

# Risk factors for retained placenta in southwestern Nigeria

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## ABSTRACT

**Introduction:** This study aimed to determine the incidence of, and identify independent risk factors to retained placenta in Ile-Ife, southwestern Nigeria.

**Methods:** This was a prospective case-control study involving 120 women with retained placenta after vaginal birth at the Obafemi Awolowo University Teaching Hospital, Ile-Ife, southwestern Nigeria over a period of seven years. Two consecutive normal deliveries after each retained placenta served as controls. Following a bivariate analysis, a multivariate logistic regression model was constructed in order to define independent risk factors for retained placenta while controlling for confounding variables.

**Results:** During the study period, there were 120 cases of retained placenta, and the total number of deliveries was 6,160, making the incidence 1.9 percent. Independent risk factors associated with retained placenta include non-use of antenatal care (Odds-ratio [OR] 22.71, 95 percent confidence interval [CI] 10.5–49.12, p-value is less than 0.000), previous retained placenta (OR 15.22, 95 percent CI 3.30–70.19, p-value is less than 0.000), previous caesarean section (OR 12.00, 95 percent CI 2.05–70.19, p-value is less than 0.006), maternal age 35 years or more (OR 7.10, 95 percent CI 1.5–32.40, p-value is less than 0.012), grand multiparity (OR 6.63, 95 percent CI 1.88–23.40, p-value is less than 0.003), previous dilatation and curettage (OR 4.44, 95 percent CI 1.69–11.63, p-value is less than 0.002), preterm delivery (OR 3.12, 95 percent CI 1.12–8.68, p-value is less than 0.029) and placenta weight less than 501 g (OR 2.91, 95 percent CI 1.34–6.32, p-value is less than 0.007).

**Conclusion:** Women with identifiable risk factors should be targeted for the prevention of retained placenta. There is a need for the training of birth attendants in the proper conduct of delivery and third stage of labour to prevent placenta retention and postpartum haemorrhage.

**Keywords:** grand multiparity, previous caesarean section, previous retained placenta, retained placenta

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## INTRODUCTION

Retained placentas affect 0.5%–3% of women following delivery, and is a major factor in the cause of maternal death from postpartum haemorrhage (PPH) and puerperal sepsis.<sup>(1,2)</sup> About 25% of maternal deaths in Africa and Asian countries are due to haemorrhage during pregnancy, birth or postpartum period. Of these, almost 30% are contributed by PPH. A further 15%–20% of these PPH maternal deaths are due to retained placenta.<sup>(3)</sup> After uterine atony, retained placenta is the second major indication for blood transfusion in the third stage of labour.<sup>(4)</sup>

Appropriate management of the third stage of labour can help to reduce complications associated with this stage of labour, including retained placenta. Retained placenta is a potentially preventable cause of PPH. Although some factors that predispose a pregnant woman to retained placenta have been identified, there is no consensus on its significance and relative importance. For example, some authors have reported a significant increase in the incidence of retained placenta due to factors such as preterm labour, grandmultiparity and in some deliveries initiated by labour induction, while others have not reported such an increase.<sup>(5-9)</sup> A controlled study by Soltan and Khashoggi showed, in descending order of significance, history of retained placenta, previous uterine surgery, preterm delivery, age above 35 years, placental weight less than 601 g, pethidine use in labour, labour induction and parity of more than five, to be associated with retained placenta.<sup>(10)</sup> However, in another controlled study, Titiz et al found that only previous history of retained placenta and a history of preterm delivery to be significantly related to retained placenta in the current pregnancy, while age, parity, and gravidity did not influence the incidence of retained placenta.<sup>(11)</sup>

Clearly, it would be relevant to investigate and identify independent risk factors for retained placenta before applying the risk approach for its prevention in any community. This will help to increase the sensitivity

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and specificity of the method and selected risk factors in preventing retained placenta. The aim of the present study was to determine the incidence and identify independent risk factors for retained placenta among pregnant women in Ile-Ife, southwestern Nigeria. Information obtained will be used in formulating policies and programme for the reduction of retained placenta.

