Risk factors associated with postpartum haemorrhage at Juba Teaching Hospital, South Sudan, 2011

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Abstract

Objective: To study risk factors associated with post partum haemorrhage (PPH) in Juba Teaching Hospital, South Sudan.

Method: An unmatched case control study was conducted in which 44 cases and 88 controls were involved, from September to December 2011. Data were collected using a structured questionnaire in face to face interviews, and analyzed using Epi-info 3.5.3 statistical programme to determine if there was a correlation.

Results: Maternal demographic and obstetric characteristics were found to be associated with the risk of bleeding during Bivariate analysis. However, age was found to confound emergency admission, uterotonic use (Oxytocin and Misoprostol) use and delivery type; the latter being modified, in the development of post partum haemorrhage.

Conclusion: These results indicate that active management of the third stage of labour (AMTSL) and prompt intervention reduced the risk of developing PPH. Understanding the factors that cause PPH will allow us to better strengthen and effect pre-delivery and emergency obstetric care which may help us reduce maternal mortality due to post partum haemorrhage.

Introduction

Post-partum haemorrhage (PPH) is a leading cause of maternal mortality worldwide and is responsible for 34% of maternal deaths in Africa [1]. It is defined as blood loss of more than 500 ml following vaginal delivery or more than 1000 ml following caesarian delivery [2]. Blood loss can occur during the first 24 hours (primary PPH) or from 24 hours up to 6 weeks after delivery (secondary PPH). Primary PPH classified by site is either placental or extra-placental bleeding [3]. Secondary PPH is abnormal or excessive bleeding from the birth canal between 24 hours and 12 weeks postnatally [4].

Evidence shows that PPH is the leading cause of maternal mortality and is responsible for around 25% of maternal deaths worldwide [5] with a prevalence rate of approximately 6%. Africa has the highest rate of PPH at about 10.5% [6]. PPH can also cause long-term severe morbidity, and approximately 12% of women who survive PPH will have severe anemia [7].

Additionally, women having severe PPH and surviving ("near misses") are significantly more likely to die in the year following the PPH [8]. In Africa and Asia, PPH accounts for more than 30% of all maternal deaths whose proportions vary between developed and developing countries, suggesting that deaths from PPH are preventable [9].

In the sub-Saharan Africa, the main direct causes of maternal death are bleeding (34%), infection (10%), pre-eclampsia /eclampsia (9%) and obstructed labour (4%) [10]. In South Sudan, about 42% of women who go into labour experience excessive bleeding. The maternal mortality ratio (MMR) was found to be 2,054 per 100,000 live births [11].

The most common cause of PPH is uterine atony, disorders of the coagulation system and platelets, trauma or a retained placenta. PPH is diagnosed clinically - immediately after delivery or later in puerperium. Without an intervention, shock, collapse, disseminated intravascular coagulation (DIC) and death occur.

The null hypothesis states that PPH is not associated with age, educational and employment status, emergency admission, multigravity, grand multiparity and use of an uterotonic during labour. The purpose of this study was to relate maternal demographics and obstetric risk factors to the development of PPH and its effect on management.

