

Risk Factors for Immediate Postpartum Hemorrhages in the Maternity of the University Teaching Hospital of Parakou

Awade Afoukou Achille Obossou^{1*}, Salifou K¹, Bib Hounkpatin², Ir Sidi¹, Af Hounkponou², Oa Hounngo¹, Vodouhe M¹, Rx Perrin², Tshabu Aguemon C²

¹Mother and Child Department, Faculty of Medicine, University of Parakou, Republic of Benin

²Faculty of Health Sciences, University of Abomey-Calavi, Republic of Benin

*Corresponding author: Awade Afoukou Achille Obossou, Obstetrician-Gynecologist, Faculty of Medicine, University of Parakou, Republic of Benin, Tel: (229)95853279/97067852; E-mail: awadefr2000@yahoo.fr

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Abstract

Objective: Study the risk factors for immediate postpartum hemorrhage (IPPH) in the maternity of the University Teaching Hospital of Parakou (UTH/P).

Method: We carried out a descriptive and analytical case-control study between May 1 and August 31, 2014. The study population consisted of 63 IPPH cases versus 126 controls matched according to age, parity, number of fetuses and number of uterine scars.

Results: IPPH incidence was 9.8% (IC 95% 7.5-12.1). The socio-demographic profile was characterized by young women; most of them were married and affiliated with Islamic religion. They had average socioeconomic status and the most represented were traders. The risk factors statistically significant for the occurrence of the immediate post-partum hemorrhage were: Fulani ethnicity, rural place of residence, illiteracy, female circumcision, induced abortions or miscarriages, previous IPPH, lack of antenatal care, anemia during pregnancy, child delivery at home or on the way, lack of labor monitoring by partograph, labor duration exceeding 12 hours, lack of Active Management of the Third Stage of Labor (AMTSL) and lack of postpartum monitoring.

Conclusion: The consideration of these risk factors associated with the occurrence of the immediate post-partum haemorrhage (IPPH) in a contest of improving care for pregnant and parturient must help to reduce the occurrence of this pathology.

Keywords: Risk factors; Immediate postpartum hemorrhage; Maternal death

Introduction

Maternal mortality remains a major concern of public health in Africa [1]. Everyday, at global level, 1500 women die from complications related to their pregnancies or to their child deliveries and most of those deaths occur in developing countries [2]. Hemorrhages are the leading direct cause of maternal deaths, with a 25% rate. Among them, immediate postpartum hemorrhages (IPPHs) are a substantial part. IPPHs represented 23.6% of all the causes of maternal deaths in West Africa in 2001 [3]. In Benin, many studies confirm the same trend [4,5]. For the World Health Organization (WHO), most of those deaths may be avoided when women have access to reproductive health services, appropriate equipment and supplies and to skill health personnel [6].

Therefore, there are modifiable risk factors, which are both maternal and environmental, as regards its prevention. The prophylaxis of that obstetrical nosology is thus crucial. It depends first and foremost on the identification of risk factors and the development of appropriate and specific strategies allowing prevention, diagnosis and management of immediate postpartum hemorrhages. That is the reason why we have set ourselves the objective of identifying the risk factors for IPPHs in the African context.

Patients and Methods

It was a case-control descriptive and analytical study based on prospective data collection. It had covered a four-month period running from May 1 to August 31, 2014 and was conducted in the UTH/P Gynecology and obstetrics Unit and some peripheral maternities of the town of Parakou.

The said study included female patients represented by cases (UTH/P postpartum or delivered women or women referred from a peripheral maternity) with an IPPH during the study period.

Controls were represented by female patients who had normal childbirth during the same period. Therefore, we had excluded delayed postpartum hemorrhages and patients who incidentally dropped out of the survey.

