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Incidence rate and outcome of placenta previa at maternity hospital in madinah, kingdom of Saudi Arabia: A retrospective study 2016-2017

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Abstract
Placenta previa is an obstetric complication defined as a placenta that implants near or over the cervical os. With increased frequency, leading to a rise in cesarean section delivery worldwide, it is worthy of note that the Saudi literature shows a shortage of data about its incidence rate and outcome. This study aims to determine the incidence of placenta previa in a retrospective cohort of women enrolled in Madinah Maternity and Children Hospital in Madinah city, Saudi Arabia, for two years 2016 and 2017. A retrospective cohort study was designed and included all women enrolled in the studied hospital during the stipulated time. The total incidence rate of placenta previa was 0.6% during the study years. In conclusion, the incidence of placenta previa in this study was comparable with results reported from previous similar studies, showing relationships with high maternal age, cesarian section, and maternal outcomes.

Keywords: placenta previa, cesarean section**,** incidence**,** pregnancy outcome, maternal morbidity

1. Introduction
Placenta previa is an implant of the placenta wholly or in part into the lower segment of the uterus, at or over the cervical os [1]. It is a major Previa if the placenta lies over the internal cervical os and minor or partial previa; if it is in the lower uterine segment but not covering the cervical os [2]. It complicates approximately 0.3-0.5% of pregnancies with no prior cesarean delivery [3]. The risk of developing placenta previa has markedly increased worldwide with the increasing number of cesarean sections. Studies have shown a placenta previa increase in cesarean deliveries increase, with a 1% chance increase after one cesarean delivery, 2.8% after three cesarean deliveries, and 3.7% after five cesarean deliveries [4]. Other factors that increase risks include; old maternal age and high parity [5], multi-fetal gestation [6], uterine surgery (curettage) [7], smoking and cocaine use [8], and abortion [9]. Incidence of placenta previa was found to range from 3.5 to 4.6 per 1000 births in most worldwide countries [3]. A study from 1989 to 1997 in the United States indicated an incidence rate of 2.8 per 1000 live births [10]. A study in Jeddah, Saudi Arabia from 2001 to 2013 has reported the incidence rate of placenta previa to be 4.1 per 1000 births [11].
Complications from placenta previa, including obstetric hysterectomy and massive bleeding requiring a blood transfusion, have been reported in several studies [12, 14]. Also, surgical injury to the bladder, ureters, viscera, and renal failure have been reported [15, 16]. Injuries to bladder and bowel were reported in 13.2% and 3.8% of placenta previa cases, respectively, in a prospective Egyptian study on 3841 deliveries [17]. There are also several neonatal complications associated with placenta previa that are often related to prematurity and stillbirth [18]. Placenta previa is known to carry higher risks of maternal morbidity and mortality. Massive obstetrical hemorrhage associated with placenta previa is found to be associated with 30% of maternal deaths in Asia [19]. Such complications least contribute to maternal mortality; particularly in countries with proper utilization of medical services, and availability of blood transfusion. However, with the rising incidence of cesarean sections combined with increasing maternal age, placenta praevia incidence and its complications will continue to rise [20, 23].
Placenta previa presents classically as painless bleeding and technologic advances in ultrasonography and second-trimester transvaginal sonography (TVS) the diagnosis of placenta previa is now commonly made earlier in pregnancy [24, 25].

AIMS

This retrospective study aims to determine the incidence and maternal outcome of placenta previa in the maternity hospital in Madinah city, Saudi Arabia, over two years (2016-2017). The study will also compare the maternal outcome as well as other hospital-related data by type of placenta previa among the studied women.

1.1 Objective

The present retrospective study aimed to study the incidence and outcome of placenta previa in Maternity and Children Hospital (MMCH), Madinah city, Saudi Arabia, to provide Saudi literature with recent data on this critical obstetric complication.

1.2 Specific objectives

1. To measure the incidence rate of placenta previa among women enrolled in Madinah Maternity and Children Hospital (MMCH) during the years 2016 and 2017.
2. To study the subtypes of placenta previa and maternal outcome.

