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Prevalence and Risk Factors of Postpartum Hemorrhage among Women Delivering through Spontaneous Vaginal Delivery at Kampala International University Teaching Hospital, Bushenyi District

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ABSTRACT

Worldwide it is approximated that 536,000 mothers die from complications related to pregnancy and child births, with over 99% of which occur in Africa and Asia. Moreover, Postpartum hemorrhage (PPH) is a leading cause of maternal mortality. However, few studies have identified risk factors for PPH in Uganda. Therefore, this study was intended to identify the prevalence and risk factors associated with PPH among women delivering through spontaneous vaginal delivery in Kampala International University Teaching Hospital. This study utilized a descriptive cross-sectional design on 100 among women who had delivered virginally in the last six months before the study. Collected data was entered and analyzed using SPSS 25. Both chi square and binary logistic regression we applied to identify risk factors for PPH. The prevalence of PPH was found to be 10.0 %. The risk factors were, a history of PPH (AOR=59.33; 95%CI=5.704-617.221) and Multiple pregnancy (AOR=9.89;95%CI=0.569-171.871). Based on the above findings, women with a history of PPH and multiple pregnancy are at highest risk of PPH. Risk factors identified in this study should be included in future risk prediction models for PPH.

Keywords: prevalence, risk factors, postpartum hemorrhage, women, spontaneous vaginal delivery

INTRODUCTION

Worldwide, postpartum hemorrhage (PPH) affects approximately 2 - 11% of all women who give birth and is associated not only with nearly one quarter (25%) of all maternal deaths globally but is also the leading cause of maternal mortality in most low-income countries [1-4]. PPH is a significant contributor to severe maternal morbidity and long-term disability as well as to a number of other severe maternal conditions generally associated with more substantial blood loss, including shock and organ dysfunction [5-6]. Prevalence of PPH ≥500 ml ranged from 2.55% in Asia to 10.45% in Africa. Also, the prevalence of primary and Secondary PPH is approximately 6% and 1.86% of all deliveries, respectively [7-8]. In Uganda, the overall Prevalence of postpartum hemorrhage was 9.0 %, and of severe postpartum hemorrhage (1000 mls or more) was 1.2 % [9]. The exact Prevalence of PPH at Kampala International University Teaching Hospital (KIUTH) is currently unknown. In a study carried out in Uganda, the risk factors for postpartum hemorrhage among all deliveries were: cesarean section delivery, multiple pregnancy, fetal macrosomia ≥4000 g, and HIV positive sero-status [9], while other intrapartum risks for PPH include: Labor of >12 hours with a 2 x risk; Emergency caesarean section with a 4 times risk; Retained placenta with a 5 times risk; episiotomy with a 5 times risk; Baby weight >4 kg with a 2 x risk; Maternal pyrexia in labor with a double risk. Currently no study documents the associated risk factors for PPH in labor induction in Uganda and yet the Prevalence of postpartum hemorrhage is high despite use of uterotonics during active management of third stage of labor [9-14]. With the available data showing little knowledge on the Prevalence of PPH following labour

induction, as well as the controversy regarding the possible risk factors or reason for PPH in IOL, there remains a need to assess the Prevalence of PPH in induced labor and the associated risk factors for PPH in these mothers.

METHODOLOGY

Study Design

A retrospective cohort study design was used to study mothers who had gone into labour between the months of January 2020 - February 2021. Patient records were used to obtain the data required in this study during the study period.

Study area

The study was conducted at KIU-Teaching Hospital (Private Not for Profit Hospital).

Target Population

All mothers who underwent spontaneous of labor

Study Population

All patients who had underwent spontaneous labor with eventual delivery at KIUTH

Sampling Technique

The patient files were selected using a non-biased simple random sampling technique.

Sample Size Determination

The sample population of the study was obtained using Kish and Leslie formula;

Where:

n = Sample size

= ± 5%, Marginal error

Z =1.96, Standard deviation corresponding to 95 % Confidence Interval

P = 20% induced labour is associated with PPH

Given that; Z = 1.96, P = 0.20, and d =0.05

Therefore, n = 0.614656/ 0.0025=246

Considering record discrepancies expected, 10% was added, that is, 25 patient files.

