Austin Journal of Pregnancy & Child Birth

Open Access

Austin Publishing Group

Research Article

Risk Factors and Outcomes of Placenta Praevia in Lubumbashi, Democratic Republic of Congo

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Received: January 11, 2021; **Accepted:** February 02, 2021; **Published:** February 09, 2021

Abstract

Introduction: Placenta Praevia (PP) is frequently associated with severe maternal bleeding leading to an increased risk for adverse outcome of mother and infant. This study aims to determine the prevalence, and to evaluate potential risk factors and respective outcomes of pregnancies with PP in Lubumbashi, Democratic Republic of Congo.

Methods: Data were retrospectively collected from patients diagnosed with PP at 4 hospitals in Lubumbashi between January 2013 and December 2016. All women who gave birth to singleton infants were studied. Differences between women with PP and without PP were evaluated. Adjusted Odds Ratios (aOR) with 95% confidence intervals for risk factors, and adverse maternal and perinatal outcomes associated with PP were estimated in multivariable logistic regression.

Results: The overall prevalence of PP was 1.49% (227/15,292). The following risk factors were independently associated with PP: multiparity ≥6 (aOR=2.36; 95% CI: 1.13-4.91), previous cesarean section (aOR=6.74; 95% CI: 2.99-15.18), and no antenatal care visit during pregnancy (aOR=7.15; 95% CI: 4.86-10.53). PP was significantly associated with adverse maternal outcomes such as delivery by cesarean section (aOR=3.09; 95% CI: 1.89-5.06), maternal anemia (aOR=11.43; 95% CI: 6.20-21.06); and hospital stay of >4 days (aOR=2.02; 95% CI: 1.24-3.29). PP was also significantly associated with adverse perinatal outcomes such as Apgar scores of <7 at the 5th minute after birth (aOR=4.39; 95% CI: 2.62-7.36), low birth weight (aOR=4.10; 95% CI: 2.26-7.44), stillbirth (aOR=4.16; 95% CI: 1.39-12.46), and early neonatal death (aOR=5.72; 95% CI: 1.60-20.42).

Conclusion: PP is associated with adverse maternal and perinatal outcomes, and multiple independent risk factors were identified. Therefore, detection and careful surveillance of these risk factors are important to ultimately improve maternal and perinatal outcomes.

Keywords: Placenta praevia; Prevalence; Risk factors; Adverse maternal outcome; Perinatal outcome

Introduction

Placenta Praevia (PP) is a potentially severe obstetric complication where the placenta lies within the lower segment of the uterus, presenting an obstruction to the cervix and thus to delivery [1-4]. PP occurs in 1/200 births, complicates about 0.3% of pregnancies and contributes to about 5% of all preterm deliveries [2,5,6]. The recurrence rate is 4 to 8% of subsequent pregnancies [7]. The etiology of this condition remains unclear. The incidence of low placenta insertion increases with advanced maternal age, multiple gestations, multiparity, smoking, previous caesarean sections and history of curettage, voluntary termination of pregnancy [8-11]. This catastrophic complication not only poses a risk to the fetus, but also endangers the life of the mother [12]. On the one hand, main maternal complications of PP are postpartum hemorrhage requiring blood transfusion and hysterectomy [13,14] which can also cause bladder damage during surgery [15]. On the other hand, premature birth, low birth weight, respiratory distress syndrome, admission to neonatal intensive care unit as well as perinatal death are significant neonatal problems [9]. Perinatal mortality in pregnancies complicated by PP is around 4-8 % [2].

Maternal and perinatal outcomes of PP occupy an important place in the literature. But we realized that there is no work devoted to this entity in the Democratic Republic of Congo (DRC) in general and in Lubumbashi in particular.

So the present study aims to determine the prevalence, and to evaluate potential risk factors and respective outcomes of pregnancies with PP in Lubumbashi, DRC.

Materials and Methods

A case-control study comparing women with and without PP was conducted. We conducted a retrospective study using maternally linked data from maternities of 4 hospitals at level 3 on the public health scale (University Clinics, Jason Sendwe Hospital, Gécamines-Sud Hospital and SNCC Hospital) in Lubumbashi (in Haut-Katanga province, DRC) for the period from January 1, 2013 to December 31,

Citation: Ndomba MM, Mukuku O, Tamubango HK, Biayi JM, Kinenkinda X, Kakudji PL, et al. Risk Factors and Outcomes of Placenta Praevia in Lubumbashi, Democratic Republic of Congo. Austin J Pregnancy Child Birth. 2021; 2(1): 1002.

