Determinants of Postpartum Hemorrhage and its Clinical Outcome at Turai Yaradua Maternity and Children Hospital Katsina, Nigeria

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Background: Postpartum haemorrhage is a common life-threatening emergency in the developing world and its frequency and magnitude are at obstetric peril. Postpartum haemorrhage is the commonest cause of maternal morbidity and mortality after vaginal delivery and constitutes a significant morbidity rate and potential for maternal death. **Aim**: The study explored the determinants of Postpartum haemorrhage and document its associated clinical morbidity in the study settings. Patients were recruited from the record department of Turai Yaradua Maternity and Children Hospital Katsina and an adapted World Health Organization instrument was employed for the study. **Methods**: Data were obtained retrospectively from 2012 to 2016 from the records department of Turai Yaradua Maternity and Children Hospital Katsina and the obtained data were coded and analyzed using SPSS Version 20. **Results**: The results showed that most of the patients were above 25years with mean age of 19years and significant number of the patients 41.8% were from low socio-economic background and largely multiparous. Uterine atony and pelvic trauma were significantly found to be the independent determinants of Postpartum hemorrhage r=0.712,P< 0.001 and r=0.621,P<0.001 respectively. In addition, maternal mortality rate of 10.9% and 9.0% were significantly found to be the most common clinical outcome of Postpartum hemorrhage among the studied group. **Conclusion**: The study concluded that uterine atony and pelvic trauma are the major determinants of Postpartum hemorrhage and coagulopathy been the least commonly associated predictor of Postpartum hemorrhage ,and therefore recommends the need for improved obstetric services and inter-professional collaboration with adequate health educational strategy at the study settings to check-out the burden of the problem.

Keywords: *Postpartum haemorrhage, Mortality, Determinants, Health*

Introduction

Globally, an estimated number of 830 women die from pregnancy or childbirth-related complications around the world every day(WHO, 2014). In the same report, 52% of maternal deaths are attributable to three leading preventable causes-haemorrhage, sepsis, and hypertensive disorders. WHO statistics suggest that 25% of maternal deaths are due to postpartum haemorrhage (PPH). Postpartum bleeding is the quickest of maternal killers; can kill even a healthy woman within two hours, if not treated. In the developing world, several countries have maternal mortality rates in excess of 1000 women per 100,000 live births, and World Health Organization statistics suggest that

60% of maternal deaths in developing countries are due to PPH, accounting for more than 100,000 maternal deaths per year (WHO, 2014). A Practice Bulletin from the American College of Obstetricians and Gynecologists places the estimate at 140,000 maternal deaths per year or 1 woman every 4 minutes. The rate of postpartum bleeding increases annually, and the rate of atonic PPH continues to remain the leading cause globally (Ijaiya, Aboyey and Abubakar, 2003). Regional reports reveal that maternal mortality ratio(MMR) in developing countries is 239 per 100 000 live births versus 12 per 100 000 live births in developed countries(WHO, 2014). Thus 99% of all maternal deaths occur in developing countries with more than half of these deaths occur in sub-Saharan Africa and almost one third occur in South Asia. A very small proportion, 1% of maternal deaths occur in the developed world. There are large disparities between countries, but also within countries; maternal deaths are more in low-income groups and rural areas as compared to high-income groups and urban areas. In another survey, an estimated maternal mortality rate revealed that nearly 800 women die daily due to birth complications regionally and 440 occurred in sub-Saharan Africa with postpartum haemorrhage being the main cause(NDHS is 2013). Common causes of postpartum bleeding are related to the failure of the healthcare system, inaccurate estimation of blood loss after delivery and lack of skills to prevent and manage postpartum bleeding (Walraven, Wanyonyi &Stone 2008). Special attention is needed with emphasis on regular attendance of antenatal clinic, proper information concerning pregnancy and delivery, skills to accurately estimate blood loss, and prevention and management of postpartum bleeding (Walraven, Wanyonyi Stone 2008). Postpartum haemorrhage is the leading cause of maternal mortality rate in areas where essential care and skilled health attendants are limited. Basic Emergency Obstetric Care and arrangements for timely referral to the big hospital with facilities must be practised everywhere. A prognosis of a 3% risk of death is associated with postpartum haemorrhage in developing world (WHO, 2014).

A combination of quality antenatal care, skilled care at birth by active management of the third stage of labour, the availability of high-quality emergency obstetric care (with trained medical personnel and adequate infrastructure) and improved access to these services are essential to save many maternal lives (WHO, 2014).