Thus the sample size was 271 patient files.

Sampling Procedure

Consecutive sampling of patient records without replacement was carried out until the sample size was obtained.

Selection Criteria

The files were chosen according to the inclusion and exclusion criteria described below.

Inclusion Criteria

All patients records of mothers who delivered following induction of labor at KIUTH during the period of February January 2020 to February 2021.

Exclusion Criteria

All patients records of mothers who did not undergo spontaneous labor at KIUTH.

Data Analysis and Presentation

Data was sorted, coded, and checked for consistency. It was entered into Ms Excel spreadsheet application software for organization and then exported to STATA 14.2 for comprehensive analysis. Data sets were analyzed using multinomial logistic model, then cross tabulated and presented in odds ratios (OR), figures, proportions, percentages, correlations, central tendencies and dispersions.

Ethical Consideration

The final draft of the research proposal was submitted to the research and ethics committee and academic board of school of clinical medicine and dentistry KIU-western Campus for approval. After these administrative and ethical clearances, the researchers(I) sought clearance to obtain and utilize the patient files for study purposes before enrolling them into the study from the records department of KIUTH maternity department.

Ethical including privacy of respondents and confidentiality of information extracted from the respondent was ensured.

RESULTS

The mean age of the 100 participants was 27.9 (SD 4.3) years. The majority of the women 86 (86%) were between 21-34 years. Most of the women (80%) were married while only 20% had tertiary education. Table 1.

Table 1: Socio-demographic Characteristics the Study Population

Characteristics		Frequency	Percent
Age of participant	≤20	6	6.0
	21-34	86	86.0
	≥35	8	8.0
	Total	**100**	**100.0**
Marital status	married	80	80.0
	unmarried	20	20.0
	Total	**100**	**100.0**
Education level	Non-formal	10	10.0
	primary	60	60.0
	secondary	10	10.0
	Tertiary	20	20.0
	Total	**100**	**100.0**
Employment	employed	20	20.0
	unemployed	80	80.0
	Total	**100**	**100.0**

Majority of women (92%) delivered between 37-41 weeks of gestation, 93% delivered by SVD and 94% of the babies weighed between 2500-4499 grams. Only 5% had history of PPH in their last pregnancy. Table 2 below shows details.

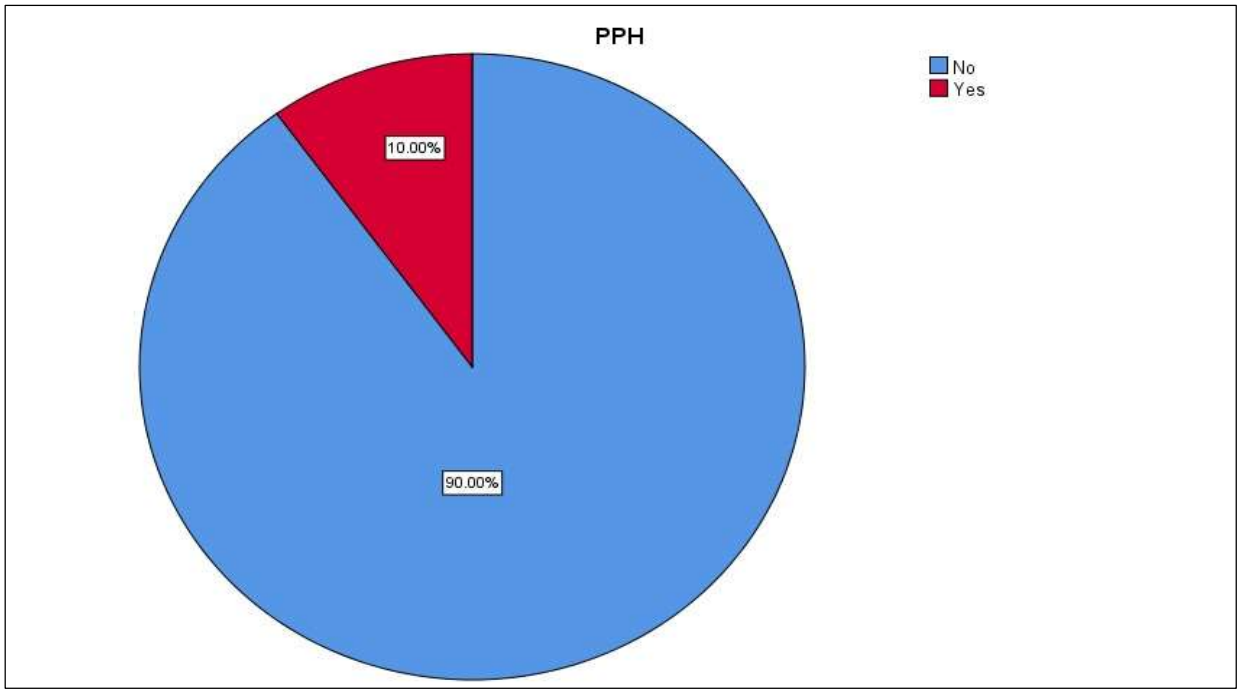
Table 2: Obstetric and labor characteristics