We considered as IPPH, any abnormal bleeding from the genital tract, occurred within the 24 hours following childbirth with or without impact on the mother's overall health status. Bleeding is said to be abnormal if:

Its quantity >500 ml by vaginal route and 1000 ml by cesarean section; with or without an impact on the mother's general health status and characterized by:

- Simple maternal intolerance
- 4 g/dl drop in the hemoglobin level

- Hypovolemic shock (consecutive acute anemia)
- Kidney failure reversible in early stage
- Disseminated intravascular coagulation [1].

We proceeded to an exhaustive recruitment of all cases of IPPH occurred during the study period.

We identified all cases of IPPH occurred after a childbirth at the THU/P and those referred to the THU/P. As regards referred cases, we moved to origin centers to count controls. These are the woman who has recently given birth (normal delivery) just before the case and the one just after the case. For each case, we matched two controls. Matching criteria were represented by the same age group (≤ 19 years, 20 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years and ≥ 40 years); the same category of parity (primiparous, with few childbirths (2,3 childbirths), multiparous (4, 5 childbirths), grand multiparous ≥ 6 childbirths), the identical number of cesarean scars and the type of pregnancy (singleton or multiple). The dependent variable was represented by any female patient with an IPPH. The independent variables were related to:

- Sociodemographic characteristics: ethnic group, occupation, civil status, educational level and place of residence.
- Gynecological and obstetrical history: circumcision, number of pregnancies, parity, number and type of abortions and IPPH history.
- Characteristics of current pregnancy: antenatal care, gestational age, pathologies and complications occurred on pregnancy, Fundal height and anemia.
- Delivery process: type of delivery, medicated therapy during labor, duration of labor, labor curve layout, nature of delivery and monitoring after childbirth.

- Newborn characteristics: his status (living, fresh stillborn, macerated stillborn) and his weight.

The collected data were recorded and processed by means of the Statistical Package for Social Sciences (SPSS) software, 20.0 version. Proportions and percentages were compared through Pearson Chi-square test (or Fisher exact test, as the case may be). For those comparisons, $p < 0.05$ was considered as statistically significant.

Results

Our research work focused on 189 female patients, including 63 IPPH cases versus 126 controls.

Frequency of immediate postpartum hemorrhages associated with deliveries

Our study registered 63 IPPH cases, including 22 cases occurred in the maternity of the University Teaching Hospital of Parakou (UTH/P). Over a total of 645 child deliveries. Thus, IPPHs complicated on average 9.8% of childbirths [IC 95% 7.5-12.1]. Frequency of IPPHs in the UTH/P maternity is estimated at 3.4% [IC 95% 2.4-4.8].

Risk factors for IPPH occurrence before delivery labor

Risk factors associated with sociodemographic characteristics: Table 1 explores the risk factors of female patients who were victims of IPPH from May to August 2014 according to sociodemographic characteristics (Table 1). We can see that Fulani ethnicity, residence in rural areas and illiteracy were risk factors for the occurrence of IPPH.

Sociodemographic characteristics	Modalities	Cases		Controls		OR1	95% IC	p
		n	%	n	%			
Ethnicity	Bariba	12	19	24	19	1		0.0029
	Mina	1	1.6	6	4.8	0.33	0.04-3.04	
	Fulani	16	25.4	6	4.8	5.33	1.72-16.46	
	Lokpa	9	14.3	11	8.7	1.63	0.70-3.75	
	Dendi	5	7.9	23	18.3	0.44	0.22-0.84	
	Nago	5	7.9	18	14.3	0.55	0.21-1.42	
	Fon	9	14.3	20	15.9	0.9	0.32-2.55	
	Ditamari	4	6.3	9	7.1	0.88	0.23-3.44	
	Others	2	3.2	9	7.1	0.44	0.08-2.35	
Civil status	Married	49	77.8	79	62.7	1		0.097
	Concubine	8	12.7	31	24.6	0.41	0.16-1.00	
	Single	6	9.5	16	12.7	0.12	0.04-0.32	
Place of residence	Urban	36	57.1	108	85.7	1		0
	Rural	27	42.9	18	14.3	4.5	2.22-9.06	
Occupation	Peasant	4	6.3	6	4.8	1		0.664