Table 1: Logistic regression of risk factors for placenta praevia in Lubumbashi (DRC).

Variable	Placenta praevia	No placenta praevia	cOR [95% CI]	aOR [95% CI]
Maternal age				
<20 years	5 (2.20%)	18 (4.32%)	0.54 [0.19-1.48]	0.91 [0.29-2.91]
20-34 years	159 (70.04%)	308 (73.86%)	1	1
≥35 years	63 (27.75%)	91 (21.82%)	1.34 [0.93-1.95]	1.26 [0.79-2.02]
Parity				
0	29 (12.78%)	95 (22.78%)	1	1
1-5	154 (67.84%)	274 (65.71%)	1.84 [1.16-2.92]	1.50 [0.87-2.57]
≥6	44 (19.38%)	48 (11.51%)	3.00 [1.67-5.38]	2.36 [1.13-4.91]
History of abortion				
No	159 (70.04%)	324 (77.70%)	1	1
Yes	68 (29.96%)	93 (22.30%)	1.49 [1.03-2.14]	1.43 [0.94-2.17]
History of myomectomy				
No	225 (99.12%)	413 (99.04%)	1	1
Yes	2 (0.88%)	4 (0.96%)	0.92 [0.08-6.46]	0.43 [0.07-2.57]
Previous CS				
No	205 (90.31%)	407 (97.60%)	1	1
Yes	22 (9.69%)	10 (2.40%)	4.37 [2.03-9.40]	6.74 [2.99-15.18]
Antenatal care in this pregnancy				
Yes	101 (44.49%)	345 (82.73%)	1	1
No	126 (55.51%)	72 (17.27%)	5.98 [4.15-8.61]	7.15 [4.86-10.53]

CS=Caesarean Section, cOR=Crude Odds Ratio and aOR=Adjusted Odds Ratio

2016.

All deliveries that took place in these 4 maternities from January 2013 to December 2016 with complete birth registry records were considered for analysis. Women diagnosed with placenta abruption were excluded to avoid misdiagnosis of PP. In addition, women with multiple gestation pregnancies were also excluded to avoid overrepresentation of studying high risk women. The study included any parturient having a PP on a single pregnancy. The control group consisted of parturients without PP during the study period, two controls for one case.

The minimum sample size was 58 cases with PP and was calculated using the following formula: $n=\frac{z^2.p(1-p)}{d^2}$ where: n= sample size; z= confidence level according to the reduced normal centered law (for a confidence level of 95%, z=1.96); p= estimated prevalence reported by Senkoro et al. [9] who had reported a PP prevalence of 0.6% in northern Tanzania; d= margin of error at 2% (typical value of 0.02).

We took into account all the parturient women who presented themselves during the study period in the abovementioned maternities for childbirth. In all, we collected 227 cases of PP; as for the control group, it was represented by 454 parturients without PP. Thus, our total study sample was 682 parturients.

A standardized questionnaire was used to collect information from the medical birth registry. Maternal age, and obstetric history (parity, previous caesarean deliveries, history of myomectomy, history of abortion, and having antenatal care visits) were examined. The following maternal complications were evaluated: postpartum anemia, caesarean deliveries, hospital stay >4 days, and maternal death. The following neonatal complications and birth outcomes were assessed: preterm birth, fetal malpresentation, Apgar score at the 5th minute after birth less than 7, stillbirth, low birth weight, admission to neonatal intensive care unit, and early neonatal death.

Placenta praevia was defined as an obstetric complication characterized by placental implantation into the lower uterine segment, covering part of or the entire cervix in the second and third trimester [9].

Maternal anemia was established on the basis of clinical signs and/or on a hemoglobin level of less than 11 g/L when it was available and/or receiving a blood transfusion (during or after delivery).

Apgar score was defined as a measure of the physical condition of a newborn infant. The Apgar score has a maximum ten points, with two possible for each of heart rate, muscle tone, breathing, response to stimulation, and skin coloration.

Data analysis was performed using Stata version 15. Frequencies with respective percentages were used to summarize categorical variables. Both bivariate and multivariable analysis were performed using logistic regression and adjusted Odd Ratios (aOR) with 95% confidence intervals for risk factors, and maternal and perinatal outcomes associated with PP were estimated. A p-value of less than 0.05 was considered statistically significant. Our study was approved by the Medical Ethics Committee of the University of Lubumbashi prior to its commencement (Approval number: UNILU/CEM/137/2019).