Variables		Frequency	Percent
Parity	primiparity	10	10.0
	2-4	66	66.0
	5+	24	24.0
	Total	**100**	**100.0**
Gestational age at birth	<37	4	4.0
	37-41	92	92.0
	>41	4	4.0
	Total	**100**	**100.0**
multiple pregnancy	yes	2	2.0
	No	98	98.0
	Total	**100**	**100.0**
History of PPH	Yes	5	5.0
	No	95	95.0
	Total	**100**	**100.0**
Duration of labor	Normal	98	98.0
	Prolonged	2	2.0
	Total	**100**	**100.0**
Induced labor	yes	6	6.0
	No	94	94.0
	Total	**100**	**100.0**
Trauma at delivery	yes	3	3.0
	Non	97	97.0
	Total	**100**	**100.0**
Birth weight	<2500g	1	1.0
	2500-4499g	94	94.0
	>4500g	5	5.0
	Total	**100**	**100.0**
HIV status	yes	10	10.0
	No	90	90.0
	Total	**100**	**100.0**

Prevalence of PPH

The study shows that women who had PPH were 10 constituting 10%. Majority 90% did not have PPH as shown in figure 1 below.

Figure 2: Prevalence of PPH



The association between demographic characteristics and PPH is shown in table 3 below. Majority of women who had PPH were aged between 21-34 (60%), were unmarried (70%), had tertiary education (80%), and were employed (70%). All these were found significant (P≤0.05).

Table 3: Association between demographic characteristics and PPH

Variables	PPH		X^2	P Value
	No	**Yes**		
Age (years)	**	**	7.89	0.019
<20	5 (5.6%)	1 (10%)		
21-34	80 (88.9%)	6 (60.0%)		
>35	5 (5.6%)	3 (30.0%)		
Marital status	**	**	17.36	<0.001
married	77 (85.6%)	3 (30.0%)		
unmarried	13 (14.4%)	7 (70.0%)		
Education level	**	**	25.19	<0.001
Non-formal	10 (11.1%)	0 (0.0%)		
primary	58 (64.4%)	2 (20.0%)		
secondary	10 (11.1%)	0 (0.0%)		
Tertiary	12 (13.3%)	8 (80.0%)		
Employment status	**	**	17.36	<0.001
employed	13 (14.4%)	7 (70.0%)		
unemployed	77 (85.6%)	3 (30.0%)		

Majority of the women who had PPH (90%) had normal duration of labor, had a singleton pregnancy (90%), and were not induced for labor (90%). However, analysis shows that only gestational age at birth, multiple pregnancy, history of PPH and duration of labor were found significant ($P \leq 0.05$). Table 4 below shows details.

