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Maternal and Fetal Perinatal Outcomes of Pregnancies Complicated with Placenta Previa-A 5-year Clinical Study

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Original Article

Summary

Placenta previa complicated pregnancy is a significant health problem and a challenge for obstetricians worldwide, due to its adverse maternal, fetal and neonatal outcomes. We aimed to study the outcomes of pregnancies complicated by placenta previa among group of Iraqi women. A retrospective cross-sectional study was conducted including data of patients for the years 2017-2021 who were admitted to our hospital or visit the private clinic and proved to have placenta previa . The study included 273 pregnant women presented with placenta previa at different gestational age and admitted for management in the obstetrics and gynecology department who met the inclusion criteria, 29 women were excluded due to emergency management and missed data about their outcomes. Diagnosis of placenta previa was approved either by U/S confirmed at the time of CS, or by examination in the theatre with or without anesthesia. Elective CS delivery was aimed at 36 complete weeks. Cases, which presented after 32 weeks of gestation were hospitalized until delivery. Data analyzed using the SPSS software version 22 and appropriate statistical tests were applied. Findings revealed that the mean maternal age was of 28.7 ± 7.3 (range 16 – 43) years multiparous women represented 84%, History of cesarean section reported in 87 women (35.7%), comorbidities including hypertension, diabetes mellitus (chronic or gestational) reported in 72 women (29.5%). Cesarean sections was the mode of delivery in vast majority of cases. Hysterectomy performed in 31 women. Postpartum Hemorrhage occur in all women and it was severe in 22.1% . . Intrauterine growth retardation (IUGR) reported in (13.9%), birth weight < 2000 gram reported in 47 neonates, respiratory distress, low Apgar scores and admission to NICU were also reported. In significant proportions. In conclusions: Placenta previa was associated with poor maternal, fetal and neonatal outcomes. Cesarean section was the mode of choice to save the mothers and their neonates. No difference between inpatient and outpatient expectant management in diagnosed patient.

Keywords: *Placenta previa, classification, etiology, epidemiology, risk factors, outcome*

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1. INTRODUCTION

Placenta previa (PP) is one of the important problems in modern obstetrics, since anomalies in the location of the placenta in an atypical place are the main cause of obstetric complications, particularly massive bleeding. When the bleeding occurs during pregnancy or at childbirth it will be associated with a high risk of maternal and perinatal mortality. Globally, the incidence of placenta previa is about 4-5 per 1000 pregnancies(1–3), according to previous studies, maternal morbidity and mortality in placenta previa is up to 30% (4).

By definition, placenta previa is the abnormal implantation of placenta in the lower part of the uterus at a site that partially (minor) or completely (Major) blocking the cervical os (5). The leading risk factors for placenta previa include: a large number of abortions and childbirth, chronic endometritis; pathology of the uterus (myoma, the presence of a scar, developmental anomalies), endocrine disorders, smoking (5–7). However, In recent years, the World Health Organization has implemented stratigies aimed at reducing maternal mortality worldwide (8). Almost, 73% of maternal deaths are due to direct obstetric causes, with obstetric hemorrhage accounting for 27.1% of cases (9). The causes can be divided into three major groups: placenta previa, abrupt placenta, and other causes (10). Perinatal mortality varies from worldwide, and it is due to prematurity, function

rational immaturity of the fetus, and also depends on the amount of blood loss (11–13).

The exact etiology of placenta previa is not well defined, however, different risk factors have shown to be contribute to occurrence of PP, clinical and epidemiological studies have shown that incidence of PP increases with increasing number of cesarean sections in previous pregnancies, accompanied by the abuse in performing unjustified caesarean sections and the lack of promotion of family planning methods (14,15). Multiparity, abortions, advanced maternal age, smoking, assisted conception are also among the risk factors of PP (6,7,16–18).

This abnormal implantation of placenta can lead to the development of complications and morbidities in both the mother and the fetus. Many of these complications are directly related to the bleeding it causes during pregnancy. These pregnant women are 10 times more likely to bleed during their pregnancy than pregnant women without PP. Other complications that are associated include hysterectomy (5.3%), need for blood transfusion (21.9%), abnormal presentation of the fetus (19.8%), postpartum hemorrhage (1.4%) and placenta accreta (3%). (19). Fetal complications and morbidities are indirectly related to prematurity, leading to three

times higher neonatal mortality compared to neonatal deaths without placenta previa (20,21). In this study we assessed the maternal and fetal perinatal outcomes of pregnancies complicated with placenta previa during a period of five years in clinical practice. This period of study aimed to collect a good number of cases with placenta previa due to relatively low incidence rate of placenta previa, so that we can get more precise findings and evaluation.