	Housewives	17	27	27	21.4	0.9	0.22-3.60	
	Pupil/Student	6	9.5	13	10.3	0.69	0.14-3.39	
	Resellers	19	30.2	43	34.1	0.66	0.17-2.61	
	Artisan	9	14.3	28	22.2	0.48	0.11-2.08	
	Civil servant	4	6.3	5	4	1.2	0.20-7.01	
	Others	4	6.3	4	3.2	1.5	0.23-9.74	
Educational level	Higher education	3	4.8	4	3.2	1		0.001
	Secondary school II2	4	6.3	13	10.3	0.41	0.06-2.48	
	Secondary school I3	8	12.7	34	27	0.31	0.06-1.60	
	Primary school	14	22.2	46	36.5	0.4	0.08-2.00	
	Non scolarisées	34	54	29	23	1.56	0.31-7.54	
2Senior secondary school; 3Junior secondary school								

Table 1: Risk factors of female patients who were victims of IPPH from May to August 2014 in the UTH/P according to sociodemographic characteristics

Risk factors associated with gynecological and obstetrical history: Table 2 explores the risk factors of female patients who were victims of IPPH from May to August 2014 in the UTH/P according to their gynecological and obstetrical history (Table 2). In our survey, induced abortions and IPPH history are risk factors for IPPH occurrence. Circumcised women were 8.9 times more at risk for an IPPH than those uncircumcised.

Obstetrical history	Modalities	Cases		Controls		OR	95% IC	p
		n	%	n	%			
Number of delivery	Paucigravidae	22	34.9	51	40.5	1		0.824
	Primigravida	22	34.9	36	28.6	1.41	0.68-2.9	
	Multigravida	10	15.9	20	15.9	1.15	0.46-2.8	
	Grand multigravida	9	14.3	19	15.1	1.09	0.43-2.78	
Abortions	No	49	77.8	81	64.3	1		0.049
	Yes	14	22.2	45	35.7	0.5	0.25-1.00	
Type of abortions	Spontaneous	8	12.7	41	32.5	1		0
	Induced	6	9.5	3	2.38	10.25	2.07-49.7	
	Spontaneous and induced	0	0	1	0.8	0	-	
Circumcision	No	46	73	121	96	1		0
	Yes	17	27	5	4	8.9	3.11-25.5	
IPPH	No	55	87.3	122	96.8	1		0.001
	Yes	8	12.7	4	3.17	4.44	1.28-15.37	

Table 2: Risk factors of patients who were victims of IPPH from May to August 2014 in the UTH/P according to obstetrical history

Risk factors associated with current pregnancy characteristics: The risk factors of the female patients who were IPPH victims from May to August 2014 according to current pregnancy characteristics are described in Table 3. In our research work, the lack of antenatal care and anemia during the pregnancy were risk factors for IPPH occurrence.

Characteristics of current pregnancy	Modalities	Cases		Controls		OR	95% IC	p
		n	%	n	%			
Antenatal care	Yes	53	84.1	123	97.6	1		0
	No	10	15.9	3	2.38	2.32	0.61-8.77	
Gestational age group	37-40 SA 02 Jrs	21	67.7	51	61.4	1		0.895
	28-37 SA	8	25.8	21	30.1	0.9	0.34-2.35	
	≥ 40 SA 03 Jrs	22	6.5	7	8.4	7.63	3.13-18.64	
Category of Fundal height (cm)	Between 30 and 34	39	67.2	79	62.7	1		0.808
	Lower than 30	9	15.5	24	19	0.75	0.31-0.86	
	Higher than 34	10	17.2	23	18.3	0.88	0.38-2.02	
Anemia	Non	53	84.1	120	95.2	1		0.01
	Yes	10	15.9	6	4.8	3.7	1.28-10.70	

