

Prevalence of retained placenta and its correlation with maternal demographic characteristics

Khansaa Hikmat Abdulrahman*

Shahla Kareem Alaf**

Abstract

Background and objectives: Retained placenta can be a life-threatening experience and is believed to be associated with certain maternal demographic characteristics. This study aimed to investigate the prevalence of retained placenta and its correlation with maternal demographic characteristics among pregnant women. **Methods:** In a case-control study, 65 women with retained placenta and 65 without it attended at the labor room of Maternity Teaching Hospital, Erbil, over the period of June 2017 to July 2018 were investigated. Using a specifically designed questionnaire, required data on the participants' obstetric history, general examination findings, vital sign, and obstetric and demographic characteristics were collected. **Results:** Most cases of retained placenta were observed in the age group ≥ 35 . Moreover, 29% of the women with retained placenta experienced preterm delivery, compared to 10% of control group, and the two groups were significantly in this regard. The results also revealed that the women with and without retained placenta were not significantly different in terms of their age, parity, twin pregnancy, hemoglobin on admission and after 24 hours, and postpartum anemia, and histories of cesarean section, miscarriage, dilation and curettage, preterm labor, blood transfusion, and induction, while they significantly differed with regard to their gestational age, history of retained placenta, and body mass index. **Conclusions:** Pre- and post-term deliveries and history of retained placenta are risk factors for retained placenta; therefore, cases with these risk factors need to be taken into careful consideration.

Key words: Kurdistan Region of Iraq, Maternal demographic characteristics, Pregnant women, Retained placenta.

Introduction

Active management during the third stage of labor consists of a series of interventions aimed at preventing postpartum hemorrhage, retained placenta, and uterine inversion and also includes managing uterotonics within 1 minute after delivery, controlling cord traction to stimulate delivery of placenta, rubbing the uterine to activate uterine contraction, and assessing uterine tonus every 15 minutes during 2 hours after delivery to identify uterine atony early^{1,2}. It has been reported that retained placenta occurs mainly as a result of lack of active management during the third stage of labor³. This delayed delivery of placenta is a life-threatening condition that results in severe bleeding and infection after childbirth; therefore, it is regarded as a significant factor in mortality and morbidity among mothers including hypovolemic shock, anemia, uterine inversion, anesthetic complications, acute renal injury, hysterectomy, genital tract laceration, and coagu-

lation disorders^{4,5}. Studies have reported various rates of mortality induced by untreated retained placenta. A review that was carried out by John CO on retained placenta cases indicated that the mortality rate was 1.8%⁶. This rate has been reported greatly higher in less equipped places in the world. For example, the results of a study conducted by MacLeod J who focused on women who delivered at home revealed that retained placenta was responsible for 70% of all deaths⁷. Therefore, retained placenta needs to be removed by an appropriate technique. An effective method to remove retained placenta is the Windmill technique which was introduced by Hinkson et al⁸. In this noninvasive technique, continuous 360° umbilical cord traction and rotation are applied in such a way as to be perpendicular to the birth canal direction at the level of the introitus. This 360° rotation is repeated slowly with motion similar to the movement of the blades of a windmill⁸. Demographic characteristics have been reported to be

* Maternity Teaching Hospital, General directorate of Erbil Health, Ministry of Health, Kurdistan Region, Iraq. Email: drkhansahikmat@yahoo.com.

