pre eclampsia or Eclampsia with incidence as high as 16.12% in abruptio placentae, Singhal et al also reported hypertension in pregnancy in 22% of the cases in their study<sup>13</sup>.

Sibai BM et al<sup>16</sup> noted abruptio placentae in 5.6% women with preeclampsia<sup>16</sup>. Mandana Saadat et al studied 125 women with pre eclampsia, abruptio placentae was noted in 8.8%<sup>17</sup>. Rathore R et al 2010 studied 100 patients with pre eclampsia and observed abruptio placentae in 4% cases<sup>18</sup>. In the present study severe Preeclampsia and Eclampsia was observed in 16.12% cases of severe abruption placentae. Association of abruptio placentae with pre eclampsia varies from 10-50%<sup>14</sup>.

Incidence of placenta previa in our study was 1.81% with a total of 37 cases. Previous one or more caesarean delivery was a risk factor in 13.97% cases with placenta previa. Similar finding was observed by serella et al<sup>19</sup>. Eight cases of placenta praevia had previous one caesarean section and four had previous two caesarean section with an incidence of 8.60% and 4.30% respectively which is similar as reported by virendera et al<sup>20</sup>. Six cases in placenta previa group (6.45%) had previous history of curettage. 4.30% cases in placenta previa had placenta previa in previous pregnancy too (Table 4).

Malpresentation was seen in 6.45% cases which is comparatively lesser than found in study conducted by serella et al (18.03%)<sup>19</sup>. Perinatal mortality was as high as 24.73% in our study with maternal mortality of 1.07% which is comparable to Singhal et al with 23 % perinatal mortality and maternal mortality of 2%<sup>13</sup>. Arora et al and Khosla et al reported very high perinatal mortality of 61.5 and 53.5% respectively<sup>21,22</sup>. Perinatal mortality rate associated with placental abruption was 119 per 1000 births compared with eight per 1000 for general obstetrical population in developed world<sup>1</sup>. Abruption placentae is cause of 10-12% of all third trimester still birth at parkland hospital<sup>1</sup>. Still birth in women with placental abruption was as high as 17.20% (16 cases), significantly higher than in placenta previa (7.52%) in our study. Mean birth weight of 2.4kg in our study was comparable to Singhal et al<sup>13</sup>. High perinatal morbidity and mortality apart from abruption placentae was due to low birth weight related to

preterm birth in (65.58%) and NICU admission in (23.65%). DIC and acute renal injury was developed in 2.15% each in our study compared to 7% in Singhal et al<sup>13</sup>. 11.82 % had PPH managed with uterotonics, B-Lynch, B/L uterine artery ligation while three cases required peripartum hysterectomy. This is comparable to Singhal et al where three patients had peripartum caesarean hysterectomy as life saving measure<sup>13</sup>.

### Conclusion

Prevalence of Antepartum haemorrhage in our study is 4.55%, a tertiary care referral centre. Incidence of abruptio (2.54%) being higher than placenta praevia (1.81%). Unbooked pregnancy, low socio economic status, Severe pre eclampsia, grandmultiparity, increased maternal age were significant risk factors for abruptio placenta. This study shows rising trend in abruptio placentae. The incidence significantly increases in cases of severe preeclampsia and eclampsia. Severe pre eclampsia and eclampsia were present in 16.12% cases of abruptio placentae in present study. Obstetricians must be aware that pregnancy with pre eclampsia, grandmultipara and previous placental abruption are at increased risk of placental abruption.

All women with Antepartum haemorrhage heavier than spotting should be assessed by consultant led care at tertiary hospitals, advised admission till bleeding stops, to establish the need for urgent intervention and to manage maternal and fetal compromise. Prompt resuscitation of hypovolemia and blood administration is an absolute requirement for acceptable obstetric care. Good perinatal outcome is anticipated with early referral to tertiary care center, early caesarean section, liberal availability of blood products and timely neonatal resuscitation.

Regular antenatal care, early diagnosis and management of pre eclampsia can prevent rising trends in abruptio placentae, thereby improving maternal and fetal prognosis - A step towards achievement of sustainable development goal-3,

to reduce maternal mortality to 70 per one lakh live births by 2030.

