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Prevalence and Risk Factors of Placenta Previa in Saudi Arabia and Sudan 2016

Dr. Itedal Abdelraheem Mohamed Ahmed

Department of Anatomy, Faculty Medicine, Najran University, Najran, KSA
*Corresponding author: *itedalanatomy@gmail.com*

Abstract

This is a descriptive cross-sectional study conducted in Alshaikh Mohamed Ali Fadul Hospital in Sudan and Najran University Hospital in the Kingdom of Saudi Arabia during July 2015-July 2016. In antenatal clinic pregnant women were scanned in their third trimester by sonographic ultrasound. After completion of the one year data regarding the detailed obstetrical and surgical history were recorded in a questionnaire form. The data were analyzed using Statistical Social Package for Social SciencesVersion20SPSS. All analyses were performed using descriptive crosstabs and to determine and arrangement the risk factors by using model logistic regression.

Total number of deliveries during the study period was 400. Of them 125 (31.25%) by pp. Of the latter 65 (16.25%) and 60 (15%) were diagnosed as placenta previa in both study groups in Sudan and KSA respectively. The incidence of placenta previa was directly related to the previous cesarean sections71 (17.75 %), parity55 (13.75 %), previous placenta previa 32 (8%) by crosstabs. These risk factors represented by the following equations by using logistic regression.

(Y)Log p/1-p =1.679+ 1.365* pervious cesarean section + 0.768* parity.
(Y)Log p/1-p =1.354+1.752* pervious cesarean section+ 1.602*previous placenta previa+1.191*assisted conception.

Keywords: Development of Placenta, Prevalence of Placenta Previa, and Risk Factors of Placenta Previa

1. Introduction

In this study we examined the following as risk factors of placenta previa: pervious cesarean section, parity, medical complication, uterine anomaly, previous placenta previa, assisted conception, with placenta previa.

The placenta is first organ to develop of the fetus and has several fascinating and critical functions. It mediates implantation and establishes the interface for nutrient and gas exchange between the maternal and fetal circulation as well as initiating maternal recognition of pregnancy, altering local immune environment and altering maternal cardiovascular and metabolic functions through the production of pancreatic and endocrine hormones. Abnormalities in any one of these functions can be associated with poor pregnancy outcome, ranging from the mild intrauterine growth restriction (IUGR) to the severe implantation failure and embryonic, fetal or perinatal death. *Croos, 2006* who described how placental development and function are regulated and the potential role for primary placental pathologies in explaining a variety of risk factors and complication in human pregnancy.

*Onwere, et al.2011*defined placenta previa (PP) as abnormally implanted placenta over ornear the internal cervical os within 2 cm**.** Placenta previahas also been defined as the presence of placental tissue over or near the internal cervical os. PP can be classified into four types based on the location of the placenta relative to the cervical os: complete or total previa, in which the placenta covers the entire cervical os; partial previa, in which the margin of the placenta covers part but not all of the internal os; marginal previa, in which the edge of the placenta lies adjacent to the internal os; and low-lying placenta, in which the placenta is located near (2 to 3 cm) but not directly adjacent to the internal os. *(Cunningham, et al 2009 and Clark, 2004).*

A low lying placenta occurs in 5% of pregnancies at 16-18 weeks gestation but are evident in only 0.5% pregnancies at term*(Neilson 2003)*. The change of placental position results from the formation of the lower uterine segment and which moves the placenta upwards with the expanding uterus. The incidence of placenta previa is higher in women with a previous caesarean section and increases in prevalence with each caesarean section(*Love and Wallace 1996)*.The incidence of placenta previa was 1.17% (*Parijchatt, et al. 2009*).

In United States, placenta previa occurs in 0.3-0.5% of all pregnancies. The risks increase 1.5- to 5-foldwith a history of cesarean delivery. Of all placenta previa, the frequency of complete placenta previa ranges from 20-45%, partial placenta previa accounts for approximately 30%, and marginal placenta previa accounts for the remaining 25-50% (*Singh, et al. 1981*).In india, according to (*Taipale, et al. 199*8), the incidence of placenta previa in cases with previous cesarean section was found to be 3.9 percent as compared to an overall incidence of 1.9 percent (p <0.01)The proportion of patients with a placenta previa is increasing as a consequence of CS. The incidence increases almost linearly after each previous CS and as the risks of such a complication increase with increasing parity,future reproductive intentions are very relevant to any individual decision for operative delivery *(David, et al. 2010).* Another study the maximum numbers of cases of placenta previa are reported after previous I and Previous II lower segment cesarean section i.e. 35.7% and 30.35% respectively see appendixes Table 2.6 (*Afshan, et al. 2013*).

In the meta-analysis of 37 previously published studies from 21 countries, the overall pooled random effects odds ratio was 2.20 (95% CI 1.96-2.46). Another study is consistent with those of the meta-analysis as the pooled odds ratio for the six population-based cohort studies that analyzed second births only was 1.51 95% CI 1.39-1.65. (*Ipek, et.al. 2011*). There is an increased risk of placenta previa in the subsequent pregnancy after CS delivery at first birth, but the risk is lower than previously estimated. Given the placenta previa rate in England and the adjusted effect of previous CS, 359 deliveries by CS at first birth would result in one additional case of placenta previa in the next pregnancy (*Ipek, et al. 2011*). Previous PP (OR=5.17; 95%,CI= 5.61-7.62) was risk factor for CS delivery through the study population and controls. (*Davood, et al.2008*).

Women with PP and prior cesarean section are at high risk for placenta accrete due to lasting damage to the myometrium and endometrium (*Ananth, et al.2003*).The previous cesarean section is an important risk factor for the development of placental complications. The incidence of placenta previa in the control group was 0.33%, opposite to the 1.86% incidence after one cesarean section (p<0.001), 5.49% after two cesarean sections and as high as 14.28% after three cesarean sections in obstetric history(*Milosević, et al.2009*).

Halima, et al.2011 reported the 5267 obstetrical admissions as: two hundred twenty six were diagnosed as cases of PP. The overall incidence was(4.2%n = 5267). Out of these 226 patients, 89 were multipara, 99 were grandmultipara and rest were primigrvidas. One hundred sixty patients had previous history of one or more caesarean section. From the available data itis concluded that there is an association between incidence of PP with the increase in parity.

From the other study, the one risk factor for placenta praevia was grand multiparity [OR=2.1 (95% CI 1.6-7.1)] see appendixes table 2.3. Birth records of 93 cases with PP complicated 0.73% of all deliveries included in

the study (n=12834 .(Multiparity was more common in patients with placenta previa78.5%,P<0.001 (*Davood, et al.* 2008).

Several risk factors for PP exist including multiparity, multiple gestations, advanced maternal age, prior cesarean delivery, myomectomy scarred uterus, manual removal of placenta and smoking (*Crane, et al.2000*).