** Department of Obstetrics and Gynecology, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region, Iraq.

effective in the prevalence rate of retained placenta. For example, Andrews stated that approximately 0.5-3.3% of women with normal vaginal delivery experienced retained placenta, and this variation in incidence rate shift according to the population under study⁴. They also pointed out that various etiological factors can affect duration of the third stage of labor and prevalence rates of retained placenta⁴. Moreover, the results of a systematic review on historical and geographical rate variations of retained placenta confirmed that the incidence of retained placenta has increased all over the world over the recent decades and that it is more common in developed countries⁹. Other researchers such as Obajimi et al. reported a variation range of 1.1-3.3% and 2.1% for retained placenta incidence although they admitted that retained placenta incidence rate can vary greatly among women from different countries¹⁰. In addition to poor management during the third stage of labor, other risk factors for retained placenta are uterine fibroids, multiparity, uterine inertia/atony, augmentation of labor with oxytocics, home delivery¹⁰, prolonged labor, induction of labor, previous placental retention, preterm deliveries, previous caesarean section, previous dilatation and curettage, and morbidly adherent placenta and sickle cell disease¹²⁻¹⁴. Mother's age has also been referred to as a risk factor for developing retained placenta. In this regard, Iklaki et al. referred to the average age of 27.7 as a risk factor for retained placenta. They referred to delivery outside the hospital, para 4, and being unbooked as other risk factors for development of this condition¹⁵. Previous C-section delivery has also been mentioned as one of the risk factors^{16,17}. Other studies have referred to race as an effective factor in development of this condition. Coveillo et al., for instance, referred to non-Hispanic black compared with non-Hispanic white race as a protective factor against retained placenta¹⁸. Given the significance of retained placenta due to its adverse effects on postpartum health of mothers and the subsequent complications ranging from severe bleeding and infection to mortality, and to the best of the authors' knowledge, the present study is regarded to be the first to be conducted at Maternity Teaching Hospital aimed to examine the prevalence of retained placenta and its correlation with maternal demographic characteristics.

Material and methods

This is a cross-sectional study design used to determine the correlation between retained placenta and demographic characteristics. It included 130 cases chosen out of 23924 pregnant women who had labor and were admitted to at the labor ward of maternity teaching hospital MTH of Erbil, Kurdistan region, Iraq. This study was carried out between June 2017 and July 2018. The study inclusion criteria included the age of 18 and more, singleton pregnancy, multiple pregnancy delivered vaginally (spontaneously or induced), hemodynamic stability, previous cesarean section, history of diagnostic curettage (D&C), and acceptance to participate in the study. The study exclusion criteria were age less than 18, hemodynamic instability, severe anemia (hemoglobin < 8 mg/dl), chorioamnionitis, and refusal to participate in the study. A specially designed questionnaire was utilized to collect data on the participants (age, gestational age, body mass index BMI, and mode of delivery, history of caesarian section (C-section), history of D&C, singleton pregnancy, and multiple pregnancies). The participating women were chosen by convenience sampling method. In order to determine the sample size, PS Software version 3.0.12 was utilized. For this purpose, the software was fed with the following information: $\alpha = 0.01$, power = 0.09, estimated placenta delivery of more than 30 minutes in women with retained placenta and less than 30 minutes in women without it, which led to a sample size of 130; 65 women in the experimental group and 65 in the control group. The present study was conducted in the labor ward after diagnosis of the condition (retained placenta). For this purpose, each woman who delivered vaginally and was diagnosed with retained placenta was assigned into the case group if she accepted to participate. In case of participation refusal, another woman was considered. Afterwards; the participants in the case group were interviewed face-to-face on admission in order to obtain data on their maternal history (i.e. age, parity, singleton pregnancy, multiple pregnancies, history of miscarriage, and histories of D&C, C-section, and blood transfusion). The same information was also obtained from the women in the control group on admission. Moreover, hemoglobin Hb on admission was checked for all participants as a routine investigation for

any woman who delivers at hospital. Cases with Hb < 11g/dL were considered anemic¹⁹. Afterwards, physical examination was performed to check stability of the vital signs. Also, their BMI was calculated by measuring the women's height and weight. Twenty-four hours after labor, Hb was assessed in both groups. In addition, their vital signs were checked. Moreover, women in both groups were monitored after delivery for development of postpartum complications including infections through an Infection Control Assessment Tool 20, uterine atony, and primary postpartum hemorrhage (PPH).

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS, version 22). Chi-square test of association was used to compare proportions. Fisher's exact test was used when the expected count of more than 20% of the cells of the table was less than 5. Student's t-test of two independent samples was utilized to compare two means. A p-value of ≤ 0.05 was considered statistically significant. This present study was conducted in accordance with the ethical standards of the ethics and scientific committee of Kurdistan Board of Medical Specialties and with the Helsinki Declaration of 1975, as revised in 2000. Written informed consent to participate in the study was obtained from each woman. Participants were assured that confidentiality would be maintained and that their information would be used for research purposes only.