Table 4: Association between PPH and obstetric/labor characteristics

Variables	PPH		X^2	P Value
	No	**Yes**		
Parity	**	**	4.27	0.118
primiparity	9 (10.0%)	1 (10.0%)		
2-4	62 (68.9%)	4 (40.0%)		
5+	19 (21.1%)	5 (50.0%)		
Gestation age at birth	**	**	7.73	0.021
<37	4 (4.4%)	0 (0.0%)		
37-41	84 (93.3%)	8 (80.0%)		
>41	2 (2.2%)	2 (20.0%)		
Multiple pregnancy	**	**	3.63	0.057
yes	1 (1.1%)	1 (10.0%)		
No	89 (98.9%)	9 (90.0%)		
History of PPH	**	**	28.66	<0.001
Yes	1 (1.1%)	4 (40.0%)		
No	89 (98.9%)	6 (60.0%)		
Duration of labor	**	**	3.63	0.057
Normal	89 (98.9%)	9 (90.0%)		
Prolonged	1 (1.1%)	1 (10.0%)		
Induced labor	**	**	0.315	0.575
yes	5 (5.6%)	1 (10.0%)		
No	85 (94.4%)	9 (90.0%)		
Birth weight (grams)	**	**	14.68	0.001
<2500	1 (1.1%)	0 (0.0%)		
2500-4499	87 (96.7%)	7 (70.0%)		
>4500	2 (2.2%)	3 (30.0%)		
Trauma during delivery	**	**	1.87	0.171
yes	2 (2.2%)	1 (10.0%)		
Non	88 (97.8%)	9 (90.0%)		
HIV status	**	**	0.001	1.000.
yes	9 (10.0%)	1 (10.0%)		
No	81 (90.0%)	9 (90.0%)		

Binary logistic regression analysis of risk factors of PPH

Factors which were significant at chi square analysis were further analyzed using binary logistic regression. Table 5 shows factors which remained significant. Women who were employed were 14 times likely to have PPH than unemployed ones and this was significant (P=<0.001; OR=13.82; 95%CI=3.163-60.390). Multiple pregnancy was also significantly associated with PPH (P=<0.001). Women who had multiple pregnancy had a 10 times risk of developing PPH compared to those with singleton pregnancy (OR=9.89; 95%CI=0.569-171.871). Having a history

of PPH in the previous pregnancy was associated with PPH (P=0.001). Women with previous history of PPH were 59 times more at risk of PPH than those with no previous history of PPH (OR=59.33; 95%CI=5.704-617.221).

Table 5: Binary logistic regression analysis of risk factors of PPH

Variables	P value	[A]OR	95% C.I.	
			Lower	Upper
Employment status Employed	<0.001	13.82	3.163	60.390
Unemployed	1			
Multiple pregnancy yes	<0.001	9.89	0.569	171.871
No	1			
History of PPH yes	0.001	59.33	5.704	617.221
No	1			

DISCUSSION

The purpose of this study was to determine the prevalence and risk factors of postpartum hemorrhage among women delivering through SVD at Kampala International University Teaching Hospital. This study demonstrated that, the overall prevalence of PPH was 10.0 %. The prevalence of PPH in this study is higher than the global rate of 6 % reported by ACOG, (2017). However, this finding is comparable to the prevalence of Sub-Saharan Africa of 10.5 % reported by Pantoja *et al.* [15] and 9.0% among rural women in Uganda reported by Ononge *et al.* [9]. This high incidence of PPH in this study may have been influenced by the characteristics of the study population; these were rural women that are reported to have higher rates of PPH. Studies that have compared urban and rural women have reported higher rates of PPH in the later [16],[17] [18][19] [20][21]. The high rates in rural areas could be related to poor methods of assessing postpartum hemorrhage like visual estimation of blood loss which cannot correctly estimate the amount of blood loss. The risk of PPH increased by 10-fold in multiple pregnancy. This is consistent with previous studies that report multiple pregnancy being associated with PPH [17][22][23]. The over distension caused by multiple pregnancy increases the risk of uterine atony. In addition, the large placental size in multiple pregnancy increases the surface area for bleeding after delivery. The study findings showed that employed women were more likely to have PPH than unemployed ones. Though a review of literature show that there is no significant difference in PPH rates between employed and unemployed women, one subsequent study showed an association of PPH with employment status [18][23]. However, the mechanism through which employment status increases risk of PPH is not known.

CONCLUSION

The prevalence of PPH in this study was high. The strongest risk factors for PPH were a history of PPH and multiple pregnancy. By identifying these women, adequate resources and staff could be mobilized in preparation for severe bleeding at the time of delivery.

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