The use of ART is associated with an increased risk of PP. The findings suggest that the increased risk may be caused by factors related to the reproductive technology (*Romundstad, et al. 2006*).There were 457 cases of PP 1.2% among the 37,702 pregnancies analyzed. Risk factors for placenta previa included a technology-assisted conception, OR, 4.8; 95% CI, 2.9–7.8 (*Hung et al.2007*) . Placenta previa were recorded in 13.9 per 1000 singleton births. Risk factors for PP, included IVF-ET, RRs = 1.38 and 2.94 (*Matsudal, et al.2011*).

Factors that significantly associated with uterine abnormalities (odds ratio) odds ratio12.79, 95%CI 1.67-97.65. The history of uterine abnormalities such as leiomyoma or uterine septumwere significantly higher in women with PP than in the control group (*Parijchatt, et al. 2009*).

There were 457 cases of PP (1.2%) among the 37.702 pregnancies analyzed. Risk factors for PP included gestational hypertensive diseases 16 (3.5) 640 (1.7) 0.01 and gestational diabetes 36 (7.9) 2403 (6.5) 0.21 overt diabetes 1 (0.2) 80 (0.2) 0.63 (*Hung, et al. 2007*).

Previous PP (OR=5.17; 95%,CI= 5.61-7.62) was risk factor for placenta previa through the control study population (*Davood, et al.2008*).

2. Materials and Methods

This study comprises two designs the first one is a community-based descriptive cross-sectional qualitative study conducted in Saudi and Alshikh Mohamed Ali Fadul Hospital in Omdurman in Khartoum State, Sudan and in department of Obstetrics &Gynecology Najran University Hospital, University of Najran Saudi Arabia (KSA)to estimate frequency of occurrence of placenta previa after previous cesarean section and to assess the association of PP and cesarean section during the period (July 2015-July 2016). Two stages sampling technique with probability proportionate to the size of population was used. In the first stage pertaining to the study was collected from the pregnant women through questionnaire designed to include the following database potential confounding variables included: previous cesarean section, parity, uterine anomaly, previous placenta previa, assisted conception, pre-existing hypertension, gestational hypertension, gestational diabetes. In the second stage placenta previa was diagnosed by ultrasonography. Primary data has been collected through data collecting sheet: questionnaires which include dependent and independent variables. The questionnaires used were designed to capture all qualitative data on indicators which were identified to be used in this study. The completed questionnaires were verified every day and data was entered into a specifically designed SPSS access database. In the clinics all women were scanned in the third trimester of pregnancy for foetal wellbeing and placental localization after taking detailed obstetrical history and clinical examination. The doctor and staff nurse on duty in the clinic were trained to enter the information in the form.

3. Results

Data was collected during the period July 2015-July 2016from 400 pregnant women. This comprises 200 from each department of obstetrics and gynecology in Alshikh Mohamed Ali Fadul Hospital in Sudan and Hospitals at Najran Kingdom Saudi Arabia. In the antenatal clinics, all pregnant women were scanned in their third trimester of pregnancy for foetal wellbeing and placental localization after taking detailed obstetrical history and clinical examination. The percent of frequencies was calculated to examine the relationship between parity, pervious cesarean section and age. Also, the number of the cesarean section, ethnicity, uterine anomaly, previous placenta previa, assisted conception, pregnancy complications and multiple pregnancies was recorded. As well as, the previous pregnancy interval and site of placenta with placenta previa was recorded.

Table 1 shows 125(31.2%) of all selected sample women were found to have placenta previa. Pregnant women in Omdurman city 65(16.2%) compared to their counterparts in Najran city 60(15%) with placenta previa.

Table 1 Shows the distribution of placenta previa in Sudan and KSA

Placenta	Country Frequency		Total frequency %
	Sudan	Saudi Arabia	
Normal	135 (33.8%)	140(35%)	275(68.8%)
Previa	65(16.2%)	60(15%)	125(31.2%)
Total	200(50%)	200(50%)	400(100 %)

(n = 400)

As shows in figures1 and 266 (33.0%) women were found to have previous cesarean section at Omdurman in Sudan compared with 61 (31.5%) Saudi pregnant women in Najran to have previous cesarean section (n = 200 in each one).

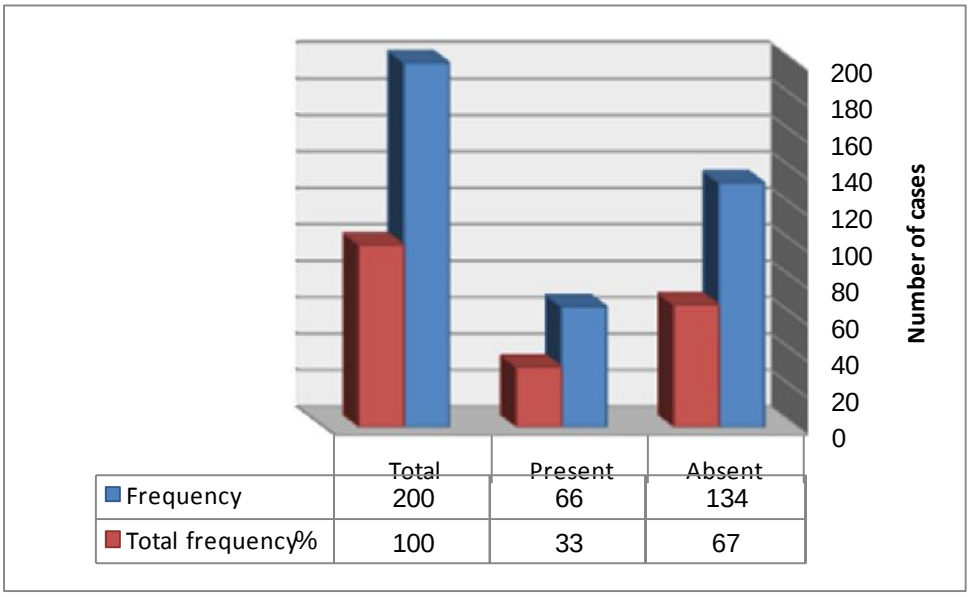


Figure (1) shows the distribution of previous cesarean section in Omdurman city- Sudan.