Results

Of the 23924 women who delivered vaginally at MTH over a period of 24 months (from 2017 to 2018, 80 cases had retained placenta; therefore, the prevalence rate of retained placenta was 0.33% in the population under investigation. A total of 80 women with retained placenta were initially considered for the study, out of whom 5 refused to participate in the study, 4 were under 18, 3 had hemodynamic instability, and 3 had severe anemia, which led to selection of 65 women as the case group. At the same time; 65 women who were not diagnosed with retained placenta were randomly selected as the control group. As indicated in Table 1, the highest proportion of women (29.2%) belonged to the age group ≥ 35 years, and there was no significant difference between two study groups in terms of age distribution of (p-value =0.530). The proportion of preterm delivery among those with retained placenta (27.7%) was significantly higher than the proportion among the control group (10.8%), and the two groups were significantly different in this regard (p-value =0.003). However, no significant difference was detected between the two groups regarding parity (p-value =0.198), Table 1.

Table (1):Demographic characteristics of the study sample.

Demographic characteristics	Retained		Control		Total		p-value
	No.	(%)	No.	(%)	No.	(%)	
Age							
< 25	17	(26.2)	16	(24.6)	33	(25.4)	0.530
25-29	12	(18.5)	18	(27.7)	30	(23.1)	
30-34	14	(21.5)	15	(23.1)	29	(22.3)	
≥ 35	22	(33.8)	16	(24.6)	38	(29.2)	
Gestational age							
< 37	18	(27.7)	7	(10.8)	25	(19.2)	0.003
37-41	43	(66.2)	58	(89.2)	101	(77.7)	
≥ 42	4	(6.2)	0	(0.0)	4	(3.1)	
Parity							
Primi	17	(26.2)	18	(27.7)	35	(26.9)	0.198
Multi	35	(53.8)	26	(40.0)	61	(46.9)	
Grand-multi	13	(20.0)	21	(32.3)	34	(26.2)	
Total	65	(100.0)	65	(100.0)	130	(100.0)	

Table 2 shows that 19.2% of the participants had history of cesarean section, but the difference between the two groups was not significant (p-value=0.824). No significant difference was observed between retained placenta and history of twin (p-value =0.492), history of miscarriage (p-value >0.999), history of D & C (p-value >0.999), and history of preterm labor (p-value =0.593). According to this table, 15.4% of the cases had history of retained placenta compared with 4.6% of the controls (p-value =0.041). Moreover, the development of retained placenta had no significant association with other factors mentioned in the table like history of blood transfusion (p=0.491), history of induction (p-value =0.108), and hemoglobin on admission (p-value =0.214), Table 2.

Table (2):Factors associated with retained placenta.

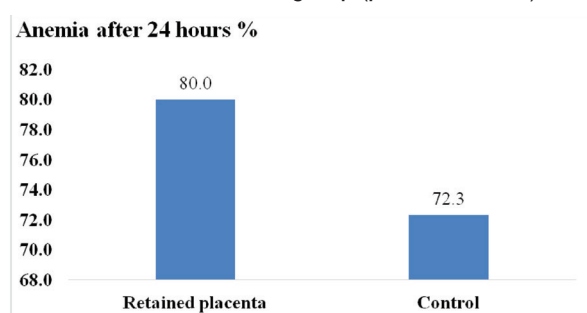
	Retained placenta		Control		Total		P-value
	No.	(%)	No.	(%)	No.	(%)	
History of Cesarean section							
No	52	(80.0)	53	(81.5)	105	(80.8)	0.824
Yes	13	(20.0)	12	(18.5)	25	(19.2)	
Twin							
No	62	(95.4)	59	(90.8)	121	(93.1)	0.492*
Yes	3	(4.6)	6	(9.2)	9	(6.9)	
History of miscarriage							
No	56	(86.2)	56	(86.2)	112	(86.2)	> 0.999
Yes	9	(13.8)	9	(13.8)	18	(13.8)	
History of D & C							
No	60	(92.3)	60	(92.3)	120	(92.3)	> 0.999
Yes	5	(7.7)	5	(7.7)	10	(7.7)	
History of preterm labor							
No	56	(86.2)	58	(89.2)	114	(87.7)	0.593
Yes	9	(13.8)	7	(10.8)	16	(12.3)	
History of retained placenta							
No	55	(84.6)	62	(95.4)	117	(90.0)	0.041
Yes	10	(15.4)	3	(4.6)	13	(10.0)	
History of blood transfusion							
No	52	(80.0)	55	(84.6)	107	(82.3)	0.491
Yes	13	(20.0)	10	(15.4)	23	(17.7)	
History of induction							
No	50	(76.9)	57	(87.7)	107	(82.3)	0.108
Yes	15	(23.1)	8	(12.3)	23	(17.7)	
Hb on admission							
Anemic	41	(63.1)	34	(52.3)	75	(57.7)	0.214
Normal	24	(36.9)	31	(47.7)	55	(42.3)	
Total	65	(100.0)	65	(100.0)	130	(100.0)	