2 Materials and Methods

The current study is a retrospective study. A retrospective cohort was built from women diagnosed with placenta previa and enrolled in Madinah Maternity and Children Hospital (MMCH) during two years period (2016-2017) in Madinah city, Saudi Arabia. Socio-demographic, reproductive and obstetric data and information about other risk factors if present and its outcome were extracted from the traditional medical records of the enrolled women and recorded in a predesigned medical sheet. Extracted data were then analyzed statistically and incidence rate calculated. Ethical consideration was taken to ensure the confidentiality and privacy of the anonymously analyzed collected data. Approval of the study was gotten from the Directorate of Health Affairs in Madinah city, Saudi Arabia and hospital officials were duly informed about the aim and scope of the study.

3. Results

Of the total 31296 women profiled in this study, 200 women had placenta previa. The overall incidence rate of placenta previa was 0.6% during the study years of 2016 and 2017 (Fig 1). The incidence rate during the year 2016 was 0.68% while that of 2017 was 0.6% (Fig 2).

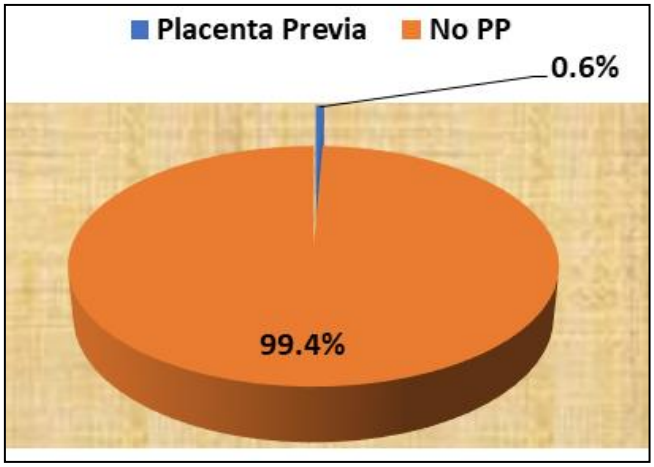

Fig 1: Incidence rate of placenta previa among women delivered at MMCH during 2016-2017, Madinah, Saudi Arabia

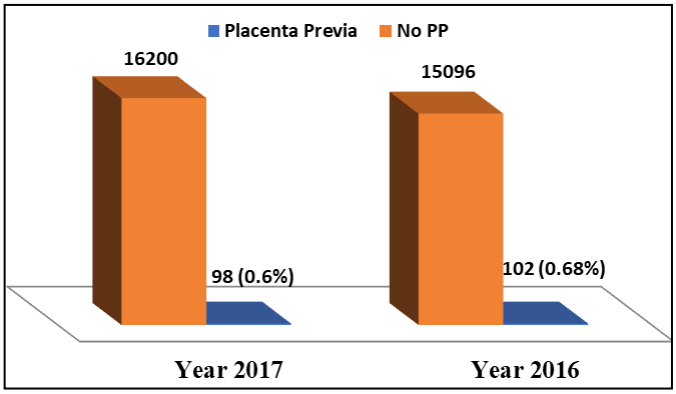

Fig 2: Comparison of incidence of placenta previa among women delivered at MMCH during 2016 and 2017, Madinah, Saudi Arabia

Table 1: Socio demographics of the studied women

Characteristics	N=200 n (%)
Age in years	
< 35	92 (46.0)
35-40	78 (39.0)
> 40	30 (15.0)
Age in years; mean ± SD (Range)	34.3 ± 6.0 (18-48)
Educational level	
Illiterate	12 (6.0)
Basic	153 (76.5)
University and higher	35 (17.5)
Residence	
Urban	177 (88.5)
Rural	23 (11.5)
Nationality	
Saudi	181 (90.5)
Non-Saudi	19 (9.5)

The personal characteristics of the studied women are presented in Table 1. The mean age of the studied women was 34.3 ± 6.0 years, and about half of them (46%) were below the age of 35 years. About three-fourth of the studied women had a basic educational level (76.5%), and the majority of them were of urban residence (88.5%) and Saudi nationality (90.5%).