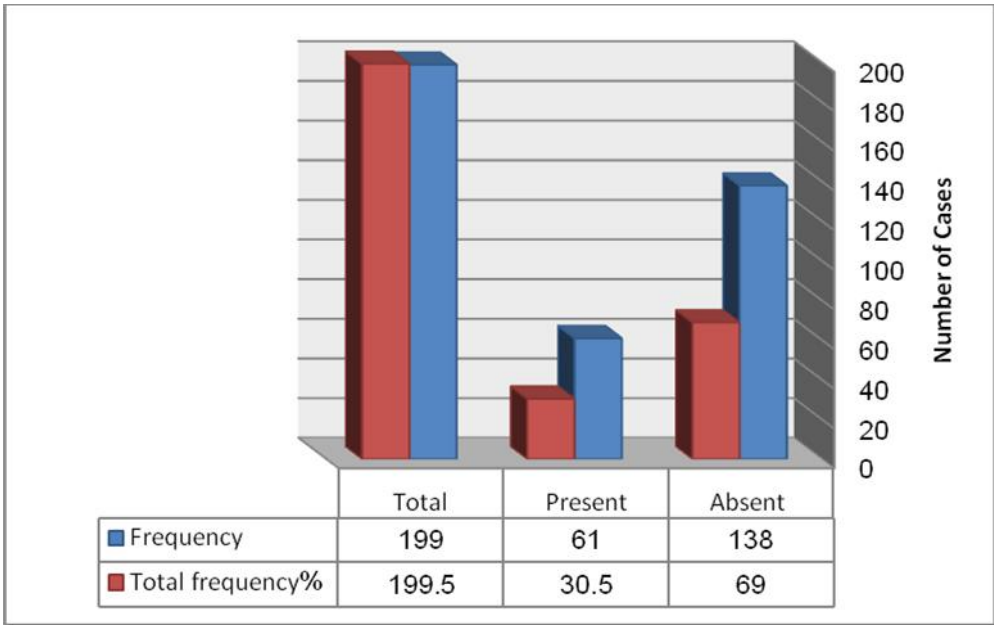


Figure (2) shows the distribution of previous cesarean section in Najran city-KSA

Table 2 Shows the relation between placenta previa and previous cesarean section in the study population. It shows that (71) women (17.75 %) in both study groups in Omdurman City and Najran City have both placenta previa and previous cesarean section. This is in comparison to (220) women (55.0 %) who have normal placenta and no history of previous cesarean section. Using chi square test for the association between placenta previa and previous cesarean section is highly statistically significant (p <0.000) Sig. (2-sided).

Table 2 Shows the association between placenta previa and previous cesarean section in Sudan and KSA*

Placenta previa	Previous Cesarean Section		
	Absent	Present	Total %
Absent	220(55.0%)	56 (14.0 %)	275 (68.75 %)
Present	53 (13.25%)	71 (17.75 %)	124 (31 %)
Total	273 (68.25%)	127 (31.75 %)	400 (100 %)

The association between placenta previa and previous cesarean section is (p <0.000)

Figures 3 and 4 shows the distribution of parity to be cross tabulated with placenta previa to test the association between the two conditions. The parity women constituted one, two, three and more than three births and prime gravida about 22(11.0%), 29(14.5%), 25(12.5%), 76 (38.0%), 48 (24.0%) in Sudan and 57(28.5%), 46(23.5%), 26 (13.0%) and 29 (14.5%) in KSA respectively.

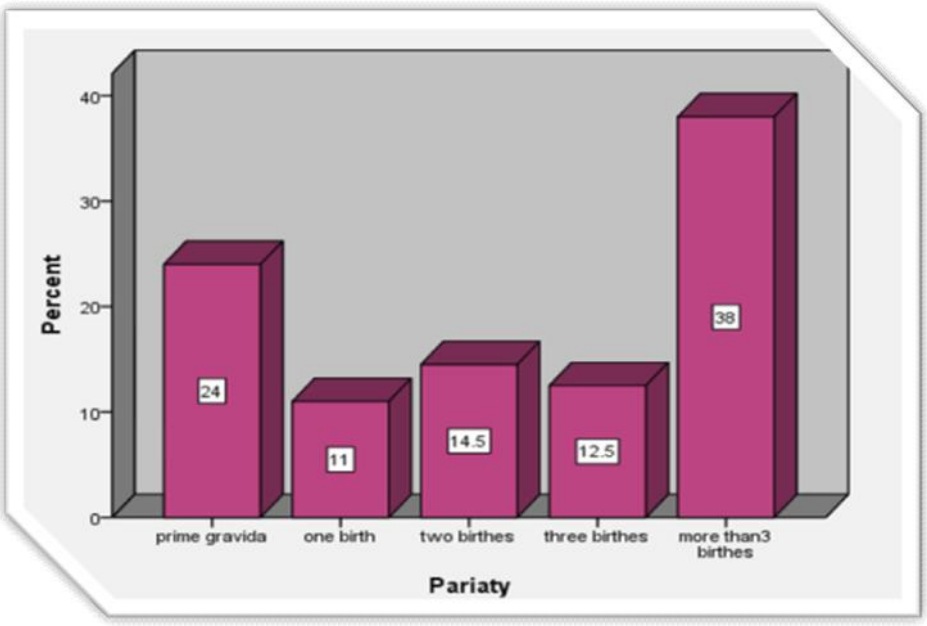


Figure (3) shows the distribution of parity among the study population in Omdurman city- Sudan.

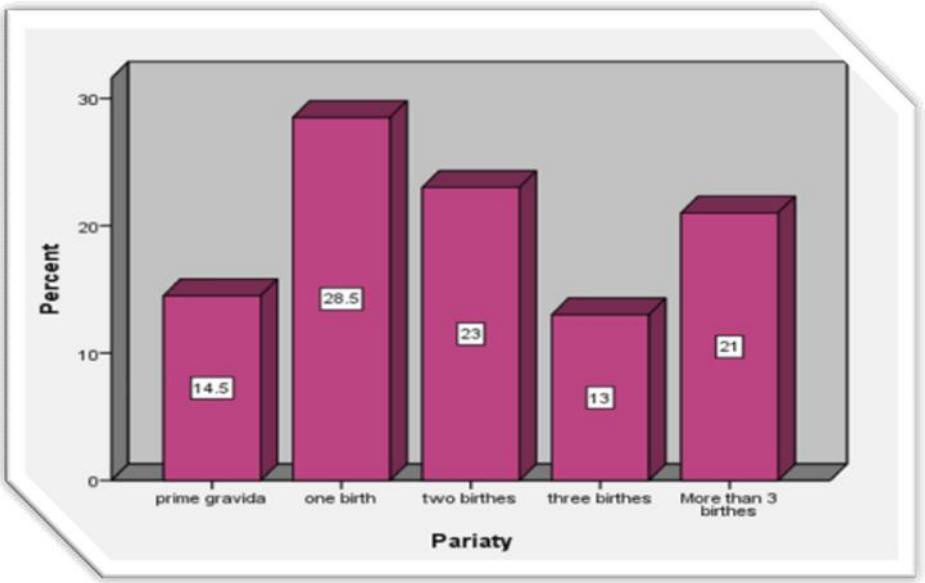


Figure (4) shows the distribution of parity among the study population in Najran city-KSA