2. PATIENTS and METHODS

This was a retrospective cross-sectional study included 273 Iraqi women presented with proved diagnosed placenta previa of different types (classification). The collected data included the last 5 years in our practice, 2017-2021. All the cases who met the inclusion criteria and were admitted for management in the obstetrics and gynecology department of our hospital or the clients of our private clinics

Sample size and Sampling technique:

The required sample size was calculated according to standard equations for medical studies, the required sample was calculated using the Open Epi® online software (22), with a precision of 5% ; $\alpha = 5\%$ and estimating a loss of 10%, a sample of at least 200 patients was enough to meet the minimal requirement of statistical power of the study

, however, a total of 273 cases were recruited but 29 cases were excluded from the study due to their emergency status, hence, the net sample was 244 women.

Data collection:

Data collected using a pre-constructed data collection form , including socio-demographic characteristics of the patients, gestational age, medical history, surgical history, mode of presentation, date of diagnosis of PP, clinical findings on examination, ultrasound findings, grade of PP, investigations, mode of delivery, gestational age at labour fetal characteristics and status , pre and postoperative hemoglobin levels, amount of blood transfused, complications, maternal outcome and neonatal outcome

Grades of PP was reported according to the classification of placenta previa (23–27), as followed:

Grade I: Placenta implanted on the lower segment but not reach the internal cervical os (low implantation).

Grade II: Placenta dose reach the edge of the cervix but does not cover it.

Grade III : The placenta covers the internal os when it is close and is a symmetrically situated (Partial)

Grade IV: The placenta is symmetrically implanted in lower segment so that it covers the cervix at full dilatation (Complete).

Major placenta previa was defined as placenta that covering the internal cervical OS partially or completely (grade III and IV) while minor one included grade I and II (23–27).

Diagnosis of placenta previa was approved either by U/S confirmed at the time of CS, or by examination in the theatre with or without anesthesia also some cases were asymptomatic but admitted for CS due to other indications, and incidentally diagnosed to have PP.

Elective CS delivery was aimed at 36 complete weeks. Earlier intervention for cases with repeated significant vaginal bleeding, two episodes or more which leading to change in vital signs or decrease hemoglobin l gm/dl or more , or starting of regular uterine contraction.

Double check-up examination in the theatre was done for all cases which firstly presented as emergency and for those managed at home after diagnosis.

Fetal follow up through intrauterine U/S assessment for gestational age, congenital anomalies, gestational age at delivery, birth weight, admission to neonatal intensive care unit, complications and fetal outcome. For all cases routine U/S examination at 18-20 weeks of gestation when diagnosis of placenta proved, patient instructed to stay home after being cautioned, repeated U/S at 28 - 30 weeks of gestation to confirm grade of placenta previa, earlier U/S performed in cases with vaginal bleeding, these patients managed carefully according to : general condition of the patient , severity of vaginal bleeding and fetus status. Cases, which presented after 32 weeks of gestation were hospitalization until delivery. Patients who presented as emergency case for severe vaginal bleeding or with abnormal presentation like transverse lie or frequent increasing uterine contraction were immediately managed after U/S examination if possible examined in the theatre with or without anesthesia then CS performed. However, these cases were excluded from the study. All CS was performed through supra-pubic skin incision and lower segment uterine incision and localization of placenta were reported. Any intraoperative complications like bleeding from placental bed or associated accreta or abruption were recorded. Cross matched blood of at least four units prepared. General anesthesia were used for all CS.

Statistical analysis

All statistical procedures, data management and analysis were performed using the statistical package for social sciences (SPSS) version 25. The descriptive statistics for each of the qualitative variables were the percentage and number of samples of each of the classes within a given variable. For the quantitative variables, the mean ± standard deviation was calculated. Appropriate statistical tests used accordingly

3. RESULTS

During the study period for the last five years, 2017-2021, a total of 273 cases with PP were reported and their medical records were carefully documented and reviewed however, according to the available data regarding the total number of deliveries in our hospital for the whole study period, the cumulative incidence of PP was 6.6 per 1000 live birth (Figure 1). The demographic characteristics of the 244 PP women are shown in (Table 1), where 74.2% of the women aged < 35 years with a mean of 28.7 ± 7.3 (range 16 – 43) years. Nulliparous represented 16% of the studied group while 84% were multiparous, History of cesarean section reported in 87 women (35.7%), comorbidities including hypertension, diabetes mellitus (chronic or gestational) reported in 72 women (29.5%), Smoking reported in only 7 women (2.9%), however, under estimation of smoking among women couldn't be excluded, history placenta previa and history of curettage documented in 21.3% and 26.2%, respectively.