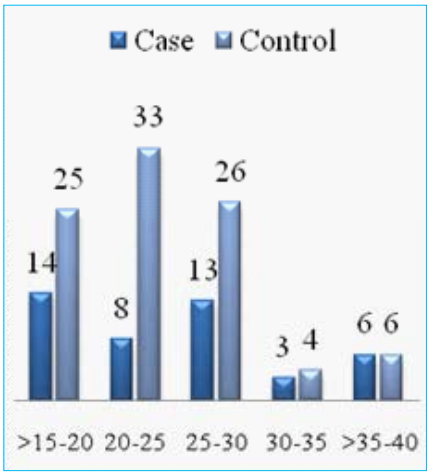

Fig 1. Age groups

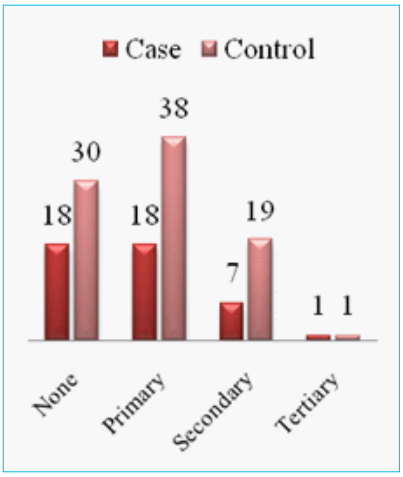

Fig. 2. Education status

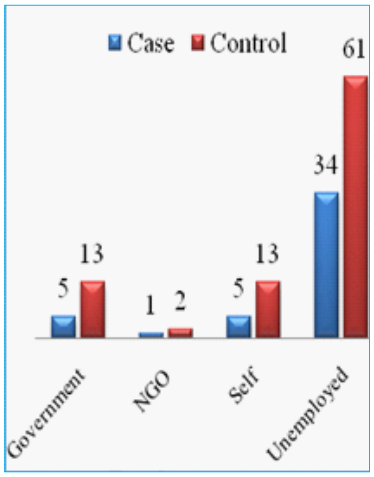

Fig 3. Employment status

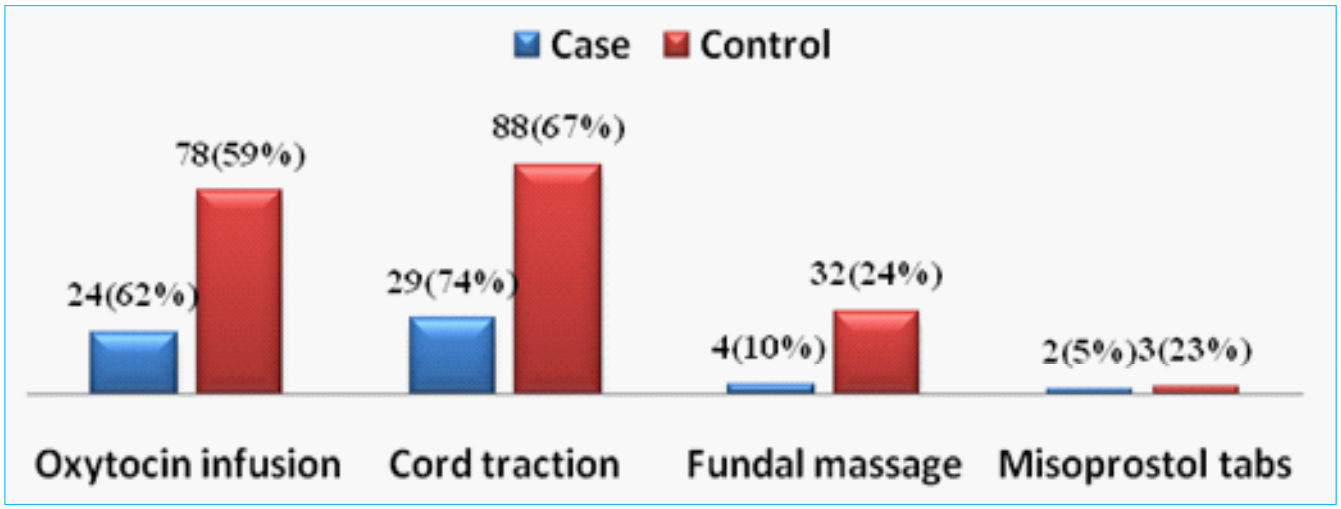

Figure 4. Management of the 3rd stage of labour.

Materials and methods

In this unmatched case control study sample size was 131 (i.e. 44 cases and 88 controls). Data were collected using a structured questionnaire in face-to-face interviews. The significance level of study was 0.05 and method of statistical analysis was Epi_info 3.5.3.

A case was defined as any pregnant woman aged 15-49 yrs presenting with bleeding during labour and/or the pueperium period, to the obstetrics ward (maternity) Juba Teaching Hospital (JTH) during the study period (June to December 2011). A control was any pregnant woman aged 15-49 years, without post partum bleeding and admitted in the Obstetric Ward, JTH during the study period with normal or caesarean delivery. Women with past bleeding tendencies and history of any haemorrhage type were excluded.

Sampling was done daily in an unmatched systematic random manner and for each case, two controls were selected. Informed consent was mandatory. Data were collected and stored in a password controlled computer and analyzed by Epi-info 3.5.3. Significant risk factors were detected by determining the Odds Ratios (OR) and 95% Confidence Intervals in Bivariate and Stratified analysis.

Ethical approval was obtained from the Ministry of Health, Republic of South Sudan (MOH, RSS). Confidentiality of information and participant rights were maintained.