Table 2: Reproductive history of the studied women

Characteristics	N= 200 n (%)
Ante-natal care	
Yes	187 (93.5)
No	13 (6.5)
Parity	
P0	12(6.0)
P1-P5	146 (73.0)
P6+	42 (21.0)
Previous curettage	
Yes	21 (10.5)
No	179 (89.5)
Previous cesarean section	
No	53 (26.5)
Previous one	40 (20.0)
Previous two	40 (20.0)
Previous three and more	67(33.5)

Table 2 presents the reproductive history of the studied women. The majority of the studied women (93.5%) were reported to follow ante-natal care during the current pregnancy. Of the studied women, 146 (73%) has previously had 1 to 5 births, 42 (21%) with six deliveries and above while 12 (6%) of them were primigravida women. Twenty-one women (10.5%) had previous

curettage. 53 (26.5%) of the studied women never had cesarean section (CS), 40 (20 %) has had one previous CS, 40 (20 %) has had two previous CS with 67 (33.5%) of them having three and more previous CS.

Table 3: Hospital stay data among the studied women

Hospital data	N= 200 n (%).
ICU admission	
Yes	55 (27.5)
No	145 (72.5)
Prolonged Intubation	
Yes	11 (5.5)
No	189 (94.5)
Blood transfusion	
No	66 (33%)
1-4 unites	52 (26.0)
5-9 units	54(27.0)
≥10 units	28(14)

Table 3 displays the hospital stay data among the studied women. Intensive care unite (ICU) admission was reported in 55 women (27.5%). Prolonged Intubation was done for 11 cases (5.5%), and blood units were transfused for 134 cases representing 67% of the studied women as a total, where 52 women (26%) received 1-4 units, 54 women(27%) received 5-9 units and 28 cases (14%) received ≥ 10 units.

Table 4: Types of placenta previa among the studied women

Placenta previa	N= 200 n (%)
No invasion	118 (59.0)
Accreta	57 (28.5)
Increta	11 (5.5)
Percreta	14 (7.0)

Table 4 presents the type of placenta previa among studied women. No invasion placenta previa was found in 118 (59%) of the studied women, placenta previa accreta in 57 (28.5%) women, placenta previa increta in 11 (5.5%) women, and percreta type was found in 14 (7%) women. All of the studied women (100%) were delivered by cesarean section. 8% of which elective and 92% as an emergency. The types of placenta previa among studied women are depicted in the pie chart below (Fig. 3).

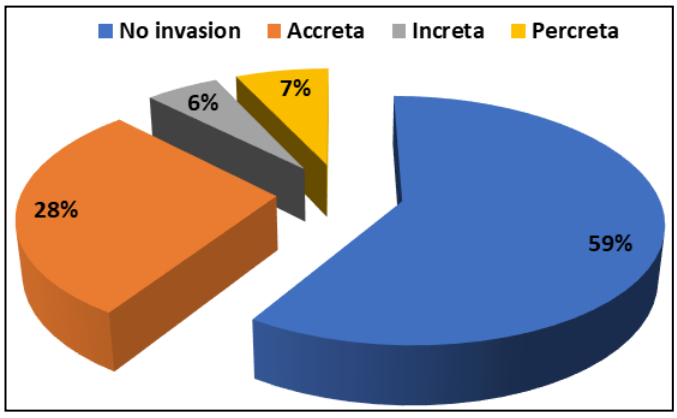

Fig 3: Percentage distribution of placenta previa by its type among the studied women at MMCH, Madinah, Saudi Arabia

Table 5: Distribution of the studied women by type of placenta previa and their previous cesarean section

Placenta previa	Previous cesarean section				P-value
	No	Previous 1	Previous 2	Previous 3 and more	
No invasion	50 (42.4)	28 (23.8)	20 (16.9)	20 (16.9)	<.0001*
Accreta	3 (5.3)	7 (12.2)	15 (26.3)	32 (56.2)	
Increta	0 (0.0)	3 (27.3)	4 (36.4)	20 (36.4)	
Percreta	0 (0.0)	2 (14.2)	1 (17.1)	11 (78.7)	