## References

- Cunningham, Leveno, Bloom, Spong, Dashe, Hoffman, Casey, Sheffield et al. *Obstetrical Haemorrhage*, Williams 24<sup>th</sup> edition, Mc Graw Hill, 2014. chapter 41, page 780-827.
- Lalonde A, Daviss BA, Acosta A et al: postpartum haemorrhage today ICM/FIGO initiative 2004-2006. *Int J. Obstet Gynaecol* 94:243; 2006
- Caric V, Bhide A. Antepartum haemorrhage (chap 10). In : Arias F, Bhide A, Kaizad AS, Daftary DS. Arias' *Practical Guide to High Risk Pregnancy and Delivery*, 4<sup>th</sup> edition, Elsevier, India; 2014. chapter 10 page 151.
- Brame RG, Harbert GM Jr, McGaughey HS, et al. Maternal risk in abruptio. *Obstet Gynecol*1968;31:224-7.
- Hibbard BM, Jeffcoate TNA. Abruptio placentae. *Obstet Gynecol*1966;27:155-67.
- Williams MA, Lieberman E, Mittendorf R, et al. Risk factors for abruptio placentae. *Am J Epidemiol*1991;134:965-72.
- Karegard M, Gennser G. Incidence and recurrence rate of abruptio placentae in Sweden. *Obstet Gynecol*1986;67:523-8.
- Ananth CV, Savitz DA, Williams MA. Placental abruptio and its association with hypertension and prolonged rupture of membranes: a methodologic review and meta-analysis. *Obstet Gynecol*1996;88:309-18
- Cunningham GF, MacDonald PC, Gant NF, et al, eds. Chap 37. Obstetrical hemorrhage. In: Williams obstetrics. 19th ed. Norwalk, CT: Appleton & Lange, 1993:819-51.
- Deering S.H Abruptio placentae. (Online) 2007 (Cited 2007 June 2). Available from URL: <http://emedicine.medscape.com/article/252810-overview>.
- Dashe JS: Toward Consistent terminology of placental location. *Semin perinatol* 37 (5):375,2013.
- Archana M, Sonal A. Study of Antepartum hemorrhage and its maternal and perinatal outcome. *International Journal of Scientific and Research Publications*, Volume 4, Issue 2, February 2014
- Singhal, Nymphaea, S Nanda. Maternal And Perinatal Outcome In Antepartum Hemorrhage: A Study At A Tertiary Care Referral Institute. *The Internet Journal of Gynecology and Obstetrics*. 2007 Volume 9 Number 2.
- Salihu HM, Bekan B, Aliyu M.H et al: perinatal mortality associated with abruptio placentae in singletons and multiples. *Am. J Obstet Gynaecol* 193:198;2005
- Das B. Antepartum hemorrhage in three decades. *J Obstet Gynaec India* 1975;25:636-7.
- Sibai BM. Diagnosis, controversies and management of the syndrome of hemolysis, elevated liver enzymes, and low platelet count. *Obstet Gynecol* 2004;103(5 pt 1):981-991.
- Saadat M, Nejad SM, Habibi G, et al. Maternal and neonatal outcomes in women with preeclampsia. *Taiwan J Obstet Gynecol* 2007;46(3):255-259.
- Rathore R, Butt NF, Iqbal A, et al. Complications and outcome of patients of preeclampsia and eclampsia presenting to medical wards of Mayo hospital Lahore. *ANNALS* 2010;16(1):17-19.
- Lavanyakumari Sarella *et al.*, *Sch. J. App. Med. Sci.*, 2014; 2(5A):1555-1558
- Pandey VP, Pandey M. Study of Antepartum Haemorrhage and its Maternal and Perinatal Outcome. *Ann. Int. Med. Den. Res.* 2016;2(1):384-89.
- Arora R, Devi U, Majumdar R. Perinatal morbidity and mortality in antepartum hemorrhage. *J Obstet Gynaec India* 2001;51(3):102-4.

22. Khosla A, Dahiya V, Sangwan K, Rathore S. Perinatal outcome in antepartum hemorrhage. J Obstet Gynae India 1989;9:71-3.