Results

Maternal demographical characteristics included age, educational and employment status (Figures 1, 2 and 3). Most women had attained either a low level of education or none at all and were unemployed. They had borne siblings with an average weight of 3.0-3.5 kg.

AMTSL protocol was used to manage the third stage of labour. The use of Misoprostol tablets for prophylaxis was minimal (Figure 4) and management of PPH was through additional Oxytocin, sutures, packing or surgery (Figure 5).

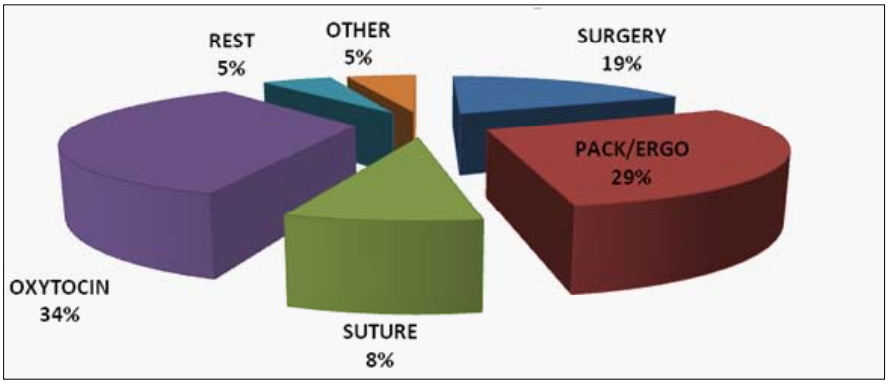

Figure 5. Types of intervention during the third stage of labour

Maternal obstetric characteristics in the form of parity (OR = 3.6, CI= 1.9,10 and p < 0.005) and gravity (OR=4.4, CI = 1.9 - 10 and p <0.005) (Table 1) were found to be significant in the development of PPH using bivariate analysis.

Age was found to confound emergency admission (OR = 5.32, CI = 2.23 - 12.68) and p value <0.005 (Table 1), Oxytocin use (OR = 0.18, CI = 0.07, 0.45) and delivery type in the development of post partum haemorrhage (Table 2). Age again tended to modify the type of delivery (OR = 0.05, CI = 0.0032 - 0.68 and p< 0,005) which were instrumental or non instrumental; in the development of PPH.

The results were not supportive of the null hypothesis and an alternative hypothesis indicated that there was an association between the risk factors of age, emergency admission, parity, and gravity in the development of PPH.

Discussion

In this study, demographic factors, maternal characteristics associated with bleeding were investigated in addition to the association of management of the third stage of labour to PPH.

The age group of 15-20 years was significant (Figure 1) indicating that teenagers had increased susceptibility to bleeding post partum after early marriage because the reproductive system was not well developed, and sufficient knowledge of reproductive health issues had not been acquired.

Most women developing PPH were either illiterate or had primary level education (Figure 2) which meant they had little knowledge of reproductive health issues, including the need to access basic health services during pregnancy. The importance of maternal and foetal wellbeing during and after delivery, and anticipation of complications were unknown. Family planning, frequent antenatal care (ANC) attendance and safety of delivery of the first baby in the hospital was not considered essential.

The majority of women were unemployed (Figure 3) and had heavy domestic tasks during pregnancy with harmful effects on child bearing and birth. Most women lived at the outskirts of the city and had problems accessing ANC and other health services.

Grand multi parity is the condition of giving birth after the 28th weeks of gestation following 5 or more previous viable babies. Grand multiparae in relation to obstetric performance are labelled as high risk. Grand multiparity has long been considered dangerous to both the mother and the foetus because of having more obstetric complications including gestational diabetes, hypertension, anaemia, placental abruption, placenta praevia, preterm labour, malpresentation, malposition, dysfunctional labour and uterine rupture. [12]. This condition requires vigilance in monitoring contractions and presentation during delivery.

Our study showed that exposure to multiparity bore a fourfold risk of developing PPH (i.e. OR = 3.6, CI= 1.9-10 and p < 0.005), (Table 3). This finding compared favourably with studies done in Nigeria where grandmultiparity was associated with primary PPH (P<0.005) among other risk factors [13].

In this study, the fourfold risk caused by multigravity (OR=4.4, CI = 1.5, 8.6 and p <0.005) (Table 3) could be explained by the laxity of the uterus and reduced strength of contraction during labour. Prolonged stages of labour and need of accentuation using oxytocics; thus increased the risks for PPH. This finding contrasted with a study by Tsu in Zimbabwe where grandmultiparity was not a significant risk factor compared to low parity, advanced maternal age and antenatal hospitalization which were strong risk factors [14].