Table 3: Risk factors of patients who were victims of IPPH from May to August 2014 in the UTH/P according to current pregnancy characteristics

Risk factors for IPPH occurrence during delivery labor

Risk factors associated with the delivery labor process: Table 4 explores the risk factors for female patients who were IPPH victims from May to August 2014 in the UTH/P according to the delivery labor process (Table 4). The risk factors for occurrence of IPPHs associated with labor process were childbirth at home or on the way to

hospital, lack of labor monitoring with labor curve, length of labor less than 6 hours or higher than 12 hours, a delivery technique other than AMTSL, lack of monitoring of immediate postpartum, type of drugs used during labor (tobacco, hexabromobiphenyl (HBB) and magnesium sulphate).

Delivery labor process	Modalities	Cases		Controls		OR	95%IC	P
		n	%	n	%			
Place of delivery	UTH/P	22	34.9	68	54	1		0
	At home	11	17.5	0	0	-	-	
	On the way	3	4.8	0	0	-	-	
	CSP	10	15.9	20	15.9	0.15	0.06-0.36	
	CSPP	17	27	38	30.2	1.38	0.65-2.90	
Monitoring by labor curve	No	35	55.6	27	21.4	1		0
	Yes	28	44.4	99	78.6	0.21	0.1-0.4	
Duration of labor (hours)	Between 6 and 12	12	19	80	63.5	1		0
	Lower than 6	6	9.5	8	6.3	5	1.5-16.9	
	Higher than 12	18	28.6	9	7.1	13.3	4.89-36.15	
	Non precise	27	42.9	29	23	-	-	
Nature of delivery	Natural	35	57.4	102	81	1		0
	AMTSL	14	23	4	3.2	10.2	3.07-33.05	
	Artificial	7	11.5	17	13.5	1,2	0.45-3.13	

	Directed	4	6.6	1	0.8	11,6	1.26-106.8	
	DMI	1	1.6	2	1.6	1.45	0.13-16.4	
Monitoring in immediate postpartum	No	25	39.7	3	2.4	1		0
	Yes	38	60.3	123	97.6	0.03	0.008-0.10	
Medicated therapy during labor								
Oxytocin	No	34	50.8	64	54	1		0.681
	Yes	29	49.2	62	46	0.88	0.48-1.46	
Antispasmodic	No	57	80.2	101	90.5	1		0.071
	Yes	6	19.8	27	9.5	0.39	0.15-0.99	
Analgesic (Trabar, HBB)	No	56	97.6	123	88.9	1		0.032
	Yes	7	2.4	3	11.1	5.12	1.28-20.35	
Prostaglandins	non	62	100	126	98.4	1		0.333
	Oui	1	0	0	1,6	0	-	

Table 4: Distribution of risk factors of female patients who were victims of IPPH from May to August 2014 in the UTH/P according to delivery labor process

Risk factors associated with the newborn characteristics: Table 5 describes the distribution of risk factors of female patients who were IPPH victims from May to August 2014 in the UTH/P according to

newborn characteristics (Table 5). No characteristic of the newborn was found as risk factor for IPPH occurrence.

Newborn characteristics	Modalities	Cases		Controls		OR	95% IC	p
		n	%	n	%			
Newborn Status At birth	Alive	56	88.9	113	89.7	1		0.867
	Stillbirth	7	11.1	13	10.3	1.08	0.4-2.85	
Newborn weight (gr)	[3000-3500]	21	34.4	43	34.1	1	0.661	
	<3000 g=1	33	54.1	69	54.8	0.98	0.53-1.90	
	[3500-4000]	6	9.8	14	11.1	0.88	0.64-1.21	
	≥ 4000 g	1	1.6	0	0	-	-	
Presentation of the foetus	Cephalic	57	95	118	96.7	1		0.57
	Breech	3	5	4	3.3	1.55	0.34-6.92	

Table 5: Distribution of risk factors of female patients who were victims of IPPH from May to August 2014 in the UTH/P according to newborn characteristics

Discussion

IPPH incidence associated with deliveries

In our study, IPPH incidence is comparable to the results described by Stanford [7] in Tanzania in 2008 and Ngbale et al. [8] in Central Africa in 2012, who had noted respective frequencies estimated at 11.9% and 10.8%. The incidence of IPPHs (leading cause of maternal death) reflects the level of development of a country's health system. In this regard, Magann et al. [9] and Woiski et al. [10] reported respectively a 5.15% incidence in Australia and 5% in the Netherlands.