## METHODS

This study was conducted at the Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Nigeria, between January 1999 and December 2005. During the seven-year period, 120 cases of retained placenta were prospectively studied. 240 women who had singleton normal vaginal delivery within 24 hours of the case study, were taken as controls. Each case of retained placenta was matched with two controls.

The management of third stage of labour in this study involved both passive and active management. All the women were residents of the Ife/Ijesa health administrative area. Most women routinely received one dose of ergometrine or ten units of oxytocin after delivery as standard treatment. In some high-risk women, the third stage was actively managed, as prophylaxis treatment against the development of PPH. The active management of the third stage involved the administration of oxytocic agent intravenously (ten units of oxytocin or 0.25–0.50 mg of ergometrine) at the delivery of the anterior shoulder with early cord clamping and cutting.

Following uterine contraction, gentle cord traction in the axis of the birth canal was then applied. The uterus was at the same time manually controlled above the level of the symphysis with countertraction (Brandt-Andrews manoeuvre or controlled cord traction [CCT]). In the expectant management, no oxytocic was given before the delivery of the placenta (but intramuscular injection of ten units of oxytocin or 0.25–0.5 mg of ergometrine was given after delivery of the placenta). The cord was clamped and cut immediately after delivery of the baby; no CCT was performed until signs of separation of the placenta were noticed. All the cases of retained placenta that occurred in our delivery suites was diagnosed within 30 minutes of the delivery of the baby. All cases of retained placenta referred to us (unbooked women from other healthcare facilities and those delivered at home, at faith clinics and at herbal homes) had retained their placenta for more than 60 minutes before presenting to us.

All women with retained placenta was managed according to the departmental protocol. The patients had an urgent packed cell volume done, with grouping and cross matching of appropriate units of blood for transfusion, as needed. Resuscitative measures were

**Table I. Complications associated with retained placenta.**

Characteristics	No. (%)
Incidence of primary PPH > 500 ml	58 (48.33)
Incidence of anaemia on admission (% PCV)	
6–19	23 (19.17)
20–25	24 (20.00)
26–29	16 (13.33)
30–38	57 (47.50)
Condition on admission	
In state of shock*	47 (39.17)
In stable state	73 (60.83)
Incidence of blood transfusion	48 (40.00)
Mismanagement of third stage of labour	27 (22.50)

PPH: postpartum haemorrhage; PCV: packed cell volume

\* Patient was in a clinical state of shock due to hypovolaemia, as a result of moderate to severe haemorrhage.

instituted with the administration of intravenous infusion of dextrose solution, crystalloids and plasma expanders with administration of oxygen to patients in shock. Attempts to deliver the placenta by CCT were made before resorting to manual removal of the placenta. Simple sedation or general anaesthesia was used, depending on the clinical situation of the patient. Following removal of the placenta, continuous oxytocin infusion was added for 1–2 hours to ensure sustained uterine contraction. Broad-spectrum antibiotics were administered to control or prevent infection.

Informed consent was obtained from each woman recruited into the study. Ethics and research committee approval was obtained. Data was collected by the use of a standardised questionnaire, which was administered to the cases and controls through interviews, in addition to a thorough review of the clinical records. Data obtained included age, educational status, occupation, marital status, parity, gestational age at delivery, antenatal complications, booking status, placental weight, foetal sex and weight. Other data included history of previous dilatation and curettage (D&C), caesarean section, myomectomy and retained placenta, as well as history of use and non-use of oxytocic agent in the current delivery. Presence or absence of PPH was ascertained.

The data was coded and input into the computer using the Statistical Package for Social Sciences version 11.0 (SPSS Inc, Chicago, IL, USA). Frequency tables were then computed for all variables separating the cases from the controls. Continuous variables such as age and parity were categorised, and obstetrical history was treated as individual elements and then as combined summary measures. The presence of an association between the hypothesised risk factors and retained placenta were tested using bivariate analysis. Tests of statistical significance based on 95% confidence interval (CI) or  $\chi^2$  test with