*Significant

Table 5 presents the distribution of the studied women by type of placenta previa and their previous cesarean section (CS). There have been statistically significant differences between placenta previa subtypes and previous cesarean section frequency among the studied women. No invasion subtype was more in women with no previous CS. Accreta and percreta subtypes showed a high prevalence among women with three and more previous CS, whereas accreta subtype was found in 56.2%, percreta subtype was found in 78.7% among these women. Increta and percreta subtypes, however, were not found in women with no history of previous CS. The high prevalence of increta was found in women with previous 2 CS (36.4%) and previous 3 and more CS (36.4%).

Table 6: Distribution of the studied women by type of placenta previa and blood transfusion

Placenta previa	Blood transfusion				P-value
	No	1-4 unites	5-9 unites	≥ 10 units	
No invasion (n= 118)	62 (52.6)	40 (33.8)	16 (13.6)	0 (0.0)	<.0001*
Accreta (n= 57)	2 (3.5)	11 (19.3)	32 (56.1)	12 (21.1)	
Increta (n= 11)	1 (9.1)	0 (0.0)	3 (27.3)	7 (63.6)	
Percreta (n= 14)	1 (7.1)	1 (7.1)	3 (21.3)	9 (64.5)	

*Significant

Table 6 shows the distribution of the studied women by type of placenta previa and blood transfusion. More than half of the studied women (52.6%) with no invasion placenta previa type did not need a blood transfusion. On the other hand, women who received a massive blood transfusion (10 and more unites) were those with placenta previa percreta (64.5%), followed by those with increta (63.6%), and accreta (21.1%).

Table 7: Maternal outcome among the studied women

Maternal outcome	N= 200 n (%)
No complications	132 (66.0)
Bilateral internal iliac artery ligation	4(2)
Bilateral uterine artery ligation	18 (9.0)
Hysterectomy	9 (4.5)
Bladder injury	9 (4.5)
Abdominal packing and reopening	2(1)
Bilateral internal iliac artery embolization	4 (2.0)
Bakri balloon insertion	14(7.0)
Bowel injury	1(0.5)
Ureter injury	1(0.5)
Acute Renal failure	1(0.5)
DIC (disseminated intravascular coagulopathy)	1 (0.5)
Bilateral tubal ligation	26 (13.0)

Table 7 shows the maternal outcome of the studied 200 women. No complications were recorded in 132 (66%) cases of the studied women. 18 (9%) cases had Bilateral uterine arteries ligation, 9 (4.5%), 1 (0.5%) and 1 (0.5%) cases had Bladder injury, Bowel injury and Ureter injury respectively with 26 (13%) having Bilateral tubal ligation. Hysterectomy and Bakri

balloon insertion were done in 9 (4.5%) and 14 (7.0%) cases respectively with bilateral internal iliac artery embolization done for 4 (2%) cases and 1 (0.5%) case complicated with acute renal failure.

4. Discussions

The present study revealed an incidence rate of placenta previa among the studied women to be 0.6% (Fig. 1). In other words, the incidence of placenta previa in this study was 6 in 1000 of the studied women. This finding was similar to that recently reported in a previous Saudi survey conducted in Jeddah (2001-2013), where the incidence rate of placenta previa was 4.1 per 1000 births (0.41%) [11]. Results are also similar to a study conducted in Pakistan by Bhutia *et al*. (from 2005-2011) [26], with a prevalence rate of 0.7%. The incidence rate in this study, is however, slightly lower than that reported in a prospective Egyptian study on 3841 deliveries (from January through June 2014), with an incidence rate of 1.3% [17] and that done in India 1.16% [27]. On the other hand, a low incidence rate was reported in a study conducted in Uganda (0.16%) by Kiondo *et al*. [28]. Study design, sample size, and the spanning time of the studies can explain these differences. Studies with a shorter spanning time frame and smaller sample size, possibly leading to an underestimation of prevalence have low incidence as seen in the Uganda study.