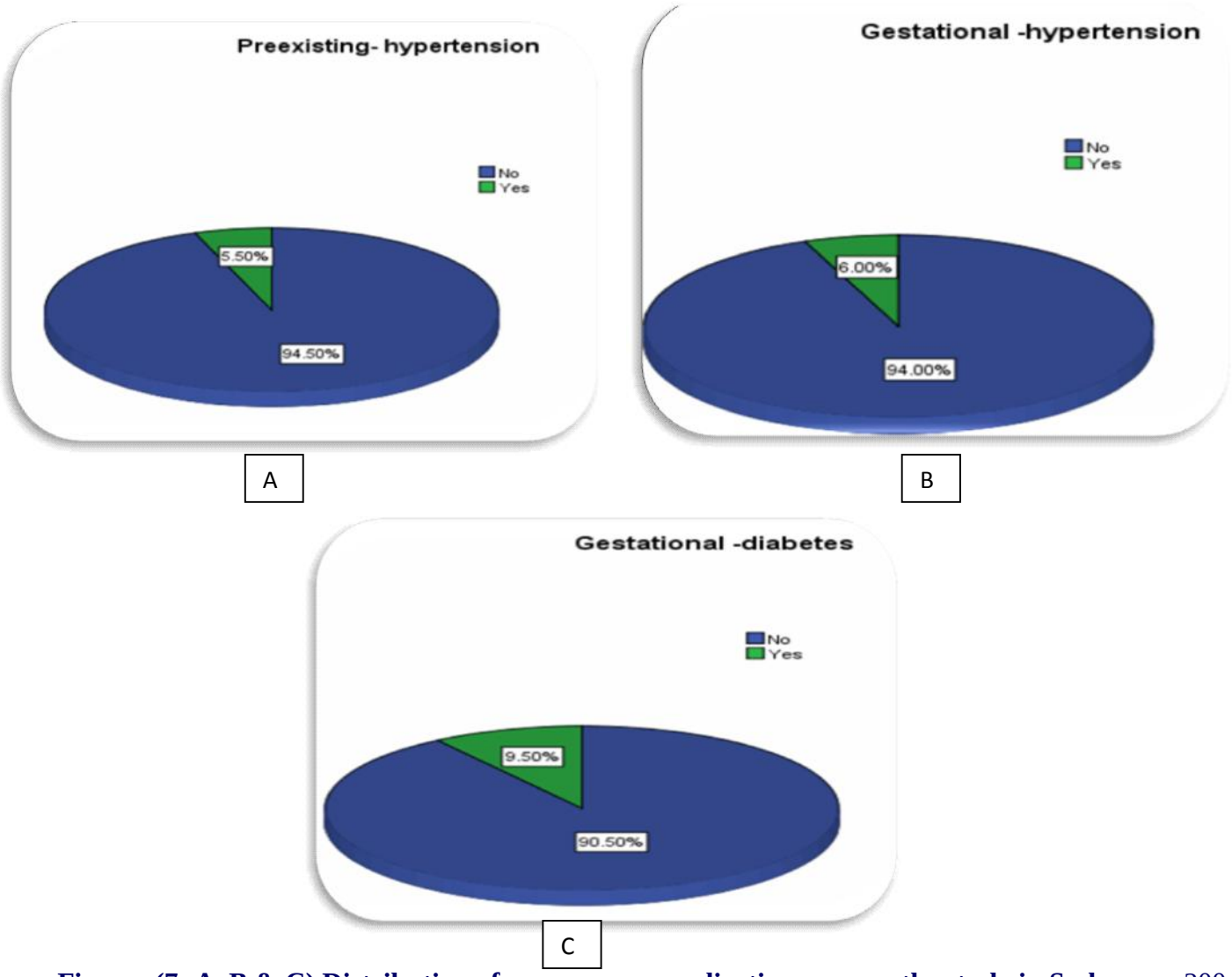
Table 3 represents the cross tabulation between placenta previa and parity in the two groups of the study population. It shows that 118 (29.5 %) multiparous have the highest frequency among the study population. At the same time 55 (13.75 %) of them have the highest frequency of presence of placenta previa. This is in comparison to the rest of women 63 (17.0%) who has no placenta previa. Using Pearson Chi-Square showed a significantly high association between placenta previa and parity (p <0.000).

Table 3 Shows the association between placenta previa and parity in Sudan and KSA *

Parity	Placenta previa		
	Absent	Present	Total %
One birth	61(15.25%)	18(4.5 %)	79 (19.75 %)
Two births	56(14.0%)	19(4.75 %)	75(18.75 %)
Three births	31 (7.75%)	20 (5.0%)	51(12.75 %)
More than 3 births	63(17.0%)	55 (13.75 %)	118(29.5 %)
Total	211 (52.0 %)	112 (28.0 %)	323 (80.75 %)

The association between placenta previa and parity is (p <0.000) Sig

Figure (7: A, B & C) shows the distribution of the pregnancy complications of placenta previa: pre-existing hypertension11(5.50%), gestational hypertension 12(6.0%) and gestational diabetes19(9.5%) in Sudan.



Figures (7: A, B & C) Distribution of pregnancy complications among the study in Sudan. n = 200