**Table II. Sociodemographical characteristics of 120 cases and 240 controls.**

Characteristics	Cases (%)	Controls (%)	p-value
Age group (years)			
< 21	5 (4.2)	46 (19.2)	
21–34	83 (69.2)	168 (70.0)	
> 34	32 (26.7)	26 (10.8)	0.000
Educational Level			
None	14 (11.7)	18 (7.5)	
Primary	30 (25.0)	44 (18.3)	
Secondary	54 (45.0)	122 (50.8)	
Post-secondary	22 (18.3)	56 (23.3)	0.189
Marital Status			
Ever married	110 (91.7)	236 (98.3)	
Never married	10 (8.3)	4 (1.7)	0.152
Employment status			
Employed	108 (90.0)	216 (90.0)	
Unemployed	12 (10.0)	24 (10.0)	0.610
Parity			
0	29 (24.2)	76 (31.7)	
1–4	60 (50.0)	138 (57.5)	
≥ 5	31 (25.8)	26 (10.8)	0.001

**Table III. Distribution of past obstetrical and gynaecological characteristics of 120 cases and 240 controls.**

Characteristics	Cases (%)	Controls (%)	p-value
Previous retained placenta	16 (13.3)	4 (1.7)	0.000
Previous dilatation and curettage	35 (29.2)	17 (7.1)	0.000
Previous caesarean section	16 (13.3)	2 (0.8)	0.000
Previous myomectomy	6 (5.0)	1 (0.4)	0.003

Yates' correction (for proportion) or Student's *t*-test were used, as appropriate. The significant variables were then analysed using multiple logistic regression; the odds-ratio (OR) was then calculated to determine the independent risk factors, while controlling for confounding variables.

## RESULTS

During the study period, there were 120 cases of retained placenta and the total number of deliveries was 6,160, making the incidence 1.9%. The clinical complications and the clinical state of women with retained placenta are shown in Table I. Primary PPH occurred in 48.33% of the women, 39.17% were admitted in a state of shock, 52.5% were anaemic, while 40% were transfused with various pints of blood on admission. The incidence of active management of third stage of labour among the controls was 12.5%, while among the cases, it was 5%. Inappropriate management of third stage of labour with or without oxytocic was observed in 22.5% of cases. There were two maternal deaths associated with retained placenta during the study period (1.7%). One woman was brought in dead, and the other died within minutes of admission. The cause of death in both cases was due to severe haemorrhagic shock secondary to retained placenta.

The sociodemographical characteristics of women in the study are summarised in Table II. The proportion of women in the age group older than 34 years was

significantly higher among cases (26.7%) than controls (10.8%) ( $p < 0.0001$ ). Similarly, the proportion of women who were grand multiparous was significantly higher in cases (25.8%) than controls (10.8%) ( $p < 0.001$ ). There was no significant difference between the two groups with respect to educational level, marital status and occupation. The distribution of obstetrical and gynaecological history among the women is shown in Table III. There was a significantly higher number of women with history of previous retained placenta ( $p < 0.000$ ), D&C ( $p < 0.000$ ), caesarean section ( $p < 0.000$ ) and myomectomy ( $p < 0.003$ ) among the cases, compared to controls.

The distribution of present obstetrical characteristics in the women is shown in Table IV. There were statistically significant differences in the number of women who did not receive antenatal care ( $p < 0.000$ ), had preterm delivery ( $p < 0.000$ ), whose placenta weighed 500 g or less ( $p < 0.000$ ), and whose labour lasted more than ten hours ( $p < 0.023$ ) among cases, as compared to controls. Precipitate delivery, foetal weight and sex were not found to be significantly associated with retained placenta.

Table V shows the result of the logistic regression with adjustment for various confounders. Factors that showed independent associations with an increased risk for retained placenta include non-use of antenatal care (OR 22.71, 95% CI 10.5–49.12,  $p < 0.000$ ), previous retained placenta (OR 15.22, 95% CI 3.30–70.19,  $p < 0.000$ ), previous caesarean section (OR 12.00, 95% CI