Distribution of 244 PP cases according to vaginal bleeding revealed that only 14 women were asymptomatic with no vaginal bleeding (incidentally diagnosed to have PP), 108 women with mild, 72 women with moderate and 50 women with severe vaginal bleeding (need hospitalization and blood transfusion), (Figure 2).

Regarding the location of placenta previa, it was anterior in 18 (74.2%) women and posteriorly located in the remaining 63 (25.8%). Type of PP was placenta previa major in 141 (57.8%) of women and minor PP in 103 (42.2%). Placenta previa grade I reported in 23 women (9.4%) grade II in 80 (32.8%), grade III in 48 (19.7%) and grade IV in 93 (38.1%) of women, (Table 2).

Gestational age at the time of termination of pregnancy was < 37 weeks in 168 (68.9%) of women, All women except 6 (2.5%) delivered by cesarean sections. Hysterectomy performed

in 31 women (12.7%) postpartum hemorrhage developed in all women and it was mild in 114 (46.7%), moderate in 70 (28.7%), and severe in 54 (22.1%), moreover, none of the women died, i.e. zero maternal mortality rate (Table 3)

Regarding the fetal and neonatal outcomes, intra uterine growth retardation (IUGR) reported in 34 cases (13.9%), birth weight was < 200 gram in 47 (19.3%), 2000-2500 gram in 91 (37.3%) and more than 2500 gram in 106 cases (43.3%), respiratory distress occurred in 36 neonates (14.8%), congenital anomalies in 3 neonates (1.2%), anemia in 21 (8.6%) neonates low Apgar score < 7 at first and five minutes reported in 95 (38.9%) and 81 (33.2%) of neonates, respectively. Admission to neonatal intensive care unit needed in 102 neonates (41.8%), (Table 4). Unfortunately, 3 neonates died giving a morality rate of 1.23%, (Figure 3)

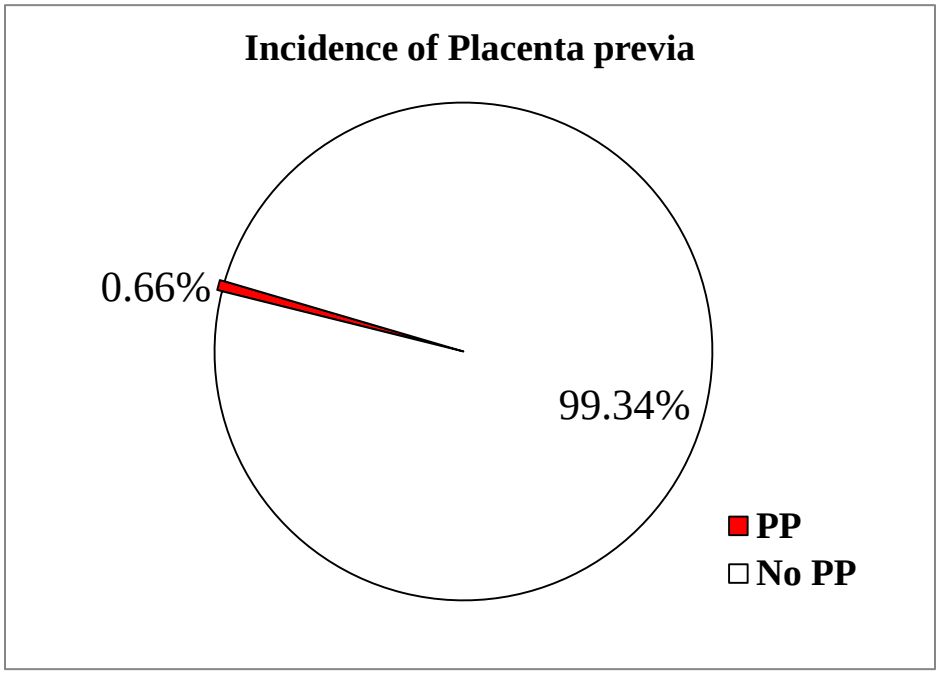

Figure 1. Cumulative incidence of placenta previa for the period 2017-2021

Table 1. Demographic characteristics of the studied group (N=244)