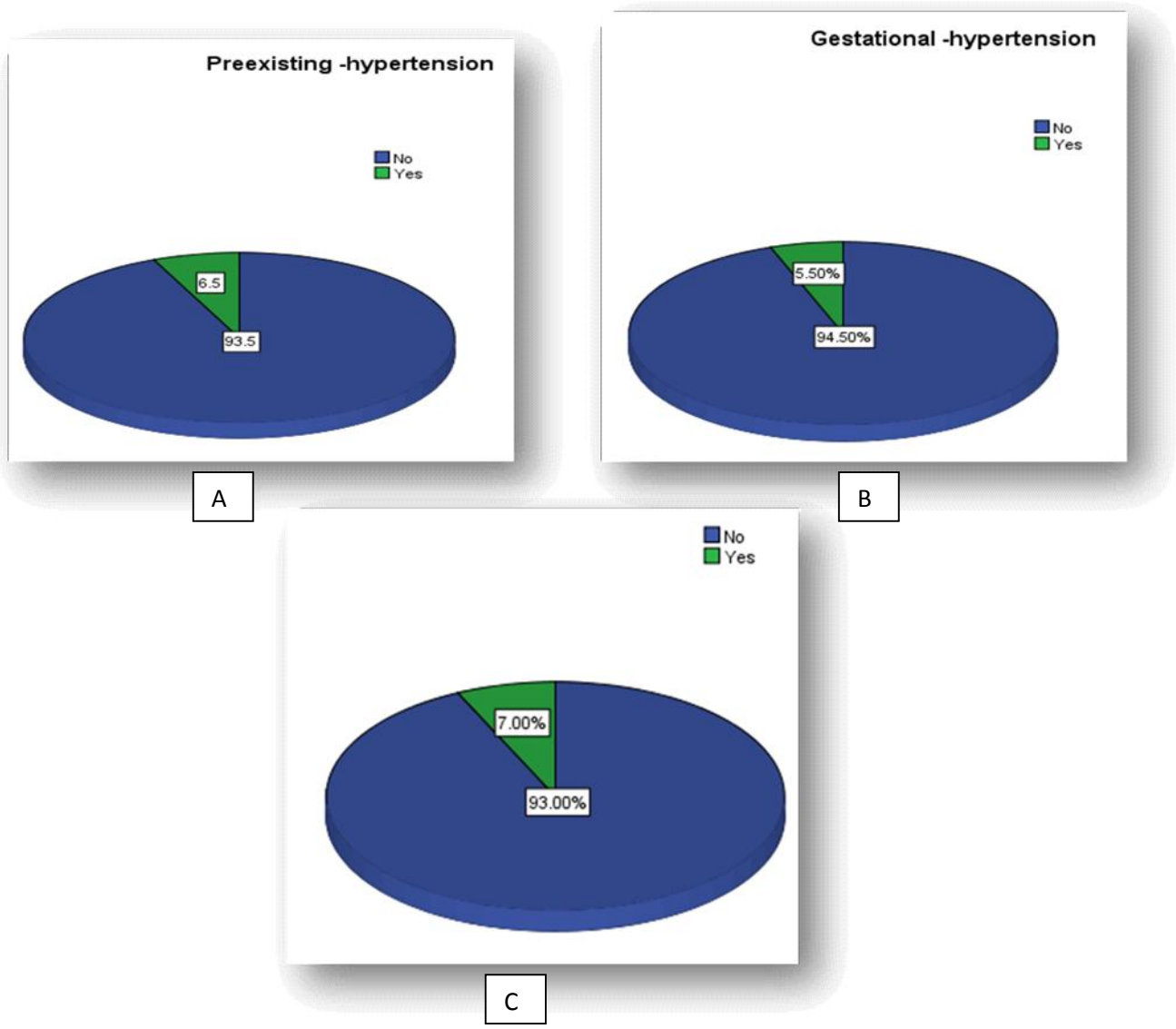
Table 4shows women with pre-existing hypertension were less likely to have placenta previa 2 (1.0%), gestational hypertension 12 (6.0%) and gestational diabetes 8 (4.0%) in Sudan. Using Pearson Chi-Square showed no significant association between PP and pregnancy complications p <0. 551, p <0. 382 p <0. 566 respectively and there had lowest placenta previa risks.

Table 4 Shows pregnancy complications and rate of placenta previa in Sudan

Patient characteristic	Women with placenta previa	Women without placenta previa	Total %	statistical significance
Preexisting hypertension	2 (1.0%)	9(4.5%)	11(5.5%)	p <0. 551
Gestational hypertension	12(6.0%)	6(3.0%)	18(9%)	p <0. 382
Gestational diabetes	8 (4.0%)	11(5.5%)	19(9.5%)	p <0. 566

The association between placenta previa pregnancy complications (p <0. 551), p <0. 382 and p <0. 566 Insig.

Also Figures (8: A, B & C) shows the pre-existing hypertension 13 (6.5%), gestational hypertension 11(5.5%) and gestational diabetes 14 (7.0%) in KSA.



Figures (8: A, B & C) Distribution of pregnancy complications among the study KSA. n =200

Table 5 Shows women with pre-existing hypertension were less likely to have PP 3(1.5%), gestational hypertension 2 (1.0%) and gestational diabetes 5 (2.5%) in KSA. Using Pearson Chi-Square showed no significantly association between placenta previa and pregnancy complications p <0. 818, p <0. 652 and p <0. 862 respectively and had lowest PP risks.

Table 5 Shows pregnancy complications and rate of placenta previa in KSA

Patient characteristic	Women with placenta previa	Women without placenta previa	Total %	statistical significance
Preexisting hypertension	3(1.5%)	10 (5.0%)	13(6.5%)	p <0. 818
Gestational hypertension	2 (1.0%)	9(4.5%)	11(5.5%)	p <0. 652
Gestational diabetes	5 (2.5%)	9 (4.5%)	14(7%)	p <0. 862

The association between placenta previa pregnancy complications (p <0. 818), p <0. 652 and p <0.862 Insig.

Figure (9) shows 4(2%) out of the 200 women were identified to have uterine anomaly in Sudan. This is going to be cross tabulated with placenta previa presence and tested for association.

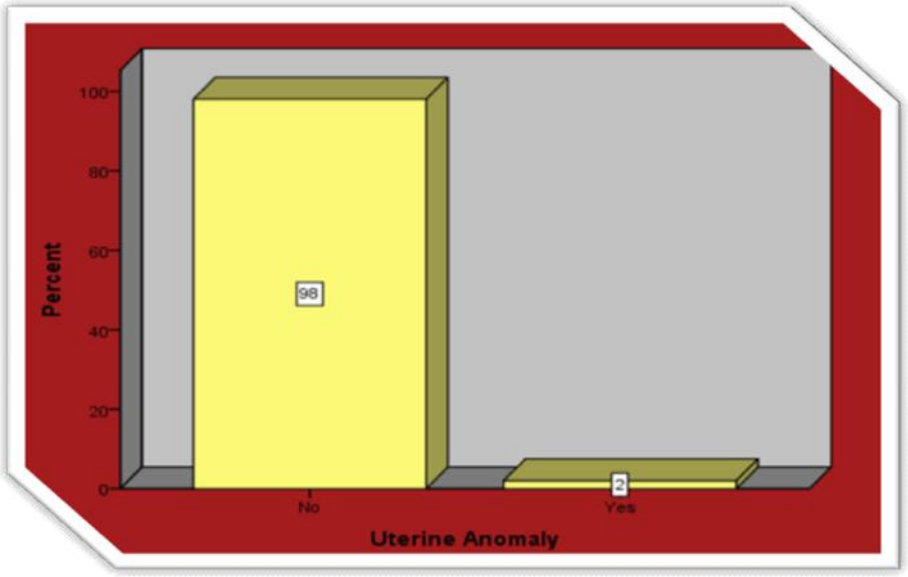


Figure (9) shows the distribution of uterine anomaly among the study population in Sudan

Table 6 represents the cross tabulation between placenta previa and uterine anomaly in the study population in Sudan. It shows that who have no placenta previa with uterine anomaly. This is in comparison to 132 women (66%) who have normal placenta. Using Pearson Chi-Square it showed no significant association between placenta previa and uterine anomaly (p <0.746).