**Table IV. Distribution of present obstetrical characteristics of 120 cases and 240 controls.**

Characteristics	Cases (%)	Controls (%)	p-value
Antenatal booking			
Unbooked	94 (78.3)	46 (19.2)	
Booked	26 (21.7)	194 (80.8)	0.000
Preterm delivery (< 37 weeks)	31 (25.8)	15 (6.3)	0.000
Precipitate delivery	1 (0.8)	0 (0.0)	0.157
Placenta weight ( $\leq$ 500 g)	53 (44.2)	49 (20.4)	0.000
Duration of labour			
First stage > 10 hours	46 (38.3)	64 (26.7)	0.023
Birth weight* (g)	2,697.5 $\pm$ 739.9	2,809.9 $\pm$ 656.5	0.214

\* Data is expressed as mean and standard deviation

**Table V. Logistic regression analysis of risk factors for retained placenta.**

Risk factor	Odds-ratio	95% confidence interval
Non-booking for antenatal care	22.71	10.50–49.12
Previous retained placenta	15.22	3.30–70.19
Previous caesarean section	12.00	2.05–70.17
Age $\geq$ 35 years	7.10	1.53–32.40
Grand multiparity (parity $\geq$ 5)	6.63	1.88–23.40
Previous dilatation and curettage	4.44	1.69–11.63
Preterm delivery	3.12	1.12–8.68
Placenta weight ( $\leq$ 500 g)	2.91	1.34–6.32

2.05–70.19,  $p < 0.006$ ), maternal age  $\geq 35$  years (OR 7.10, 95% CI 1.5–32.40,  $p < 0.012$ ) grand multiparity (OR 6.63, 95% CI 1.88–23.40,  $p < 0.003$ ), previous D&C (OR 4.44, 95% CI 1.69–11.63,  $p < 0.002$ ), preterm delivery (OR 3.12, 95% CI 1.12–8.68,  $p < 0.029$ ), and placenta weight less than 501 g (OR 2.91, 95% CI 1.34–6.32,  $p < 0.007$ ). Previous myomectomy and prolonged labour (labour lasting more than ten hours) were not significantly associated with retained placenta.

## DISCUSSION

The 1.9% incidence of retained placenta in this study was within the reported incidence of 0.5%–3%,<sup>(5,7,12)</sup> and comparable with the previously-reported incidence of 1.4% in our centre by Onwudiegwu and Makinde.<sup>(13)</sup> 78.3% of patients with retained placenta were not booked for antenatal care. This was higher than in the study by Soltan and Khashoggi (8.01%),<sup>(10)</sup> but similar to that by Begum (89%)<sup>(14)</sup> and that of a previous study in our centre (74%) by Onwudiegwu and Makinde.<sup>(13)</sup> Delivery supervised by untrained traditional birth attendants or delivery in inappropriately-staffed centres are associated with a high incidence of poor and delayed management of third stage of labour, leading to a high incidence of retained placenta in the unbooked high-risk and low-risk women. Non-booking for antenatal care constituted an approximate 23-fold increase in risk of retained placenta in this study. The declining maternal health service utilisation occasioned by poor economic status and the introduction of fees for service have contributed to the

increased incidence of unbooked emergencies and the attendant obstetrical morbidity and mortality in our women over the years.<sup>(15-19)</sup>

History of previous retained placenta and caesarean sections were highly associated with retained placenta in this study, in agreement with the findings of other researchers.<sup>(5-7,9)</sup> The risk of repeat retained placenta in other studies was about 2–4 times, while in this study, the risk was increased 15-fold but still less than the 29-fold risk observed by Soltan and Khashoggi.<sup>(6,10,20)</sup> D&C carried a four-fold risk of predisposing to retained placenta in this study. It is hypothesised that these factors cause injuries that lead to deficient or damaged endometrium predisposing the implanted ovum's chorionic villi to penetrate into the uterine muscle. This penetration of the endometrium and the uterine muscle predisposes to placenta retention. The severe form of this phenomenon is believed to be the cause of placenta accreta.<sup>(21)</sup> Myomectomy was not significantly associated with retained placenta in this study. This may be because the type of myomectomy in this study did not involve the bridging of the endometrial cavity of the uterus.