Variable		No.	%
Maternal Age (year)	< 35	181	74.2
	≥ 35	63	25.8
Mean age (range)	28.7 ± 7.3 (17-44)	-	-
Parity	Nulliparous	39	16.0
	Multiparous	205	84.0
History of cesarean section	Yes	87	35.7
	No	157	64.3
Comorbidities	Yes	72	29.5
	No	172	70.5
Smoking	Yes	7	2.9
	No	237	97.1
History placenta previa	Yes	52	21.3
	No	192	78.7
History of Curettage	Yes	64	26.2
	No	180	73.8

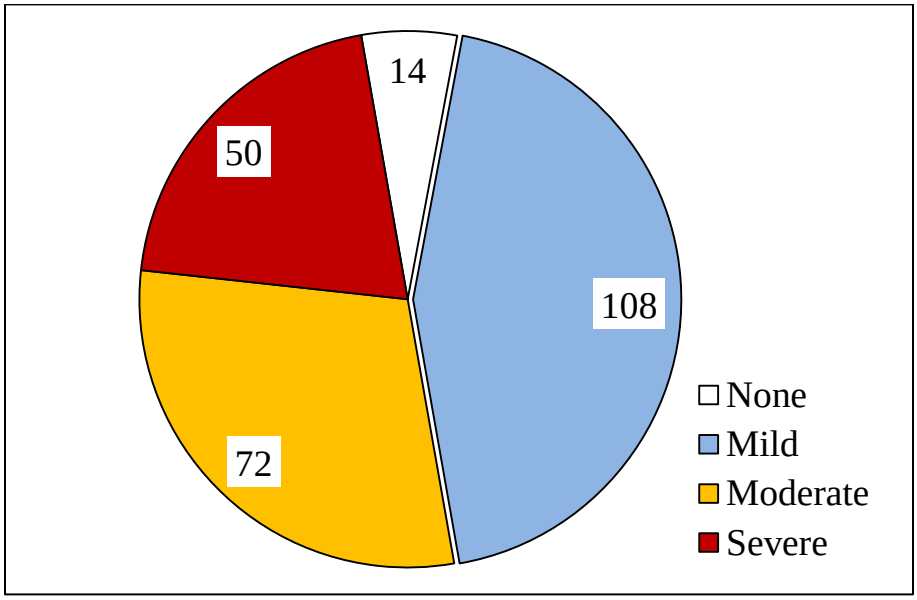

Figure 2. Distribution of 244 placenta previa cases according to vaginal bleeding

Table 2. Characteristics of placenta of the studied group (N = 244)

Characteristics of placenta		No.	%
Location of placenta	Anterior	181	74.2
	Posterior	63	25.8
Type of placenta previa	Major	141	57.8
	Minor	103	42.2
Placenta previa grade	I	23	9.4
	II	80	32.8
	III	48	19.7
	IV	93	38.1

Table 3. Gestational age at the time of termination of pregnancy of the studied group (N = 244)

Variable		No.	%
Gestational age	< 36 weeks	168	68.9
	≥ 36	76	31.1
Mode of delivery	Cesarean section	238	97.5
	Normal	6	2.5
Hysterectomy		31	12.7
Postpartum Hemorrhage	Mild	114	46.7
	Moderate	76	31.2
	Severe	54	22.1

Table 4. Fetal and neonatal outcomes of the studied group.

Variable		No.	%
Intra uterine growth retardation (IUGR)		34	13.9
Birth weight	< 2000 g	47	19.3%
	2000 - 2500	91	37.3%
	> 2500	106	43.4%
RDS		36	14.8
Congenital anomalies		3	1.2
Anemia		21	8.6
ABGAR score < 7 at first minute		95	38.9
ABGAR score < 7 at 5 minute		81	33.2
Admission to NICU		102	41.8