Table 6 shows the association between placenta previa and uterine anomaly in Sudan

Placenta	Uterine Anomaly		
	Absent	Present	Total %
Normal placenta	132 (66 %)	3 (1.5 %)	135(67.5 %)
Placentaprevia	64 (32%)	1(0.5 %)	65(32 %)
Total	196 (98 %)	4 (2 %)	200 (100 %)

The association between placenta previa and uterine anomaly is (p <0.746) Insig.

Figure (10) shows 20(10.0%) out of the 200 women were identified to have uterine anomaly in KSA. This is going to be cross tabulated with placenta previa presence and tested for association.

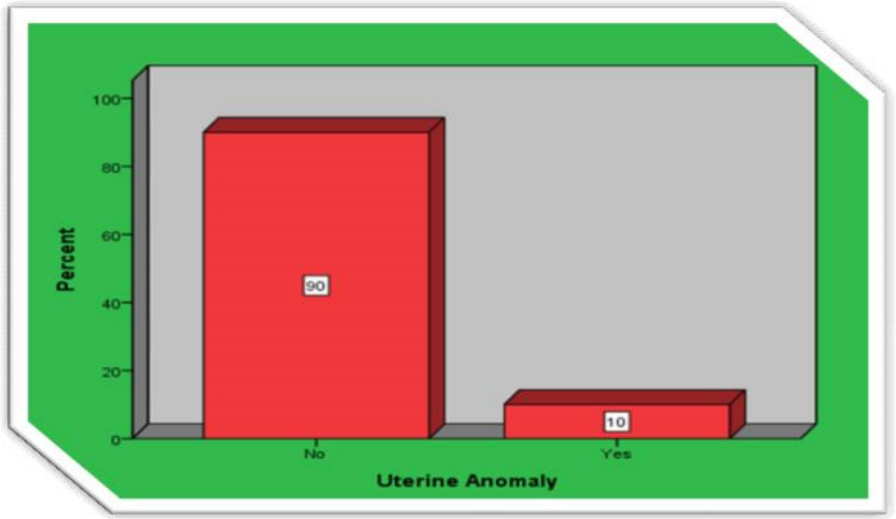


Figure (10) showing the distribution of Uterine Anomaly among the study population in KSA

Table 7 represents the cross tabulation between placenta previa and uterine anomaly in the study population in KSA. It shows that 9 women have placenta previa with uterine anomaly. This is in comparison to 130 women (65 %) who have normal placenta. Using Pearson Chi-Square it showed no significant association between placenta previa and uterine anomaly (p <0.562).

Table 7 shows the association between placenta previa and uterine anomaly in KSA

Placenta	Uterine Anomaly		
	Absent	Present	Total %
Normal placenta	130(65 %)	10 (5 %)	140(70 %)
Placentaprevia	51 (25.5 %)	9(4 %)	60(30 %)
Total	181 (90.5%)	19 (9.5%)	200 (100 %)

The association between placenta previa and uterine anomaly (p <0.562Insig.

Among the 200 pregnancies on each one, 12 (6.0%)) in Sudan and 57 (28.5%) in KSA were pregnant through assisted conception as shown by Figures (11.12).

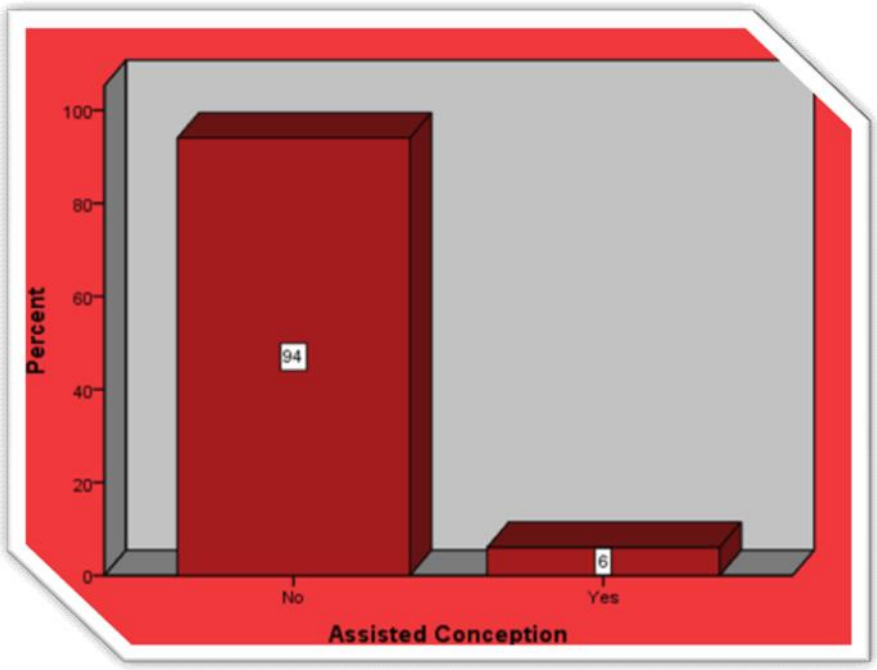


Figure (11) shows the distribution of assisted conception among the study in Sudan

Table 8 represents the cross tabulation between placenta previa and assisted conception in the study population in Sudan. 2(1%) of them have PP with assisted conception, this is in comparison to 126 women (63.5%) who have normal placenta. Using Pearson Chi-Square it showed no significant association between placenta previa and assisted conception (p <0.455).

Table 8 shows the association between placenta previa and assisted conception in Sudan

Placenta	Assisted Conception		
	Absent	Present	Total %
Normal placenta	126(62.0 %)	10(5.0 %)	136 (67 %)
Placenta previa	62 (31.0%)	2(1.0 %)	64(32 %)
Total	188 (94 %)	12 (6 %)	200 (100 %)

The association between placenta previa and assisted conception (p <0. 455) Insig.