No significant differences were detected between the two study groups regarding the means of age (p-value =0.821), parity (p-value =0.323), gestational age (p-value =0.134), Hb at admission (p-value =0.288), and Hb after 24 hours (p-value =0.071). The mean BMI of those with retained placenta was significantly higher than that of the control group (33.36 Kg/m² vs. 31.12 Kg/m²) (p-value =0.002) (Table 3).

Table (3):Means of the studied variables of the two study groups.

Variables	Retained placenta		Control		p-value
	Mean	(±SD)	Mean	(±SD)	
Age	30.18	(±7.42)	29.89	(±7.25)	0.821
Parity	3.17	(±2.00)	3.55	(±2.40)	0.323
Gestational age	37.35	(±3.97)	38.18	(±1.95)	0.134
Hb at admission	11.00	(±1.40)	11.23	(±1.08)	0.288
Hb after 24 hours	10.08	(±1.40)	10.49	(±1.13)	0.071
BMI	33.36	(±4.72)	31.12	(±3.49)	0.002

As shown in Figure 1 below, 24 hours after delivery, 80% of those with retained placenta developed anemia compared with 72.3% of the control group (p-value=0.303).

**Figure (1):**Incidence of anemia 24 hours after delivery.

Discussion

Retained placenta is of vital significance because it can have unfavorable impacts on postpartum health of mothers. The postpartum complications that retained placenta can cause include severe bleeding, infections, and mortality. In this regard, the present study was carried out in order to examine the prevalence of retained placenta and its association with maternal demographic characteristics. The results indicated that there was no significant difference between the women with and without retained placenta in terms of their age. This finding is in good agreement with those of the studies carried out by Endler et al. and Coveillo who concluded that women with and without retained placenta did not significantly differ regarding their age^{17,18}. The results of the current study also revealed that the two groups of women were not significantly different regarding their parity. This finding is agreement with that of the study carried out by Nikolajsen¹⁹. However, the results of the present study indicated that the women with and without retained placenta were significant different in terms of their gestational age. This difference can be attributed to difference between the two groups regarding their status of pre-term and post-term delivery, such that the mean gestational age of the retained placenta group was lower than the other group, because it was affected by the relatively higher number of pre-term deliveries. This finding is not in agreement with the one reported by Donnette et al., Endler et al., and Nikolajsen et al. who concluded no significant difference between women with and without retained placenta in terms of their gestational age^{11,17,19}. Given the discrepancy between the mentioned studies and the present one, it is recommended that further investigation be carried out in this regard. According to the results, there was no significant difference between the women with retained placenta and those without it in terms of history of cesarean section (p -value =0.824); therefore, it can be stated that history of cesarean section is not a predictive index for retained placenta. This finding is not in agreement with those of the studies carried out by Owolabi et al., Iklaki et al., and Belachew et al.^{1,15,16} who reported that women with retained placenta had experienced cesarean section significantly more than those without retained placenta. More investigations are