Results

Placenta praevia complicated 1.49% (227) of 15,292 pregnancies.

Table 2: Maternal outcomes associated with placenta praevia.

Variable	Placenta praevia	No placenta praevia	cOR [95% CI]	aOR [95% CI]
Mode of delivery				
Vaginal delivery	83 (36.56%)	339 (81.29%)	1	1
CS delivery	144 (63.44%)	78 (18.71%)	7.54 [5.23-10.87]	3.09 [1.89-5.06]
Anemia				
No	122 (53.74%)	401 (96.16%)	1	1
Yes	105 (46.26%)	16 (3.84%)	21.57 [12.27-37.90]	11.43 [6.20-21.06]
Duration of hospitalisation				
≤4 days	78 (34.36%)	315 (75.54%)	1	1
>4 days	149 (65.64%)	102 (24.46%)	5.90 [4.14-8.40]	2.02 [1.24-3.29]
Maternal death				
No	222 (97.80%)	416 (99.76%)	1	1
Yes	5 (2.20%)	1 (0.24%)	9.37 [1.09-80.70]	2.25 [0.23-21.58]

CS=Caesarean Section, cOR=Crude Odds Ratio and aOR=Adjusted Odds Ratio

Risk factors for PP are presented in (Table 1). There were higher rates of age ≥35 years (27.75% *vs* 21.82%), parity ≥6 (19.38% *vs* 11.51%), prior caesarean delivery (9.69% *vs* 2.40%), no having an antenatal care visit during pregnancy (55.51% *vs* 17.27%), and a history of abortions (29.96% *vs* 22.30%) among parturients with PP as compared with the comparison group. Significant risk factors for PP after adjusting for potential confounding factors were multiparity ≥6 (aOR=2.36; 95% CI: 1.13-4.91), previous caesarean section (aOR=6.74; 95% CI: 2.99-15.18), and no antenatal care visit during pregnancy (aOR=7.15; 95% CI: 4.86-10.53). Age ≥35 years, history of myomectomy, and history of abortion had no significant association with PP.

Maternal outcomes associated with PP. After adjustment for confounders (Table 2), PP was significantly associated with several adverse maternal outcomes, such as delivery by caesarean section (aOR=3.09; 95% CI: 1.89-5.06), maternal anemia (aOR=11.43; 95% CI: 6.20-21.06); and hospital stay of >4 days (aOR=2.02; 95% CI: 1.24-3.29). There were no significant differences between the PP and the control group regarding maternal death (aOR=2.25; 95% CI: 0.23-21.58).

Adverse perinatal outcomes included higher rates of preterm birth, fetal malpresentation, an Apgar score <7 at the 5th minute after birth, low birth weight, stillbirth, admission to neonatal intensive care unit, and early neonatal death in the PP group. In order to assess which of the aforementioned factors was independently associated with PP, a multivariable analysis with backward elimination was conducted. Infants delivered by mothers with PP were more likely to have Apgar scores of <7 at the 5th minute after birth (aOR=4.39; 95% CI: 2.62-7.36), low birth weight (aOR=4.10; 95% CI: 2.26-7.44), stillbirth (aOR=4.16; 95% CI: 1.39–12.46), and early neonatal death (aOR=5.72; 95% CI: 1.60-20.42). Admission to neonatal intensive care unit and fetal malpresentation were not associated with PP after multivariable logistic regression (Table 3).

Discussion

This is the first study investigating risk factors for placenta praevia in Lubumbashi. The prevalence of PP was 1.49%, in accordance with N'guessan et al., [16] who found 1.6% in Abidjan (Cote d'Ivoire), but lower than the 3% prevalence that was previously reported by Nayama et al., [17] in Niamey (Niger) and 1.9% reported by Kaur et al., [18] in India. However our study shows higher prevalence than 0.15-0.42 % reported in the literature [10,19,20]. According to Kaur et al., [18], women in developing countries are more likely to have more than two caesarean sections due to the high number of births. Silver et al., [21] and Singh et al., [22] point out that there is a positive correlation between the incidence of abnormal placentation and the number of caesarean sections. As our medical centers are the 4 tertiary hospitals providing care to the entire population of Lubumbashi, our data allow us to study the risk factors, as well as to assess the adverse outcomes associated with PP. The present study strengthens the association between PP and risk factors, such as multiparity (≥6), history of abortion, previous caesarean section, and no ANC visit. After multivariable analysis, our data demonstrate that these are independent risk factors for PP except history of abortion.