Distribution of placenta previa by personal characteristics of the studied women showed that 92 (46%) of them were below the age of 35 years with 108 (54%) in the age group of 35years and above (Table 1). The present study results coincided with studies that suggest that advanced maternal age is strongly associated with an increased incidence of placenta previa [5, 29].

The majority of women (93.5%) in this study were reported to follow ante-natal care (at MMCH – primary health care -private hospital) during the current pregnancy. Of the studied women, 73% of them were P1 to P5, 21% of them were P6+, while the remaining 6% of them were primigravida women (Table 2). Again, these results were reported by other similar studies where no association between placenta previa and advanced maternal age or high parity [17, 26]. The observed high incidence of placenta previa among women reported ant-natal care (ANC) visits (93.5%) might reflect the role of proper ANC and the use of ultrasonography in the diagnosis of early placenta previa and its types. Which in turn, gives the obstetricians more time to prepare for proper management, provide blood unites, and discuss with the patients the alternative procedures that may be taken during delivery.

Admission to ICU and prolonged intubation were frequent hospital measures after a cesarean section of cases with placenta previa. In our study, there 55 women admitted to ICU (27.5%). Also, prolonged intubation was performed in 11 cases (5.5%) (Table 3). The correction and management of severing hemorrhage associated with placenta previa require massive transfusion, ICU admission, prolonged intubation and other procedures [30]. In a previous Saudi study, 26 patients were admitted to the intensive care unit (ICU) (11.3%), all of them had received more than six unit's blood transfusion, and 22 patients had a hysterectomy for uncontrollable bleeding, but no bladder no bowel injuries were reported [11].

The incidence of placenta previa in this study showed variation according to its subtypes. No invasion placenta previa was found in 118 (59%) of the studied women. Placenta previa accreta was found in 57 women (28.5%), placenta previa increta in 11 women (5.5%), while the percreta subtype was found in 14 women (7%) (Table 4). In a similar study, the prevalence of placenta accrete was 26.9% which is considered as an average range for prevalence. However, there is a wide discrepancy in the incidence of placenta accreta in different studies [31, 32].

There have been statistically significant differences between placenta previa subtypes and previous cesarean section frequency among the studied women. No invasion subtype was more in women with no previous CS. Accreta and percreta subtypes showed a high prevalence among women with three and more previous CS, where accreta was found in 56.2%, and percreta was found in 78.7% among these women. Increta and percreta subtypes, however, were not found in women with no history of previous CS. The high prevalence of increta was found in women with previous 2 CS (36.4%) and previous three and more CS (36.4%) (Table 5). Generally, Placenta previa complicates approximately 0.3-0.5% of pregnancies with no prior cesarean delivery [3]. This association is increased with a shorter interval between pregnancies, and the higher number of repeat cesarean section [32, 33]. A meta-analysis concluded that in 359 deliveries by CS at first birth is enough to cause an additional case of placenta previa in the next pregnancy [34].

The significant increase in the risk of postpartum hemorrhage in women with placenta previa necessitates massive blood transfusion and the need for an emergency hysterectomy [35]. In our study, women who received a massive blood transfusion (10 and more units) were those with placenta previa percreta (64.5%), followed by those with increta (63.6%), and accreta (21.1%) (Table 6). Blood transfusion is closely related to blood loss antepartum, intrapartum and/or postpartum. Women with placenta previa had three-fold higher odds of blood transfusion and fivefold odds of prolonged hospital stay [36]. It is therefore crucial that blood transfusions and the obstetric emergency care be readily available at any facility treating women with placenta previa [36, 39]. In this study the average unit of blood for a patient was three units of blood which is similar to a study with an average unit of donated blood of 2.5±1.8 units [40].