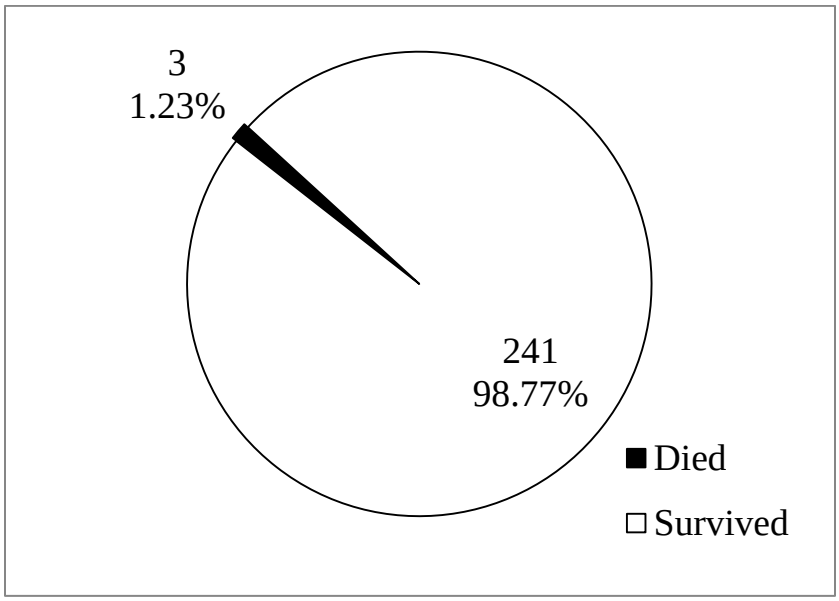

Figure 3. Neonatal mortality rate of the studied group

4. DISCUSSION

Placenta previa complicated pregnancy is a significant health problem and a challenge for obstetricians worldwide, due to its adverse maternal, fetal and neonatal pregnancy outcomes with high morbidity rates. Different risk factors contribute to development of PP (28). This study aimed to study perinatal maternal , fetal and neonatal outcomes of pregnancies complicated with placenta previa and followed up until end of pregnancy who were registered in our center or the private clinic during a period of 5 years, (2017-2021), this period selected to reflect our practice in management of such cases, to assess the main risk factors and to estimate the incidence of PP among Iraqi women among group of Iraqi women who were diagnosed with PP. According to the available data we found the cumulative incidence of PP of 0.66% equal to 6.63 per 1000 live birth. The incidence rate of PP reported in our study was close to that reported in earlier Iraqi studies from Missan where Al Hashimi et al reported an incidence rate of 0.6% (29), other Iraqi study conducted at Al-Anbar province (west of Iraq) by Saleh et al. (30) found lower incidence rate of 0.21%. In Asian countries incidence of PP was 3.63% in Iran and 3.5% in Pakistan (31).

The mean age of the PP women (the studied group) was 28.7 ± 7.3 (range 17-44) years which was lower than other studies, Tuzovic et al. (32) and Sheiner et al. (33) . This difference could be attributed to the earlier age at marriage and conception in our country in addition to the prolonged age of fertility in our community. Multiparity is well documented to be a risk factor for the development of major degree placenta previa (18), we reported that 42.6% of our cases had multiple parity of 3 or more, this findings also supported by other studies (18,34). Increase number of parity in our community may be related to the nature of Iraqi population, with regard to the religious and social factors.

The mean gestational age at diagnosis of the major degree placenta previa

was 31.0 weeks , 33.8 % of patients diagnosed between 25 - 30 weeks and 32.4% of patients at or after 35 weeks ,the mean gestational age at which first attacks of bleeding found was 29.6 weeks, the majority of attacks (44.1 %) were mild vaginal bleeding, while sever in 20.6% of patients. In 84.3 % of those patients , the attacks of vaginal bleeding recurrence between 1 - 4 times , From these results we found that the time of

first attack of vaginal bleeding is approximate the time of the diagnosis, and this may be a result of poor antenatal care and delay in the diagnosis of placenta previa , so the majority of cases diagnosed after starting of vaginal bleeding which necessitate shifting the patient to the hospital. In Japanese study , Onoyama et al. (35)revealed that when genital bleeding and first uterine contraction occurred at < 29 weeks , patients were at high risk for delivery at <34 weeks . The management protocol aimed to deliver the fetus beyond 36 complete weeks, this was achieved only in 31.1 % of patients, this was comparable to results of, Onoyama et al. (35).

Previous cesarean sections reported in 41.2% of cases indicated the association between previous CS and PP , this finding was wifely postulated and approved in previous studies that documented such relation in addition to association between higher number of CSs and higher incidence rate of PP (18,20,36). Smoking approved as a risk factor of PP , nonetheless, only five cases of our studied group were smokers, the lower rate of smoking could be attributed to the fact that Iraqi women, even when they are smokers, deny their smoking status, from other point of view, there still some debate regarding the association between smoking and PP among different studies (17,20).