We also think that our rate may be associated with a surge in the number of private health facilities where child deliveries are sometimes performed by low-skilled personnel, but also with the stubbornness of some women to give birth at home.

Risk factors for IPPH occurrence associated with sociodemographic characteristics and history

In our study, one quarter of the female patients who were victims of IPPH were members of Fulani ethnic group. In the northern region, the Fulani live a precarious life and have an extremely low school

enrollment rate. As a result, their development is hindered by a degree of exclusion [11]. Most Fulani women live in rural areas. They exert the following professions: sellers, peasants or housewives. They have a low socioeconomic status, they do not attend ANC, they are often anemic and most of them give birth at home. So, they have several risk factors and are therefore more exposed to IPPH.

According to study setting, other authors established a relationship between ethnicity and IPPH occurrence. Olowokere et al. [12] had mentioned a 89.7% ratio of women from Yoruba ethnic group who were victims of IPPH. In Norway, Al-Zirqi et al. [13] also reported that ethnicity was a risk factor for IPPH.

More than one out of two women was literate. In this regard, As a result, we noted that illiteracy was a risk factor for IPPH occurrence. It is a category of women who do not understand the importance of ANC, who are unaware of the severity of the different pathologies associated with pregnancy and child delivery. And hence, they under rate the need for them to give birth in the presence of skilled personnel. Moreover, they are often victims of early and forced marriage.

The ratio of circumcised women was statistically significant. In our series, circumcision was a risk factor for IPPH. Regard less of the type of circumcision, those acquired scars are an area of weakness and thus contribute, at the time of delivery, lacerations and even perineal tears which cause IPPH. In their study, McSwiney and Saunders [14] also found that circumcision was a risk factor for IPPH occurrence. Akan et al. [15] in turn, insisted on the fact that female genital mutilations have many consequences, including postpartum hemorrhage.

In our study, induced abortions are a risk factor for IPPH occurrence. Intrauterine maneuvers, particularly curettage history, may alter the endometrium and cause placental pathologies (placenta accreta, placenta previa); this is a source of hemorrhage. In our series, the women who have an IPPH history are 4 times more likely to have again an IPPH. Our remark had been confirmed by several studies: Olowokere et al. [12] in Nigeria, Driessen et al. [16] in France and Al-Kadri et al. [17] in Saudi Arabia.

Risk factors for occurrence of IPPHs associated with current pregnancy characteristics

Our results enabled us to conclude that the lack of antenatal care or poor quality care is a risk factor for IPPH. In Benin, Fourn et al. [18] stated that prenatal care appear as an effective action of protection against pregnancy and delivery complications. Hence the importance of antenatal care (ANC) for an early screening with possible correction of risk factors in IPPH prevention. According to Wandabwa et al. [19], the lack of antenatal care gets multiplied by five the risk for IPPH occurrence.

In our survey, one out of six female patients was anemic during pregnancy. The impact that a hemorrhage volume can have on the general health condition of a woman sometimes depends on previous hemoglobin level of the latter. Anemic women are most exposed (OR=3.7) to the risk of having an IPPH. In Nigeria, Olowokere et al. [12] also identified anemia in 12.5% of the cases as a risk factor for IPPH.