The need for blood indicates that liberal blood transfusion and cesarean hysterectomy are essential factors in reducing the case-fatality rate in women with placenta previa. As in this study results, some other similar studies have showed that 90% of patients with placenta accreta required blood transfusion and packed red blood cells is needed in 40% of cases. The reported maternal mortality with these measures is as high as 7% [16, 40]

A method to control massive hemorrhage in cases with placenta previa is the bilateral or unilateral uterine artery ligation. In the current study, there were 18 cases (9%) underwent bilateral uterine artery ligations and 4 cases underwent bilateral internal iliac artery ligation (Table 7). This procedure significantly reduces pulse pressure and helps to transform the pelvic arterial system into a venous-like system having sluggish blood flow [41, 42]. Bilateral uterine artery ligation is ineffective in hemorrhages secondary to placenta praevia/accreta; in these cases, the bleeding needs to be controlled by a different technique [43].

Because placenta previa is a potentially life-threatening obstetric condition, there is a need to perform a hysterectomy. Studies have documented a significant increase in maternal complications associated with placenta previa include emergency hysterectomy, infections, and thrombophlebitis [9, 44]. Hysterectomy is one of the essential maternal morbidity associated with placenta previa. Although no case fatality was reported in the current study, hysterectomy was done for 9 of the studied 200 cases (4.5%) (Table 7).

Another method to control blood during cesarean delivery is the embolization of the internal iliac artery. In our study, this procedure was done for 4 (2%) cases successfully with no

complications. A hundred percent success was also recorded in a recent survey of 16 women with pernicious placenta previa who underwent direct puncture embolization of the internal iliac artery during cesarean delivery at a center in China [45]. Postoperative Doppler Imaging showed a normalized uterine blood flow and adequate uterine recovery in all cases. Embolization is considered a safe, effective, simple, and rapid method to control bleeding among women with pernicious placenta previa.

In this study, there were 9 cases (4.5%) of bladder injury, which was lower than that reported in an Egyptian study (13.2%) [17]. It was found that the bladder is the most frequently involved organ in placenta percreta and is associated with significant morbidity [46]. In a meta-analysis of 54 cases of placenta percreta, bladder injuries were reported as high as 26% [47].

5. Conclusion

A total of 200 women with placenta previa were extracted from the medical files recorded in MMCH during 2016 and 2017, resulting in a total incidence rate of placenta previa was 0.6 %. However, characteristics such as older age and women who have undergone a cesarian section have been related to placenta previa. These factors may be useful for screening at-risk mothers.

The need for blood transfusion and ICU admission should be planned for every case with placenta previa. Scheduled cesarean with or without attempting to do a hysterectomy, patient counseling and informed consent should be ready before the operation. Because the placenta previa rate is expected to increase by increasing cesarean section rate, vaginal delivery should be encouraged in primigravida women.

Furthermore, according to available knowledge, the study is the first to assess the incidence rate of placenta previa among women in Madinah city, Saudi. The work will add to the Saudi literature concerning placenta previa, its incidence, personal and reproductive characteristics of affected women as well as the maternal outcome of placenta previa among these women.

Finally, further studies that will include multiple centers and uniform diagnostic criteria are needed to identify the optimal management strategies for this increasingly common, morbid condition.