Emergency admissions occurred unpredictably and at short notice during the ante partum period or in the immediate postpartum period due to complications occurring after home delivery or referral from another health facility. In the ante partum period admissions are positively related to delay in delivery. Nineteen (43.2%)) cases were admitted as emergencies. In this study, emergency admission indicated a fivefold risk to developing PPH (OR = 5.32, CI (2.23-12.68) and p value <0.005 (Table 3).

It had been shown before that AMTSL reduces the incidence and severity of PPH [15]. In this study, AMTSL was practiced with Oxytocin, but Misoprostol use for prophylaxis was not much in evidence (Figure 5). However, Misoprostol uterotonic prophylaxis has been shown to be effective in South Sudan where a coverage of 93.7% was

Table 1. Factors significantly associated with PPH in group variable analysis

	Variable	Cases	Control	OR	95% C I	P value	Comment
		n Col%	n Col%				
1	Entry point						
	Emergency	19(43.2%)	11(12.5%)	5.32	2.23_12.68	0.000074	OR > 1
	Out patient	25(56.8%)	77(87.5%)				
2	Gravida status						
	>5 pregnancies	20(45.5%)	14(15.9%)	4.4	1.93-10.04	0.00056	OR > 1
	<5 pregnancies	24(54.5%)	74(84.1%)				
3	Parity						
	Multiparous >5 births	16(36.4%)	12(13.6%)	3.62	1.52-8.59	0.0026	OR > 1
	Non-multiparous <5 births	28(63.6%)	76(86.4%)				
4	Oxytocin use						
	Given	28(63.6%)	80(90.9%)	0.18	0.07-0.45	0.00013	OR < 1
	Not given	16(36.4%)	8(9.1%)				

Table 2. Factors associated with PPH by age groups

Covariate	OR	95% CI	P value	Comment
1. PPH and Emergency admission Stratified by Age Group				
15-20	13.3	1.36-130.3	0.016*	Effect Modification & Confounding
>20-25	9.3	1.67-52.06	0.013*	
>25-30	4.7	1.03-21.65	0.048*	
>30-35	1.5	0.06-40.6	0.714*	
2. PPH and Oxytocin use Stratified by Age Group				
15-20	1.13	0.09-13.7	0.71*	Effect Modification
>20-25	0.06	0.009-0.47	0.0086*	
>25-30	0.16	0.03-0.72	0.017*	
3. PPH and type of delivery Stratified by Age Group				
>20-25	0.05	0.0032-0.68	0.004*	Effect Modification
>25-30	0.71	0.11-4.65	0.54*	

achieved [16]. Oxytocin was significantly protective with p-value < 0.005, OR (0.18) and CI (0.07-0.45) indicating that exposure and outcome (PPH) were associated. These findings confirm the benefits of AMTSL.

Age was controversial and had an indirect role in the development of PPH for parity and gravity were expected to occur at older ages. However early marriage, poor ANC attendance and illiteracy could have contributed to poor response leading to emergency admissions.

Unemployment did not significantly bear on PPH development. Traumatic episiotomy, prolonged third stage of labour, retained placenta and bleeding tendencies which traditionally contribute to PPH were not significant in this study.

Limitations may have manifested as bias in recall, selection and information collection. The incidence of disease was difficult to estimate among the exposed and unexposed subjects of the study. This hospital study did not give the real picture of the situation as it was not representative of what was going on in the whole community.

Recommendations

- ANC facilities should incorporate appointments, and adequately prepare pregnant women for childbirth. Early detection of risk factors (hypertension, anaemia, etc.) should be routine. Health education should emphasize maternal and child health (MCH) aspects including diet, exercise and enhanced close monitoring of the foetus by ultrasound.
- The stages of labour should be shortened by closer monitoring, prompt recognition of delaying factors and timely intervention.
- AMTSL should be performed in ALL deliveries using an uterotonic (Oxytocin or Misoprostol). Midwives should be trained in AMTSL and provided with updated guidelines and protocols.
- Emergency and obstetric care (EmOC) facilities should be established for referral, transfer or treatment with access to well-stocked and staffed emergency facilities. In cases of shocked patients newer methods of resuscitation e.g. anti-shock garment, should be employed before any envisaged blood transfusion.

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