The increased frequency of PPH in the developing world is more likely reflected by the rates given above for expectant management because of the lack of widespread availability of medications used in the active management of the third stage (WHO,2014). Several factors also contribute to much less favourable outcomes of postpartum bleeding in developing countries. The first is a lack of experienced caregivers who might be able to successfully manage postpartum bleeding if it occurred(Walraven, Wanyonyi &Stone 2008). Additionally, the same drugs used for prophylaxis against postpartum bleeding in active management of the third stage are also the primary agents in the treatment of postpartum bleeding. Lack of blood transfusion services, anaesthetic services, and operating capabilities also play a role. More so, co-morbidities are more commonly observed in developing countries and combine to decrease a woman's tolerance of blood loss (WHO,2014).

Materials and Methods
A retrospective descriptive study design was employed. The study was conducted at Turai Umaru Yaradua Maternity and Children Hospital (TUYMCH), located in the Katsina metropolis. Katsina is the capital of Katsina State with a population of 318,459 in 2006 census. The State has a total population of 5,792,578 (provisional 2006 census figure). The facility of study provides secondary and tertiary healthcare services in Neonatology and Obstetrics and Gynecology for patients mainly from Katsina metropolis and surrounding Local Government Areas. The

maternity wings of these hospitals attend to booked, unbooked, and emergency cases. About 27 deliveries are conducted daily with an annual delivery rate of 3,600. Deliveries are both vaginal (spontaneous and assisted) and operative. Turai Yaradua MCH is in Katsina State in the Katsina urban Area lying between N1204114511 to N1304015011 and E00703111011 to E00704114511 in Katsina State. The area is located at the centre of Hausa plains, at the extreme Northern part of Nigeria majorly of Hausa and Fulani population and densely populated. An adapted instrument based on World Health Organization criteria was employed and ethical clearance was sought from the ministry of health MOH/ADM/SUB/1152/2/464. The data were obtained by the primary investigator and research assistants. The process involved the use of hospital patients folders, maternity register, theatre records and postnatal ward statistics. The obtained data were tallied and analyzed using mean, and odd ratios and presented in frequency, percentages, tables and charts.

The researcher meticulously adhered to the ethical principles and guidelines governing public health research during the study after securing ethical approval from the ethical review board of the hospital.

Results

Table 1: Showing the number of deliveries in Turai Yaradua Maternity and Children Hospital Katsina between 2012 and 2016

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2012	140	213	285	172	177	236	225	272	181	281	208	217
2013	192	251	199	196	249	215	268	265	314	240	242	283
2014	342	400	373	324	392	276	273	249	507	287	254	269
2015	177	343	430	494	450	565	526	406	651	305	422	435
2016	418	379	421	449	433	429	421	416	461	464	305	418

The table above shows the number of deliveries at the study settings. It is obvious that the highest number of deliveries was in January and December in 2016 and with the lowest number of deliveries in 2012. Others are reflected in the table above.

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2012	140	213	285	172	177	236	225	272	181	281	208	217	2607
2013	192	251	199	196	249	215	268	265	314	240	242	283	2914
2014	342	400	373	324	392	276	273	249	507	287	254	269	3946
2015	177	343	430	494	450	565	526	406	651	305	422	435	5204
2016	418	379	421	449	433	429	421	416	461	464	305	418	5014
TOTAL	1269	1586	1708	1635	1701	1721	1713	1608	2114	1577	1431	1622	19685

Table 2: *Showing Number of Cases of Postpartum Haemorrhage in Turai Yaradua Maternity and Children Hospital Katsina between 2012 and 2016*

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2012	7	12	13	2	9	10	14	10	1	5	7	10
2013	6	3	2	7	4	6	10	4	7	6	18	11
2014	5	13	10	13	4	15	11	8	6	21	12	10
2015	0	14	17	25	14	49	27	10	29	4	23	7
2016	7	6	17	25	12	13	11	6	7	11	4	7

It is clear from the table above, that postpartum bleeding was highest I June 2015, and with the lowest cases of postpartum bleeding in September 2012.

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
2012	7	12	13	2	9	10	14	10	1	5	7	10	100
2013	6	3	2	7	4	6	10	4	7	6	18	11	84
2014	5	13	10	13	4	15	11	8	6	21	12	10	128
2015	0	14	17	25	14	49	27	10	29	4	23	7	219
2016	7	6	17	25	12	13	11	6	7	11	4	7	126
TOTAL	25	48	59	72	43	93	73	38	50	47	64	45	657

Table 3: *Showing number of deliveries in Turai Yaradua Maternity and Children Hospital Katsina between 2012 and 2016 (Annual Summary)*

Year	Number of deliveries	Cases of postpartum haemorrhage	Percentage of postpartum cases
2012	**2607**	**100**	**3.8%**
2013	**2914**	**84**	**2.9%**
2014	**3946**	**128**	**3.2%**
2015	**5204**	**219**	**4.2%**
2016	**5014**	**126**	**2.5%**

It is clear that the number of deliveries does not correspond to the number of postpartum bleeding at the study settings. It is shown that 2012 had the highest percentage of postpartum bleeding despite the lowest number of deliveries in the same year. However, is noted that 2016 had the highest number of deliveries with the lowest percentage of postpartum bleeding.