The findings of the present study confirm those of most prior studies that the risk of PP increases with multiparity [9,23,24] and previous caesarean section [25]. The pathogenesis of PP is unknown. Several authors hypothesize that the presence of areas of suboptimally vascularized endometrium in the upper uterine cavity due to previous surgery (previous scarring) or pregnancies promotes implantation of trophoblast in, or unidirectional growth of trophoblast toward the lower uterine cavity [8,26,27]. According to Kiondo et al., [14], PP in multiparity is thought to be due to atherosclerotic changes in the uterus resulting in an under-infusion and infraction of the placenta, thereby increasing the size of the placenta, and subsequently the probability that the placenta covers or encroaches on cervical os.

Age was not found to be risk factors in the present study; although many studies have reported an association of PP with increased age [23,24]. In this study there was a higher rate of women with a history of abortion in the PP cohort than in the control cohort, but the difference did not reach statistical significance in the multivariate analysis (aOR=1.43; 95% CI: 0.94-2.17). It is possible that controlling for important confounding factors such as previous CS, and multiparity, reduced the magnitude of the association between history of abortion and PP. However several studies concluded that a history of abortion has a contributing role in PP in the succeeding pregnancy [25,28,29].

Table 3: Perinatal outcomes associated with placenta praevia.

Variable	Placenta praevia (n=227)	No placenta praevia (n=454)	cOR [95% CI]	aOR [95% CI]
Preterm birth				
No	128 (56.39%)	357 (85.61%)	1	1
Yes	99 (43.61%)	60 (14.39%)	4.60 [3.15-6.72]	1.46 [0.85-2.51]
Fetal malpresentation				
No	189 (83.26%)	394 (94.48%)	1	1
Yes	38 (16.74%)	23 (5.52%)	3.44 [1.99-5.95]	1.33 [0.67-2.63]
Apgar score at the 5th minutes				
≥7	87 (38.33%)	349 (83.69%)	1	1
<7	140 (61.67%)	68 (16.31%)	8.26 [5.69-11.99]	4.39 [2.62-7.36]
Low birth weight				
No	130 (57.27%)	384 (92.09%)	1	1
Yes	97 (42.73%)	33 (7.91%)	8.68 [5.58-13.51]	4.10 [2.26-7.44]
Stillbirth				
No	188 (82.82%)	412 (98.80%)	1	1
Yes	39 (17.18%)	5 (1.20%)	17.09 [6.63-44.06]	4.16 [1.39-12.46]
Admission to NICU				
No	138 (60.79%)	339 (81.29%)	1	1
Yes	89 (39.21%)	78 (18.71%)	2.80 [1.95-4.03]	0.92 [0.54-1.57]
Early neonatal death				
No	199 (87.67%)	414 (99.28%)	1	1
Yes	28 (12.33%)	3 (0.72%)	19.42 [5.83-64.64]	5.72 [1.60-20.42]

cOR=Crude Odds Ratio; NICU=Neonatal Intensive Care Unit; and aOR=Adjusted Odds Ratio

Women with PP have been shown to be prone to adverse maternal outcomes, such as delivery by caesarean section, maternal anemia, and hospital stay of >4 days [9,30,31].

Correspondingly, women with PP had tenfold higher odds of Caesarean delivery [9]. This can be explained by the fact that the placenta in the lower segment obstructs engagement of the head especially for major praevia. This necessitates Caesarean section and may also cause the transverse lie of the fetus. The present study shows that women with PP had also threefold higher odds of anemia. This can be explained by an increased frequency of maternal peripartum hemorrhage and caesarean section which observation is found in several studies [2,9]. Women with PP are at increased risk of severe bleeding during and after delivery, most often requiring a blood transfusion. Therefore, it is important that blood transfusions and the obstetric emergency care be readily available at any facility treating women with PP. The present study found that PP was more frequent among women without antenatal care visits. This may be because they were admitted earlier compared to their counterparts. Routine ultrasound examinations would be useful for early detection of women at risk of PP to enhance prevention of adverse outcomes; unfortunately, the cost and maintenance of ultrasound machines hinder their utility in developing countries [9].