6. References

1. Oyelese Y, Smulian JC. Placenta previa, placenta accreta, and vasa previa. Obstetrics and Gynecology. 2006; 107(4):927-941.
2. Becker RH, Vonk R, Mende BC, Ragosch V, Entezami M. The relevance of placental location at 20-23 gestational weeks for prediction of placenta previa at delivery: evaluation of 8650 cases. Ultrasound Obstet Gynecol. 2001; 17(6):496-501.
3. Iyasu S, Saftlas AK, Rowley DL, Koonin LM, Lawson HW, Atrash HK. The epidemiology of placenta previa in the United States, 1979 through 1987. Am. J. Obstet Gynecol. 1993; 168:1424-429
4. Marshall NE, Fu R, Guise JM. Impact of multiple cesarean deliveries on maternal morbidity: a systematic review. Am. J. Obstet Gynecol. 2011; 205(3):2621-8.
5. Ananth CV, Wilcox AJ, Savitz DA, Bowes WA, Luther ER. Effect of maternal age and parity on the risk of uteroplacental bleeding disorders in pregnancy. Obstet Gynecol. 1996; 88:511-116.
6. Ananth CV, Smulian JC, Vintzileos AM. The association of placenta previa with history of cesarean delivery and abortion: a meta-analysis. Am J Obstet Gynecol. 1997; 177:1071-1078.
7. Ananth CV, Demissie K, Smulian JC, Vintzileos AM. Placenta previa in singleton and twin births in the United States, 1989 through 1998: a comparison of risk factor profiles and associated conditions. Am J Obstet Gynecol. 2003; 188:275-281.
8. Macones GA, Sehdev HM, Parry S, Morgan MA, Berlin JA. The association between maternal cocaine use and placenta previa. Am J Obstet Gynecol. 1997; 177:1097-1100.
9. 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
10. Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, *et al*. Rates of caesarean section: analysis of global, regional and national estimates. Paediatr Perinat Epidemiol. 2007; 21:98-113.
11. Abduljabbar HS, Bahkali NM, Al-Basri SF. Placenta previa: A 13 years-experience at a tertiary care center in Western Saudi.Arabia. Saudi Medical Journal. 2016; 37(7):762-766.
12. Rouse DJ, MacPherson C, Landon M, Varner MW, Leveno KJ, Moawad AH. Blood transfusion and cesarean delivery. Obstet Gynecol. 2006; 108(4):891-197.
13. Jang DG, Sun KS, Shin JU, Choi YJ, Ko HS, Park IY, *et al*. Maternal outcomes according to placental position in placental previa. Int J Med Sci. 2011; 8(5):439-444.
14. Senkoro EE, Mwanamsangu AH, Chuwa FS. Frequency, Risk Factors, and Adverse Fetomaternal Outcomes of Placenta Previa in Northern Tanzania. Journal of Pregnancy 2017; 2017:7.
15. Hudon L, Belfort MA, Broome DR. Diagnosis and management of placenta percreta: a review. Obstet. Gynecol. Surv. 1998; 53:509-517.
16. O'Brien JM, Barton JR, Donaldson ES. The management of placenta percreta: conservative and operative strategies. Am J Obstet Gynecol. 1996; 175:1632-1638.
17. Ahmed SR, Aitallah A, Abdelghafar HM, Alsammani MA. Major Placenta Previa: Rate, Maternal and Neonatal Outcomes Experience at a Tertiary Maternity Hospital, Sohag, Egypt: A Prospective Study. Journal of Clinical and Diagnostic Research. 2015; 9(11):QC17-QC19.
18. Zlatnik M, Cheng Y, Norton M, Thiet M, Caughey A. Placenta previa and the risk of preterm delivery. J. Matern. Neonatal Med. 2007; 20:719-723
19. Kainer F, Hasbargen U. Emergencies associated with pregnancy and delivery: peripartum haemorrhage. Dtsch Arztebl Int. 2008; 105:629–38.
20. Usta IM, Hobeika EM, Musa AA, Gabriel GE, Nassar AH. Placenta previa-accreta: risk factors and complications. Am. J. Obstet. Gynecol. 2005; 193:1045-1049.
21. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Maternal morbidity associated with multiple repeat cesarean deliveries. Obstet. Gynecol. 2006; 107:1226-1232.
22. Yang Q, Wen SW, Oppenheimer L, Chen XK, Black D, Gao J. Association of cesarean delivery for first birth with placenta praevia and placental abruption in second pregnancy. BJOG 2007; 114:609-613.
23. Knight M, Kurinczuk JJ, Spark P, Brocklehurst P; United Kingdom Obstetric Surveillance System Steering Committee. Cesarean delivery and peripartum hysterectomy. Obstet. Gynecol. 2008; 111:97-105.
24. Becker RH, Vonk R, Mende BC, Ragosch V, Entezami M.