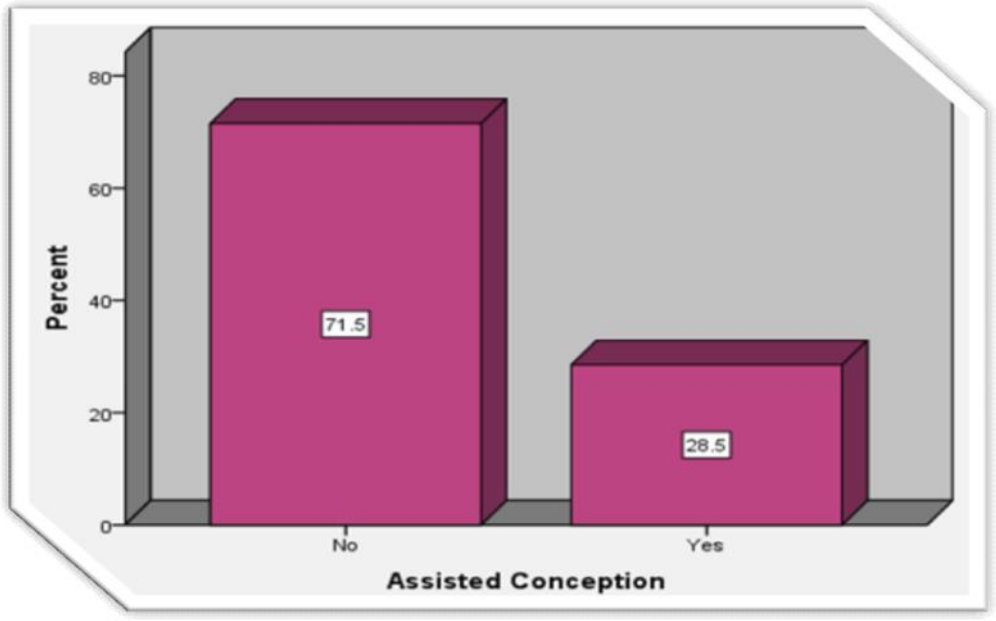


Figure (12) shows the distribution of assisted conception among the study population in KSA

Table 9 represents the cross tabulation between placenta previa and assisted conception in the study population in KSA. 8(4 %) have placenta previa with assisted conception. This is in comparison to 91 women (45.5 %) who have normal placenta. Using Pearson Chi-Square it showed no significantly association between placenta previa and assisted conception (p <0. 072).

Table 9 shows the association between placenta previa and assisted conception in KSA

Placenta	Assisted Conception		
	Absent	Present	Total %
Normal placenta	91(45.5 %)	49(24.5 %)	139(64.5 %)
Placenta previa	52(26%)	8(4 %)	60(30 %)
Total	143 (94 %)	57 (28.5 %)	200 (100 %)

The association between placenta previa and assisted conception (p <0. 072) Insig.

Figures (13.14) shows pervious PP was present in 36 (9%) of the 200 Sudanese pregnancies and pervious PP was present in 12(3%) of the 200 Saudi pregnancies.

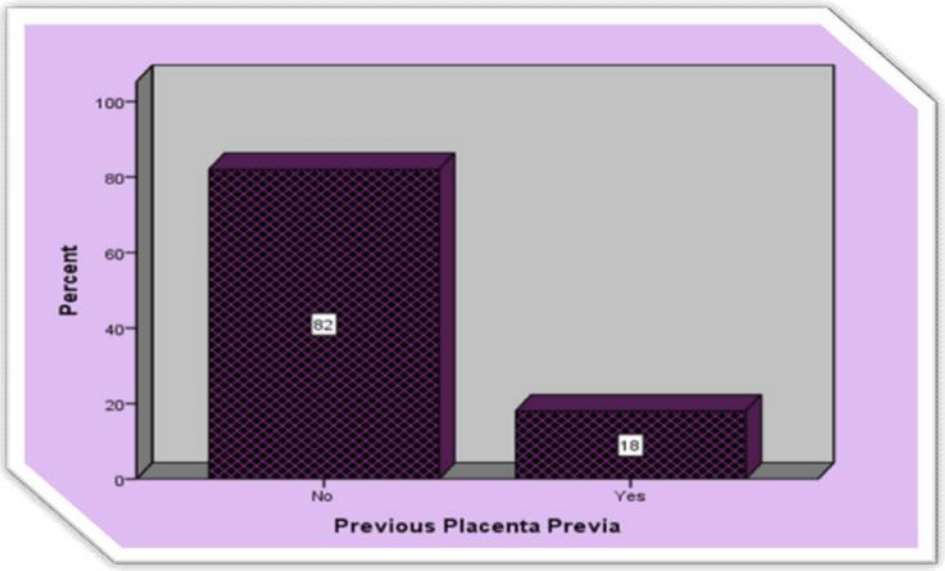


Figure (13) shows the distribution of Previous Placenta Previa among the study population in Sudan

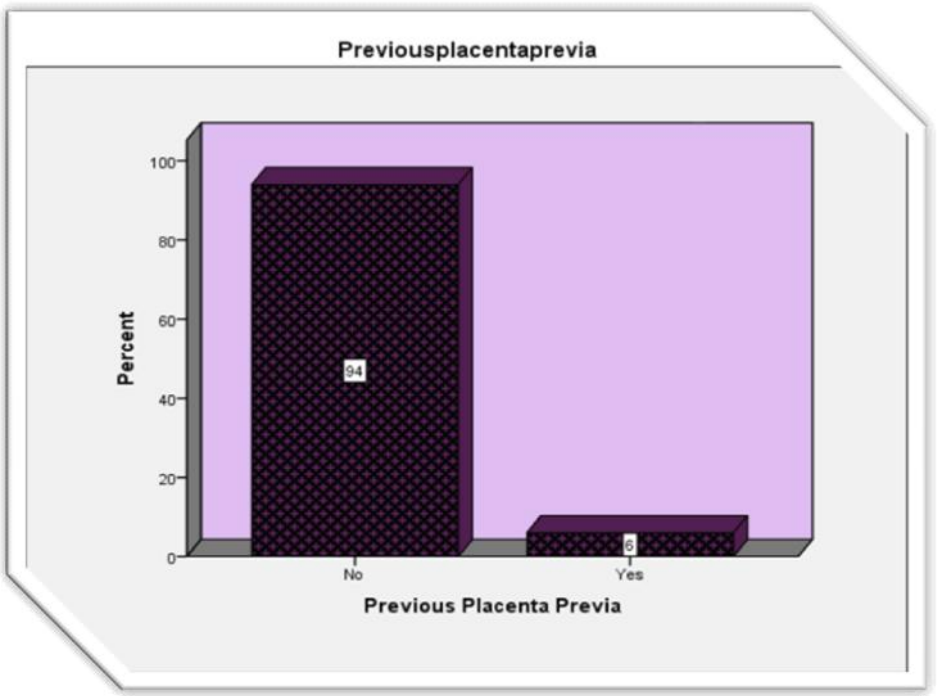


Figure (14) show the distribution of Previous Placenta Previa among the study population in KSA

In Table 10 the previous placenta previa was recorded in 32(8%) this is in comparison to 92(23%) women who have placenta previa without previous placenta previa out of 400 pregnant women's. Using Pearson Chi-Square it showed a significant association between placenta previa and previous cesarean section (p <0.000).

Table 10 Shows the association between previous placenta previa in Sudan and KSA*

Previous Placenta Previa	Women with placenta previa	Women without placenta previa	Total %
Absent	92 (23.0%)	260 (65.0%)	352(88%)
Present	32(8%)	16(4%)	48(12%)
Total	124 (31.0%)	276 (69.0%)	400(100%)

The association between placenta previa and previous placenta previa (p <0.000) Sig.