Risk factors for occurrence of IPPHs associated with delivery process and newborns

In our study, the lack of labor monitoring by partograph is a risk factor for IPPH occurrence. Partograph is the reference instrument in matters of delivery labor monitoring. It helps detect pathologies abnormalities in labor progression and take action on time. During our survey, we were given the opportunity to note that some private as well as public health centers do not use partograph. In their results, Yisma et al. [20] lamented that partograph was actually used in only 57.3% of the cases by obstetrical care providers in the public health institutions. Wandabwa et al. [19] had reported that about 9 female patients out of 10 IPPH victims had not benefitted from a monitoring during their delivery labor with partograph. As a result, the use of partograph in delivery labor monitoring plays an essential role in IPPH prevention.

In our study, we noted that the longer labor is, the higher IPPH risk is (OR=13.3). Actually, a long labor exhausts the endometrium; this will cause a uterine inertia which, in turn, will generate IPPH for two reasons. On the one hand, uterine atony itself causes hemorrhage, and on the other hand uterine atony may lead to a retained placenta which also causes hemorrhage. In addition, the time of delivery phase has a substantial impact on IPPH occurrence. Magann et al. [21] came to the conclusion that there is a correlation between maternal age above 35 years, duration of second stage of labor, extension of third stage of labor and IPPH occurrence.

The lack of immediate postpartum monitoring was a risk factor for IPPH in our study. Among our patients, 42.8% of the mothers who were victims of IPPH gave birth in (private or public) peripheral health centers. In those premises, thoroughness does not often apply as a compulsory rule for the personnel. Objectively, no monitoring sheet is drafted and immediate postpartum monitoring as well as gestures therein included are deficient. Thus, the lack of monitoring of immediate postpartum is a risk factor for IPPH. Winters et al. [22] identified variations in the monitoring and management of immediate postpartum in maternities of different countries in Europe. This leads us to say that there are still health institutions where postpartum monitoring is low with all its consequences.

We had not identified birth weight as a risk factor where as many authors found it: Sosa et al. [23] in Uruguay, Prata et al. [24] in Egypt. According to those researchers, macrosomia (>4000 g) is a major risk factor for the occurrence of IPPH. By contrast, a low birth weight under 2500 g would, conversely, be a protective factor.

Conclusion

The control of risk factors for occurrence of post partum hemorrhage is crucial in the development of prevention policies for of this pathology purveyor of morbidity and high mortality.

References

1. World Health Organization (WHO) (2004) Beyond the numbers: reviewing maternal deaths and complications to make pregnancy safer.
2. UNDP Report on the MDG 12 (2012) Assessment of the progress made in Africa toward the achievement of the Millennium Development Goals.
3. Bouvier Colle MH, Ouedraogo C, Dumont A, Vangeenderhuysen C, Salanave B, et al. (2010) Maternal mortality in West Africa. Rates, causes and substandard care from a prospective survey. *ActaObstetGynecolScand* 80: 113-119.