The relevance of placental location at 20-23 gestational weeks for prediction of placenta previa at delivery: evaluation of 8650 cases. Ultrasound Obstet Gynecol. 2001; 17(6):496-501.
25. Wexler P, Gottesfeld KR. Early diagnosis of placenta previa. Obstet Gynecol. 1979; 54(2):231-234.
26. Bhutia BC, Lertbunnaphong T, Wongwananuruk T, Boriboonhirunsarn D. Prevalence of pregnancy with placenta previa in Siriraj hospital. Siriraj Medical Journal 2011; 63:191-195
27. Himang Jharaik, Aditi Sharma, Rajni Sharma, and Ankita Jamwal. Obstetric factors and pregnancy outcome in placenta previa. 2019; 3(4):200-202
28. 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(1): 44-49.
29. Williams MA, Mittendorf R. Increasing maternal age as a determinant of placenta previa. More important than increasing parity. J Reprod Med. 1993; 38(6):425-428.
30. El-Messidi A, Mallozzi A, Oppenheimer L. A multidisciplinary checklist for management of suspected placenta accreta. J ObstetGynaecol Can. 2012; 34:320-324.
31. Miller DA, Chollet JA, Goodwin TM. Clinical risk factors for placenta previa-placenta accreta. Am J Obstet Gynecol. 1997; 177(1):210-214.
32. Armstrong CA, Harding S, Matthews T, Dickinson JE. Is placenta accreta catching up with us? Aust N Z J Obstet. Gynaecol. 2004; 44(3):210-213.
33. Getahun D, Oyelese Y, Salihu HM, Ananth CV. Previous cesarean delivery and risks of placenta previa and placental abruption. Obstet Gynecol. 2006; 107:771-778.
34. Gurol-Urganci I, Cromwell DA, Edozien LC, Smith GC, Onwere C, Mahmood TA. Risk of placenta previa in second birth after first birth cesarean section: a population-based study and meta-analysis. BMC Pregnancy Childbirth. 2011; 11:95.
35. Zaki ZM, Bahar AM, Ali ME, Albar HA, Gerais MA. Risk factors and morbidity in patients with placenta previa accreta compared to placenta previa non-accreta. Acta Obstet Gynecol Scand. 1998; 77(4):391-394
36. Ojha N. Obstetric factors and pregnancy outcome in placenta previa. Journal of Institute of Medicine 2013; 34(2):
37. Hasegawa J, Matsuoka R, Ichizuka K. Predisposing factors for massive hemorrhage during Cesarean section in patients with placenta previa. Ultrasound Obstet Gynecol. 2009; 34:80-84
38. Kodla CS. A study of prevalence, causes, risk factors and outcome of severe obstetrics haemorrhage. Journal of Scientific and Innovative Research. 2015; 4(2):83-87.
39. RaeesM, Parveen Z, Kamal M. Fetal and maternal outcome in major degree placenta previa. Gomal Journal of Medical Sciences 2015; 13(3):13-16.
40. 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(1):62-66.
41. Iffy L, Charles D, Humbert LR, Jahir CS. Textbook of Operative Perinatology and Surgical Management of Obstetric Haemorrhage. Invasive Obstetric Techniques, 1st edn New York: MacMillan Publishing Co. 1984; 751-758.
42. Palacios-Jaraquemada JM. Efficacy of surgical techniques to control obstetric hemorrhage: analysis of 539 cases. Acta Obstet Gynecol Scand. 2011; 90:1036-1042.
43. Burchell RC. Physiology of maternal iliac ligation. J Obstet Gynaecol Br Commonw. 1968; 75:642-651.
44. Crane JM, Van den Hof MC, Dodds L. Maternal complications with placenta previa. Am J Perinatol. 2000; 17:101-105.
45. Chen Z, Li J, Shen J, Jin J, Zhang W, Zhong W. Direct puncture embolization of the internal iliac artery during cesarean delivery for pernicious placenta previa coexisting with placenta accreta. Int J Gynaecol Obstet. 2016; 135(3):264-267.
46. Caliskan E, Tan O, Kurtaran V, Dilbaz B, Haberal A. Placenta previa percreta with urinary bladder and ureter invasion. Arch Gynecol Obstet. 2003; 268:343-344
47. Washecka R, Behling A. Urologic complications of placenta percreta invading the urinary bladder: a case report and review of the literature. Hawaii Med J. 2002; 61:66-69.