In the current study we found that 10.3% of cases had gestational hypertension and 4.9% with gestation diabetes which agreed findings in previous studies (37). Similarly, gestational DM was also reported to be associated with PP (38). History placenta previa is approved as a significant risk factor for PP (39,40). In our study , 36.8% of cases had history of PP which support findings of previous studies; in a 10-year retrospective cohort study conducted by Zhang et al (41) authors concluded that women with a history of placenta previa are at risk for adverse outcomes and placenta previa in the subsequent pregnancy. In contrast, Tuzovic et al. found no difference in the incidence of placenta previa between women with history of PP and those without (32). The high rate of recurrent PP in our study could be attributed to high parity, high rate of CS and uterine evacuation. In our study, at least one curettage was seen in 44.1% of patients after incomplete or missed abortion. A study conducted by Johnson et al. in 2016 documented that risk of placenta previa increased with multiple curettage in a dose response fashion (42) . This indicated a role like termination of pregnancy to be a predisposing factor for placenta previa. Despite ANC is completely free in our country

so as in many countries, unfortunately, in our studied group poor ANC reported in 55.9% of cases while one case had no ANC, this indicated an association between poor ANC and incidence of PP where poor ANC is another risk factor for complicated pregnancies (43,44). Cesarean section is the method of choice for delivery of patient with major degree placenta previa(45,46) , in our study majority of cases delivered by CS, however, only 3 patients delivered by NVD due to their preferences, and more acceptance of NVD by the patients (47,48), NVD performed in only 3 cases with gestational age < 28 weeks and stillbirth babies, with adequate blood transfusion and closed monitoring of the patients.

Postpartum hemorrhage complicate 63.2% of patients (43/68), however, of these 43 cases, 30.9% had severe, 27.9% moderate and 41.2% mild PPH, the main cause of bleeding were atony, bleeding from placental attachment and associated accrete It is noted that blood loss in intraoperative and postoperative period were different This variation between may be explained by the presence of large number of patients who are presented in emergency state due to vaginal bleeding and surgical interference achieved immediately after resuscitation. Ohkuchi et al. found in their study that the 19th centile value of blood loss was 615 ml and 1.531 ml for women with vaginal and cesarean deliveries respectively (49).

Adverse fetal and neonatal outcomes were more frequently reported in cases with PP major, compared to their incidence among general population, in our study IUGR (13.2%), LBW (25%), , RDS (13.2%) , Congenital anomalies (5.9%),, Anemia (8.8%)%, and Low ABGAR score < 7 at first minute (41.2%), were reported . It was expected to get such outcomes, patients with PP major are at high risk to have adverse fetal, neonatal and maternal outcomes. Poor outcomes could be also associated and shared the same risk factors of PP such as delay in diagnosis of major degree placenta previa and preterm labour , which is unavoidable , leading to prematurity and it's complications (Respiratory distress syndrome). No perinatal mortalities reported in our study. These findings were almost similar to that reported in previous studies with some variation in the incidence rates of these complications and outcomes, (25,39,40,50). The variation in the incidence rates among different studies could be attributed to the differences in the facilities, antenatal care availability, maternal characteristics and

other factors, Senkoro et al. (50) found that adverse maternal and neonatal outcomes such as PPH, APH, cesarean delivery, fetal malpresentation and early neonatal death were significantly associated with PP. Gargari et al. (40) concluded that PP was associated with reduction of gestational age and low neonatal birth weight. Interestingly, there is also a variation in the outcomes according to the type of PP ; complete vs. incomplete as Feng et al. (39) concluded that cases with complete PP admitted earlier and had more adverse pregnancy outcomes. Ahmed et al. from Egypt, found that among women with major PP, 15.1% end with hysterectomies, 13.2% were delivered fresh stillbirth babies. Admission to NICU in 20% of survived babies. However, similar to our finding no maternal death reported in the Egyptian study. Our study is not free of limitations, of these the restriction in data collection and missed to follow up of some cases lead to inability to involve larger group of cases, furthermore, we were unable to include control group due to same reasons, however, we recommend to conduct further studies with larger sample size as case-control or cohort study.

5. CONCLUSIONS

Placenta previa was associated with poor maternal, fetal and neonatal outcomes. Cesarean section was the mode of choice to save the mothers and their neonates. No difference between inpatient and outpatient expectant management in diagnosed patient , and our findings were comparable to other previous studies and literatures . However, further studies with larger sample size and multiple centers are highly suggested

Ethical Clearance: Ethical clearance and approval of the study are ascertained by the authors. All ethical issues and data collection were in accordance with the World Medical Association Declaration of Helsinki 2013 of ethical principles for medical research involving human subjects. Data and privacy of patients were kept confidentially.

Conflict of interest: Authors declared none

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