Aversion to caesarean sections by pregnant women in our environment causes a lot of high-risk women to deliver in inappropriate and ill-equipped centres, with attendant complications including retained placenta.<sup>(15,16,22)</sup> The increasing rate of caesarean sections has also been cited as a risk factor for increased incidence of retained placenta and placenta accreta.<sup>(23)</sup> The fact that the risk of retained placenta increases with age and parity is

confirmed in this study. Grandmultiparity and age greater than 35 years each increases the risks by about seven-fold. Increased abnormalities of placenta implantations in grandmultiparous women,<sup>(9,24)</sup> and the notable association with uterine atony in this group of women, constitute factors leading to retained placenta.<sup>(24,25)</sup> It has been postulated that the uterine muscles get replaced by fibrous tissue with repeated pregnancies, with a resultant reduction in the contractile power of the uterus which may lead to atony and finally, placenta retention.<sup>(14,26)</sup>

Grandmultiparous and older women in our environment tend to be unbooked and they often deliver at home because of their overconfidence stemming from previous normal deliveries. They are thus prone to complications such as prolonged obstructed labour, prolonged second stage of labour, ruptured uterus and prolonged third stage of labour, retained placenta and PPH.<sup>(15,16,27)</sup> The percentage of the grandmultiparous women (25.8%) in this study is higher than that seen by Soltan and Khashoggi<sup>(10)</sup> and Chhabra and Dhorey,<sup>(23)</sup> but similar to that reported by Onwudiegwu and Makinde<sup>(13)</sup> in an earlier study at our centre.

Preterm delivery and small placenta weight each contributed about a three-fold risk of retained placenta in this study. Risk factors to preterm labour, such as infarcts or fibrinoid degeneration of decidual arterioles, which are also commonly associated with stillbirth and intrauterine growth restriction, may cause abnormal adherence of the placenta leading to its retention after birth.<sup>(10)</sup> Other authors reported a three- to nine-fold increase in preterm delivery as a risk of retained placenta.<sup>(5,7,10)</sup> Precipitate labour, which had previously been observed to be associated with retained placenta, was not significantly associated in this study.<sup>(28,29)</sup>

Antibiotics were given to the women in this study because of the high incidence of infection associated with patients with retained placenta referred to our centre. To date, there has not been any known randomised controlled trial to evaluate the effectiveness of antibiotic prophylactics to prevent endometritis after the manual removal of placenta in vaginal births.<sup>(30)</sup> There is an urgent need to conduct such studies to evaluate whether women with retained placenta after giving birth would benefit from routine antibiotics prior to manual removal of the placenta in various settings. Retained placenta was associated with PPH in 48.33% of the women. It was severe enough to warrant blood transfusion in 40% of the women, while 39.17% were admitted in a state of shock. This is consistent with findings in other studies by Onwudiegwu and Makinde<sup>(13)</sup> and Chhabra and Dhorey.<sup>(23)</sup> Inappropriate management of the third stage of labour, even in low-risk

patients, can lead to retained placenta. This comes in the form of attempts to deliver the placenta when uterine contraction have not taken place, to separate the placenta from the decidua. Forceful pull on the umbilical cord leads to snapping of the umbilical cord with placenta retention. Occasional entrapment of the placenta results from uterine and cervical constriction ring following delay in the delivery of the placenta after the injection of an oxytocic agent during the active management of the third stage of labour. This was the experience in 22.5% of cases in this study, which is similar to the 24.4% findings in an earlier study by Onwudiegwu and Makinde.<sup>(13)</sup>

This study confirmed the risk factors for retained placenta are, in descending order of importance, non-booking for antenatal care in current pregnancy, history of retained placenta and caesarean sections; age greater than 35 years, grand multiparity, previous history of D&C preterm delivery in the current pregnancy and placenta weight less than 501 g. Pregnant women with identifiable risk factors should be targeted for the prevention of retained placenta. However, there is a need for the training and retraining of birth attendants in the proper conduct of delivery and third stage of labour to prevent placenta retentions and PPH. Moreover, the improvement in the socioeconomic conditions of the populace and removal of fee for service in maternity care services, coupled with the involvement of the informal sector and the rural populace in the recently-introduced health insurance scheme, will improve the utilisation of available delivery care services and reduce the number of unbooked emergencies.

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