PP was linked in this study to a number of adverse neonatal outcomes including low birth weight, Apgar score <7 at the 5th minute, and early neonatal death. This is consistent with previous studies [9,20,30,31]. These adverse neonatal outcomes were because most of the women presented with antepartum hemorrhage with severe bleeding, which necessitated an early delivery [18,32,33]. The adjusted odds of low birth weight, Apgar score <7 at the 5th minute, and early neonatal death were 4.10, 4.39, and 5.72 respectively. We attribute these results to maternal hemodynamic instability associated with antepartum hemorrhage at the time of presentation that might have affected the baby enough to require resuscitation of the neonate [33]. In logistic regression, PP was not found to be an independent risk factor for perinatal mortality. It is the direct result of abnormal implantation, but also its association with other risk factors for adverse perinatal outcome, such as Apgar score <7 at the 5th minute, low birth weight and early gestational age at delivery, that contribute to this increased risk of perinatal mortality.

In our study, preterm birth rate was 43.61% in women with PP, while in women without PP it was 14.39%; but there was no significant association between preterm birth and PP in multivariate analysis (aOR=1.46; 95% CI: 0.85-2.51), unlike other studies that explain that with the advancement of gestation, the lower uterine segment is formed, resulting in placental migration [14,25].

Conclusion

Placenta praevia is one of the gravest obstetric emergencies. This study showed that multiparity, previous caesarean and inadequate antenatal care were key risk factors. These risk factors may be useful for screening at-risk mothers. Adverse maternal and perinatal outcomes associated with PP can be reduced by detecting the condition in the antenatal period by ultrasound before it becomes symptomatic. This study highlights the need for comprehensive obstetrics care to appropriately treat PP and its complications. This calls for educating

our patients and make them aware of the importance of antenatal care and making it available.

Data Availability

The datasheet used to support the findings of this study are available from the corresponding author upon request.