Table 4: *Showing the primary cause of Postpartum Haemorrhage in Turai Yaradua Maternity and Children Hospital Katsina between 2012 and 2016*

Causes of PPH	2012	2013	2014	2015	2016	TOTAL
Uterine Atony	74	58	89	90	107	418 (67.8%)
Trauma	15	16	21	20	48	120 (19.4%)
Retained Products	10	9	16	17	18	70 (11.3%)
Coagulopathy	1	1	2	2	3	9 (1.5%)
TOTAL	100	84	128	129 219	176 126	657

It is obvious from the table that Uterine atony was the leading cause of primary postpartum bleeding.

Table 6: Showing number of maternal mortalities as a result of Postpartum Haemorrhage in Turai Yaradua Maternity and Children Hospital Katsina between 2012 and 2016 (Annual Summary)

Year	Cases of Post Partum Haemorrhage	Number of Mortality	Percentage of Mortality Cases
2012	**100**	**9**	**9%**
2013	**84**	**4**	**4.8%**
2014	**128**	**14**	**10.9%**
2015	**219**	**10**	**7.8%**
2016	**126**	**14**	**8%**
Total	**657**	**51**	**8.3%**

The table shows that 2014 had the highest number of maternal mortality across the study period.

Table 7: *Determinants of Postpartum Haemorrhage in Turai Yaradua Maternity and Children Hospital Katsina*

Variable	Frequency	Percentage(%)	P-value	Odd ratio
Determinants				
Uterine atony	418	67.8	0.40	0.001
Trauma	120	19.4	0.22	0.003
Retain product	70	11.3	0.21	0.72
Coagulopathy	9	1.5	0.32	2.01

The table above shows that patients with coagulopathy are twice at risk of developing postpartum bleeding as opposed to other determinants.

Discussion

In this study, the demographic observation shows that most subjects are between the age of 19 to 45 years with mean age of 22years, similar demographic observations was noted in Nigeria and African countries (Onange,Mirambe,Wandbay 2016, Green et.al., 2016). The global prevalence of primary postpartum haemorrhage is estimated at 6% of all deliveries, with prevalence figure varying between region to region. The prevalence in this study is 3.6%, this findings is relatively less than the African report of 5.1%. Similar findings have been reported in Nigeria where 4.28% was documented (Greek *et al*., 2016). The variations existed in this study could be linked to the study settings where secondary health care centre was used and other studies were conducted at the tertiary or referral centres which invariably affects the quality of obstetric services and patient turnout. Higher prevalence of 6%,and 7% have been reported by some studies in Europe (Gibbs, Ronald 2008), and lower prevalence have equally been reported by some studies (Eteuka,Itana,Asuguo 2000, Lynch,Christopher 2006, Say, Chou, Gemil 2014). The similarities and the differences in these studies may be due to the criteria used in defining primary postpartum bleeding. Uterine atony is still the leading cause of primary postpartum bleeding worldwide whether it is assessed by spontaneous vaginal delivery or ceassarean section (WHO,2014, Week, 2015, Anderson & Etches, 2007). It is also the leading cause of primary postpartum bleeding in this study .The mortality rate of primary postpartum hemorrhage in this study is 8.3% . This findings seems to be higher compared to the global target, the possible explanation to this higher mortality rate could be associated to the poor obstetric services at the study settings and late patients presentation to the hospital . Higher mortality rate have been reported in other African studies (Barbieri, 2009, WHO 2014).

Conclusion

The prevalence of primary postpartum haemorrhage in this study is 3.6%%, while uterine atony was the leading cause. Efforts should be made to improve surgical skills aimed at reducing blood loss at the surgery. The training and re-training of skilled birth attendants on the active management of third stage of labour should be made a routine. Provision of skilled care at every delivery will go a long way to reduce the incidence and the morbidity and mortality associated with primary postpartum haemorrhage.

Advocacy and public enlightenment campaigns on the benefits of antenatal care and institutional delivery will assist in the reduction of maternal mortality associated with primary postpartum haemorrhage.

✧ No conflict of interest has been declared

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