4. Saizonou J, Ouendo EM, Dujardin B (2006) Maternal deaths audit in four Benin referral hospitals: quality of emergency care causes and contributing factors. *African Journal of Reproductive health* 10: 28-40.
5. Zoumenou E, Denakpo J, Tchaou B, Assouto P, Lokossou TH, et al. (2009) Severe immediate postpartum hemorrhages: epidemiological characteristics and management in the developing countries. *Méd Afr Noire* 56: 717-721.
6. The United Nations (UN) (2010) End poverty in 2015. Millennium Development Goals-The United Nations Summit, September 20-22, 2010, New York. High-level plenary meeting of the General Assembly.
7. Stanford J (2010) Post partum haemorrhage among women delivered at Mbeya referral hospital in 2008. *DMS Journal* 19-23.
8. Ngbale RN, Koirokpi A, Goddot/Nangouma NMJ, Gaunefet CE, SongoKette T, et al. (2012) Immediate postpartum hemorrhages in the Regional University Hospital of Boassangoa, Central Africa. *Méd Afr Noire* 59: 39-43.
9. Magann E, Evans S, Hutchinson M, Collins R, Howard C, et al. (2005) Postpartum Hemorrhage after Vaginal Birth: An Analysis of Risk Factors. *Southern Medical Journal* 98: 419-422.
10. Woiski DM, Hermens R, Middeldorp MJ, Kremer AJ, Marcus AM, et al. (2010) Haemorrhagia post partum; an implementation study on the evidence-based guideline of the Dutch Society of Obstetrics and Gynaecology (NVOG) and the MOET (Managing Obstetric Emergencies and Trauma-course) instructions; the Fluxim study. *BMC Pregnancy and Childbirth* 10: 5-9.
11. Bierschenk T, Forster R (2004) Social organization of the Fulani in the East of Atacora (Republic of Benin, districts of Kouandé, Pehunco and Kérou). *Forum* 6, Mainz: Department of Anthropology and African Studies 86.
12. Olowokere AE, Adekeye AO, Ogunfowokan A, Olagunju EO, Irinoye OO (2013) The prevalence, management and outcome of primary postpartum haemorrhage in selected health care facilities in Nigeria. *Int J Nursing And Midwifery* 5: 28-34.
13. Al-Zirqi I, Vangen S, Forsen L, Stray-Pedersen B (2008) Prevalence and risk factors of severe obstetric haemorrhage. *BJOG* 115: 1265-1272.
14. McSwiney MM, Saunders PR (1992) Female circumcision: a risk factor in postpartum haemorrhage. *J Post grad Med* 38: 136-137.
15. Akan CI, Pepple DKO (2003) Urethral Injury Following Genital Mutilation in Pregnancy: A Rate Cause of Postpartum Haemorrhage. *NigJnlOrthopaedics and Trauma* 2: 130-133.
16. Driessen M, Colle MHB, Dupont C, Khoshnood B, Rudigoz RC, et al. (2011) Postpartum hemorrhage resulting from uterine atony after vaginal delivery: factors associated with severity. *Obstetrics and Gynecology* 117: 21-31.
17. Al-Kadri HM, Dahlawi H, Al Airan M, Elsherif E, Tawfeeq N, et al. (2014) Effect of education and clinical assessment on the accuracy of postpartum blood loss estimation. *BMC Pregnancy and Childbirth* 14: 110-116.
18. Fourn L, Takpara I, Mbainadjiel BS (2004) Prenatal care and adverse pregnancy outcomes in an urban maternity of Cotonou (Benin). *Méd Afr Noire* 51: 381-384.
19. Wandabwa J, Doyle P, Todd J, Ononge S, Kiondo P (2008) Risks factors for severe post partum haemorrhage in Mulago Hospital, Kampala, Uganda. *East African Medical Journal* 85: 64-71.
20. Yisma E, Dessalegn B, Astatkie A, Fesseha N (2013) Knowledge and utilization of partograph among obstetric care givers in public health institutions of Addis Ababa, Ethiopia. *BMC Pregnancy and Childbirth* 13: 17.
21. Magann EF, Doherty DA, Brery CM, Niederhauser A, Chauhan SP, et al. (2008) Obstetric characteristics for a prolonged third stage of labour and risk for postpartum hemorrhage. *Gynecol Obstet Invest* 65: 201-205.
22. Winters C, Macfarlane A, Tharaux CD, Zhang WH, Alexander S, et al. (2007) Variations in policies for management of the third stage of labour and the immediate management of postpartum haemorrhage in Europe. *BJOG* 114: 845-854.
23. Sosa GC, Althabe F, Belizan MJ, Buekens P (2009) Risks factors for postpartum hemorrhage in vaginal deliveries in a Latin-American population. *ObstetGynecol* 113: 1313-1319.
24. Prata N, Hamza S, Bell S, Karasek D, Vahidnia F, et al. (2011) Inability to predict postpartum hemorrhage: insights from Egyptian intervention data. *BMC Pregnancy and Childbirth* 11: 97-106.