required in order to figure out the reason for this difference between the present study and the mentioned ones. The results also indicated that the women with and without retained placenta were not significantly different regarding twin pregnancy. Moreover, the results revealed that histories of miscarriage, D&C, and preterm labor were not significantly different in the women with and without retained placenta (p -value>0.05). In this regard, Zhou et al. reported that women who had one miscarriage followed by a short pregnancy interval had a higher risk of retained placenta, but this association was weak²², which cannot be compared with the finding of the present study. Moreover, Owolabi et al. reported a significant association between history of D & C and incidence of retained placenta¹, which is in disagreement with the present study. Furthermore, as opposed to the result of the present study, Obajimi et al. reported preterm delivery as a risk factor for retained placenta¹⁰. Given the mentioned discrepancies, the association between these three variables (i.e. histories of miscarriage, D&C, and preterm labor) and retained placenta needs to be taken into account in the future studies. The results of the present study revealed that history of retained placenta is significantly different in women with and without retained placenta; therefore, it can be considered as a risk factor for future cases of retained placenta. Similar findings have been reported by a previously conducted study¹⁹. However, the two groups in the present study were not significantly different in terms of their history of blood transfusion; therefore, this variable cannot be considered as a risk factor for retained placenta. However, Van den Bosch et al. concluded that history of blood transfusion in the early postpartum can be a risk factor for retained placenta²³. Therefore, further investigations need to be carried out into this variable in order to come up with clearer results. The results also showed that history of induction and Hb on admission was not significantly different in the women with and without retained placenta; therefore, they were not considered as risk factors. The association of previous induction and Hb on admission and after 24 hours with risk of retained placenta has not been reported by any previous studies; therefore, no comparison can be made in this regard.

As revealed by the results of the present study, the women

with retained placenta and those without it were significantly different regarding their BMI (p -value=0.002). This finding suggests that BMI can be considered as a risk factor for retained placenta, such that women with higher BMI (≥ 33.36) are at a higher risk of developing retained placenta. Similarly, Endler et al. indicated that women with retained placenta had a higher mean BMI than those without it, but this difference was not significant¹⁷. Most relevant studies; however, did not report whether increased BMI is a risk factor for retained placenta^{9-17,19}. Given the discrepancy between the mentioned studies, more investigations need to be carried out in order to clarify the correlation between BMI and incidence of retained placenta. The last finding of the present study was that 80 and 72.3% of the women respectively with and without retained placenta developed anemia 24 hours after delivery, but this difference was not significant. Therefore, retained placenta cannot be considered as a risk factor for anemia. No similar finding was reported by any previous studies; therefore, this finding cannot be compared to any studies.

Conclusions

The results of the present study indicated that among the studied maternal characteristics, pre-term and post-term delivery and history of retained placenta were significantly different in the women with and without retained placenta; therefore, they were considered as risk factors for retained placenta, and since retained placenta can be associated with numerous serious consequences including severe postpartum hemorrhage and death, women with these characteristics should be taken into special account and their placenta should be removed in an effective safe method such as the Windmill technique.