References

1. Devarmani M, Tallur PS. Placenta previa: maternal and foetal outcome. J Evolution Med Dent Sci. 2016; 5: 2477-2480.
2. Fatemeh C, Najmeh S, Zakieh N. Maternal and neonatal outcoms of placenta previa at a Tertiary Maternity Hospital Ahvaz, Islamic Republic of Iran. International Journal of Medical Science and Clinical Inventions 2017; 4: 2834-2838.
3. Leveno KJ, Alexander JM, Bloom SL. Placenta previa. In: Williams' Manual of Pregnancy Complications. 23rd ed. New York, NY: McGraw-Hill. 2013.
4. Bhide A, Thilaganathan B. Recent advances in the management of placenta previa. Curr Opin Obstet Gynecol. 2004; 16: 447-451.
5. Boog G. Placenta praevia. EMC-Obstetrique. 2009.
6. Neilson JP. Interventions for suspected placenta praevia. Cochrane Database Syst Rev. 2003; 2: CD001998.
7. Lavery JP. Placenta previa. Clin Obstet Gynecol. 1990; 33: 414-421.
8. Faiz AS, Ananth CV. Etiology and risk factors for placenta previa: an overview and meta-analysis of observational studies. J Matern Fetal Neonatal Med. 2003; 13: 175-190.
9. Senkoro EE, Mwanamsangu AH, Chuwa FS, Msuya SE, Mnali OP, Brown BG, et al. Frequency, Risk Factors, and Adverse Fetomaternal Outcomes of Placenta Previa in Northern Tanzania. Journal of pregnancy 2017; 2017: 5936309.
10. Rosenberg T, Pariente G, Sergienko R, Wiznitzer A, Sheiner E. Critical analysis of risk factors and outcome of placenta previa. Archives of gynecology and obstetrics. 2011; 284: 47-51.
11. Bhutia P, Lertbunnaphong T, Wongwananuruk T, Boriboonhirunsarn D. Prevalence of pregnancy with placenta previa in Siriraj hospital. Siriraj Medical Journal. 2017; 63: 191-195.
12. Zaman BS, Zubair A, Bhatti SZ, Malik ZS. Effect of placenta previa on fetal and maternal morbidity mortality. Ann King Edward Med Coll. 2005; 11: 205-207.
13. Onwere C, Gurol-Urganci I, Cromwell DA, Mahmood TA, Templeton A, van der Meulen JH. Maternal morbidity associated with placenta praevia among women who had elective caesarean section. Eur J Obstet Gynecol Reprod Biol. 2011; 159: 62-66.
14. Kiondo P, Wandabwa J, Doyle P. Risk factors for placenta praevia presenting with severe vaginal bleeding in Mulago hospital, Kampala, Uganda. African health sciences. 2008; 8: 44-49.
15. Hudon L, Belfort MA, Broome DR. Diagnosis and management of placenta percreta: a review. Obstet Gynecol Surv. 1998; 53: 509-517.
16. N'guessan K, Kouakou F, Loue V, Angoi V, Abauleth Y, Boni S. Placenta praevia: maternal and featal prognosis in university hospital of Cocody (Abidjan-Côte d'Ivoire). Mali medical. 2009; 24: 57-59.
17. Nayama M, Sako-Moussa Y, Garba M, Idi N, Tahirou A. Prise en charge du placenta praevia au niveau de la maternite issaka gazobi de niamey: Etude prospective à propos de 98 cas sur 1 an. Médecine d'Afrique noire. 2007; 54: 203-208.
18. Kaur B, Dhar T, Sohi I. Incidence, risk factors and neonatal outcomes of placenta previa presenting as antepartum hemorrhage in tertiary care centre of north India. International Journal of Basic and Applied Medical Sciences. 2015; 5: 58-61.
19. Koifman A, Levy A, Zaulan Y, Harlev A, Mazor M, Wiznitzer A, et al. The clinical significance of bleeding during the second trimester of pregnancy. Archives of gynecology and obstetrics. 2008; 278: 47-51.
20. Kollmann M, Gaulhofer J, Lang U, Klaritsch P. Placenta praevia: incidence, risk factors and outcome. The Journal of Maternal-Fetal & Neonatal Medicine. 2016; 29: 1395-1398.
21. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstetrics & Gynecology. 2006; 107: 1226-1232.
22. Singh P, Jain SK. Evaluation of the effect of progesterone and placebo in parturient of symptomatic placenta previa: a prospective randomized control study. International Journal of Scientific Study. 2015; 3: 69-72.
23. Hossain GA, Islam SM, Mohamed S, Chacraborty MK, Akhter M, Sultanas S. Placenta preavia and it's relation with maternal age, gravidity and caesarean section. Myomensigh Med J. 2004; 13: 143-148.
24. Cieminski A, Długołecki F. Relationship between placenta previa and maternal age, parity and prior caesarean deliveries. Ginekologia polska. 2005; 76: 284-289.
25. Tuzovic L, Djelmis J, Ilijic M. Obstetric risk factors associated with placenta previa development: case-control study. Croat Med J. 2003; 44: 728-733.
26. Oya A, Nakai A, Miyake H, Kawabata I, Takeshita T. Risk factors for peripartum blood transfusion in women with placenta previa: a retrospective analysis. J Nippon Med Sch. 2008; 75: 146-151.
27. Shaikh S. Frequency of placenta previa in multigravida at tertiary care hospital. Int J Cur Res Rev. 2014; 6: 39-43.
28. Karami M, Jenabi E. Placenta previa after prior abortion: a meta-analysis. Biomed Res Ther. 2017; 4: 1441-1450.
29. Hung TH, Hsieh CC, Hsu JJ, Chiu TH, Lo LM, Hsieh TT. Risk factors for placenta previa in an Asian population. International Journal of Gynecology and Obstetrics. 2007; 97: 26-30.
30. Ojha N. Obstetric factors and pregnancy outcome in placenta previa. Journal of Institute of Medicine. 2013; 34: 38-41.
31. Raees M, Parveen Z, Kamal M. Fetal and maternal outcome in major degree placenta previa. Gomal Journal of Medical Sciences. 2015; 13: 13-16.
32. McCormack RA, Doherty DA, Magann EF, Hutchinson M, Newnham JP. Antepartum bleeding of unknown origin in the second half of pregnancy and pregnancy outcomes. BJOG: An International Journal of Obstetrics & Gynaecology. 2008; 115: 1451-1457.
33. Asıcıoglu O, Sahbaz A, Gungorduk K, Yildirim G, Asıcıoglu BB, Ulker V. Maternal and perinatal outcomes in women with placenta praevia and accreta in teaching hospitals in Western Turkey. Journal of Obstetrics and Gynaecology. 2014; 34: 462-466.