We determine the high risks of placenta previa in the presence and absence of logistic regression equation; unadjusted relative risks (RRs) with 95% confidence intervals (CI) were derived. Adjusted odds ratios were derived from logistic regression models. The rate difference is defined as the difference in the rate of placenta previa for those patients.

The tables (11) and (12) showed a risk factors for inclusion equation in the regression model was based on the results of the available analysis. We instead provide 95% CI for effect measures that should be interpreted as means of assessing the precision of the estimate. Finally, we also calculated the population attributable risk to assess the quantitative impact of each of the risk factors on placenta previa.

Table (11) shows the risks of placenta previa of previous cesarean delivery and parity factors. A risk for placenta previa was two-fold higher among women with a prior cesarean delivery (OR 3.914, 95% CI 2.082-7.359). However, the risk of previa was higher (OR 2.156, 95% CI .994-4.674) in women with multiparty. The two risks included equation as the following:

Table (11) Shows risk factors of placenta previa in pregnancies after previous cesarean section and parity in Sudan

	NO.	Risk factors of Placenta Previa in the Equation			
		Cases with PP	Crude OR	Adjusted OR	95% confidence interval (CI)
Pervious cesarean (33.0%) Section *	66	35 (17.5 %)	1.243 (1.365)	3.914	2.082-7.359 P>0.000
Parity * (65.0%)	130	54 (27.0%)	1.679 (0.768)	2.156	0.994-4.674 P>0.052
(Y) Log odds of the outcome=$B_0+B_1X_1+B_2X_2+B_3X_3$--------					

Method: Forward Stepwise (Wald).
(Y) (Log p/1-p = b0 +b1*x +b2*x
Y: Log odds of the outcome codded (0,1).
A: Constant, intercept, the coefficient of Y when X= 0
B: It is the rate of change in Y with any change in X
X: The independent variable that predict the probability of the outcome.

(Y) Log p/1-p =1.679+ 1.365* Pervious cesarean Section + 0.768* Parity

Table (12) shows the risks of PP were previous cesarean delivery , previous placenta previa and assisted conception factors. A risk for PP two-fold higher among women with a prior cesarean delivery (OR 5.765, 95% CI 2.989-11.120). However, the risk of PP was higher (OR 18.208, 95% CI 2.133-155.424) in women with previous placenta previa and assisted conception (OR .304, 95% CI .127-.730).

Table (12) Shows risk factors of placenta previa in pregnancies after previous cesarean section, previous placenta previa and assisted conception in KSA

	N	Risk factors of Placenta Previa in the Equation			
		Cases with PP	Crude OR	Adjusted OR	95%confidence interval (CI)
Pervious cesarean section (31%)	62	35 (17.5 %)	1.505 (1.752)	5.765	2.989-11.120
Previous placenta (6%) previa	12	11 (5.5%)	1.644 (1.602)	18.208	2.133-155.424
Assisted conception (28.5%)	57	8 (4 %)	1.354 (1.191)	0 .304	0.127-0.730
(Y) Log odds of the outcome=$B_0+B_1X_1+B_2X_2+B_3X_3$--------					

Method: Forward Stepwise (Wald).

(Y) Log p/1-p =1.354+ 1.752* Pervious cesarean Section + 1.602* Previous placenta previa + 1.191* Assisted conception.

Figure (15) shows risk factors which award for incidence of placenta previa in Omdurman and Najran:

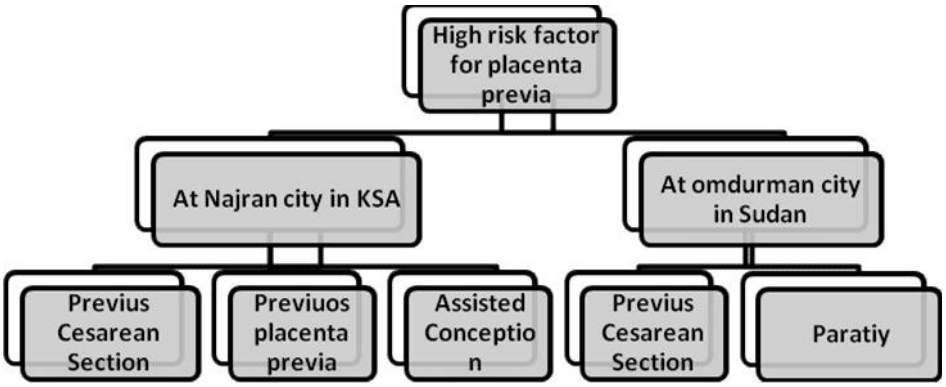


Figure (15) Shows a risk factors of incidence of placenta previa.

4. Comments

The study shows that susceptibility of placenta previa increases with frequency of previous cesarean section, results in damage to the myometrium and endometrium. This study revealed an association of placenta previa with increasing previous placenta previa and parity in Sudan and KSA.

The results obtained with many studies conducted around the world that confirmed a 2 -5 fold increases risk of placenta previa with previous history of CS, *David et al 2010*and *Afshan, et al. 2013* showed that the proportion of pregnant women with a placenta previa is increasing as a consequence of previous caesarean section. Moreover, (*Ipek, et.al. 2011*) confirmed the positive linear correlation between placenta previa and caesarean section.

This study found that a multiparous woman is at high risk of developing placenta previa than a woman of low parity in Sudan and KSA. *Halimi 2011* reported that women of higher parity have a higher incidence of developing placenta previa. Also *Davood, et al. 2008* showed that multiparity was more common in patients with placenta previa. The findings showed a significant incidence of placenta previa after previous placenta previa in Sudan and KSA.

In the present study, the relationship between placenta previa and uterine anomaly is insignificant in Sudan and KSA, may be that due to the small number of patient in our study. *Parijchatt et al. 2009* reported a relationship between placenta praevia and uterine anomaly.

The findings of this study show that adjustment for potentially confounding factors did not substantially alter the association between the use of assisted conception and the occurrence of placenta previa in Sudan and KSA. The results of the risk factors for placenta previa do not agree with their reported by *Hung et al.2007* but is associated with an increased risk of placenta previa in KSA based on the findings of the model logistic regression method.

In this study showed that women with pre-existing hypertension were less likely to have placenta previa. Gestational diabetes and gestational hypertension showed no statistic significant association with placenta previa in Sudan and KSA. These do not agree with the findings suggested by *Hung et al. 2007*. This may be due to environmental factors.

The findings showed a significant incidence of placenta previa after previous placenta previa in Sudan and KSA approve with *Davood, et al* based to the crosstab analysis. Also am using model logistic regression method to determined and arranged the risk factors of placenta previa.

5. Condensation

Placenta praevia remains a risk factor for maternal complications after previous caesarean section, paratiy, previous placenta previa and assisted conception but the common a risk factor was previous caesarean section agree with the findings estimated in previous studies.

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