References

- Owolabi AT, Dare FO, Fasubaa OB, Ogunlola IO, Kuti O, Bisiriyu LA. Risk Factors of Retained Placenta in Southwest Nigeria. *Singapore Med*. 2008; 49(7): 532-7.
- Tessa M, Raams TM, Browne JL, Festen-Schrier VJ, Klipstein-Grobusch K, Rijken MJ. Task shifting in active management of the third stage of labor: a systematic review. *MC BMC Pregnancy and Childbirth*. 2018; 18(1):47.
- Baskett FT, Calder AA, Arulkumaran S. Retained Placenta. In: Munro Kerr's Operative Obstetrics, 11th Edition, Sanders Elsevier, London. 2007; 19, 237-41.
- Andrews DW. The Retained Placenta. *Best Practice and Research Clinical Obstetrics and Gynaecology*. 2008; 22(6): 1103-17.
- Eifediyi RA, Eigbefoh JO, Isabu PA, Omorogbe FI, Ukponmwan OG, Momoh M. Retained Placenta: Still a Cause of Maternal Morbidity and Mortality in a Nigerian Semi-Urban Population. *Sudan Journal of Medical Sciences*. 2011; 6(1): 33-8.
- John CO, Orazulike N, Alegbeleye J. An appraisal of retained placenta at the University of Teaching Hospital: a five-year review. *Nigerian journal of medicine: journal of the National Association of Resident Doctors of Nigeria*. 2015; 24(2):99-102.
- MacLeod J, Rhode R. Retrospective follow-up of maternal deaths and their associated risk factors in a rural district of Tanzania. *Tropical medicine & international health*. 1998; 3(2):130-37.
- Hinkson L, Suermann MA, Hinkson S, Henrich W. The Windmill technique avoids manual removal of the retained placenta-A new solution for an old problem. *Eur J Obstet Gynecol Reprod Biol* 2017; 215:6.
- Cheung WM, Hawkes A, Ibish S, Weeks AD. The retained placenta: Historical and geographical rate variations. *J Obstet Gynaecol*. 2011; 31(1): 37-42.
- Obajimi GO, Roberts AO, Aimakhu CO, Bello FA, Olayemi O. An appraisal of retained placentae in Ibadan: a five year review. *Annals of Ibadan post-graduate medicine*. 2009; 7(1): 21-5.
- Rizwan N, Abbasi RM, Jatoi N. Retained Placenta Still a Cause of Maternal Morbidity and Mortality. *Journal Pakistan Medical Association*. 2009; 59(12): 812-4.
- Serjeant GR, Loy LL, Crowther M, Hambleton IR, Thame M. Outcome of Pregnancy in Homozygous Sickle Cell Disease. *Obstetrics & Gynecology*. 2004; 103(6): 1278-85.
- Donnette SS, Thame M, Aleith HK, Hambleton I, Serjeant GR. Retained Placenta in Homozygous Sickle Cell Disease. *Obstetrics & Gynecology*. 2009; 114(4): 825-8.
- Obajimi GO, Roberts AO, Aimakhu CO, Bello FA, Olayemi O. An Appraisal of Retained Placenta in Ibadan: A Five-Year Review. *Annals of Ibadan Post-graduate Medicine*. 2009; 7(1): 21-5.
- Iklaki CU, Emechebe CI, Njoku CO, Ago BU, Ugwu BS. Socio-Demographic Profile and Complications of Patients with Retained Placenta in a Tertiary Centre, South-South Nigeria. *Open Access Library Journal*. 2016; 13(1): 1-8.
- Belachew J, Cnattingius S, Mulic-Lutvica A, Eurenium K, Axelsson O, Wikstrom AK. Risk of retained placenta in women previously delivered by caesarean section: a population-based cohort study. *BJOG*. 2014; 121(2):224-9.
- Endler M, Grunewald C, Saltvedt S. Epidemiology of retained placenta: oxytocin as an independent risk factor. *Obstetrics and Gynecology*. 2012;119(4): 801-9.
- Coviello EM, Grantz KL, Huang CC, Kelly TE, Landy HJ. Risk factors for retained placenta. *Am J Obstet Gynecol*. 2015; 213(6): 864.e1
- Nikolajsen S, Lokkegaard EC, Bergholt T. Reoccurrence of retained placenta at vaginal delivery: an observational study. *Acta obstetrica et gynecologica Scandinavica*. 2013; 92(4): 421-5.
- Management Sciences for Health. Infection Control Assessment Tool. second. 2009.
- Endler M, Saltvedt S, Eweida M, Åkerud H. Oxidative stress and inflammation in retained placenta: a pilot study of protein and gene expression of GPX1 and NF B. *BMC pregnancy and childbirth*. 2016; 16(1): 384.
- Zhou W, Nielsen GL, Larsen H, Olsen J. Induced abortion and placenta complications in the subsequent pregnancy. *Acta Obstet Gynecol Scand*. 2001; 80(12): 1115-20.
- Van den Bosch T, van Schoubroeck D, Lu C, De Brabanter J, Va Huffel S, Timmerman D. Color Doppler and gray-scale ultrasound evaluation of the postpartum uterus. *Ultrasound Obstet Gynecol*. 2002; 20(6): 586-91.