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A Case For Training of Unskilled Obstetric Practitioners And Referral Cascade In The Maternal Healthcare Service in The Niger Delta, Nigeria.

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Abstract
Backround:*Obstetric services in the Niger Delta area of Nigeria is offered by both skilled and hugely unskilled practitioners. The Delta is therefore heralded with high maternal and perinatal mortality and morbidity.*
Objectives:*The aim of the study is to determine the categories of obstetric practitioners in the Niger Delta, evaluate their association with maternal and perinatal outcomes and if there are shortcomings in their care, to recommend urgent need for their structured training.*
Method:*This was a descriptive cross-sectional study. Data on obstetric qualification of carers were collected from 58 health facilities in four local Government areas of Rivers State. A 4-year review of pregnancy outcomes for both booked and unbooked patients with the University of Port Harcourt Teaching Hospital using the annual report for the years 2011-2014 was also conducted.*
Results:*14 categories of obstetric practitioners - 5 skilled SOP and 9 unskilled USOP were identified. Obstetric outcome was worse in the unbooked patients managed by USOP than the booked ones managed by SOP on the basis of major obstetric complications ($p < 0.001$), maternal and perinatal mortality rate ($P < 0.001$ respectively) and yearly caesarean section rates ($p < 0.001$).*
Conclusion*: The adverse outcomes associated with the care offered by USOP underscore the urgent need for their training and introduction and actualisation of referral guidelines in the Niger Delta.*
Keywords*:Maternal healthcare, Niger Deltatraining, Unskilled practitioners, Referral cascade,*

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I. Introduction

One of the main predictors of maternal and perinatal mortality in Nigeria isa unskilled obstetric practitioner. The WHO defines a skilled birth attendant SBA as 'someone trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns. [1] The Millennium Development Goal MDG for skilled birth attendants SBAwas not achieved. It was 53.6.0 in 2012 and 58.6% in 2014. [2]The gap between the end-point status of 58.6% and the desired 100% to achieve universal access is large and needs to be bridged as the global community implements the Sustainable Development Goals. [2]The activities of unskilled obstetric practitioners in association with other predictors and causes of maternal and perinatal mortality give rise to very high rates of the later in Africa, especially in Nigeria.Goal five of the MDGs aimedto reduce maternal mortality in Nigeria to 250:100000 by 2015. [3, 4]The last WHO figure on maternal mortality in Nigeria in 2013 stood at 560 per 100,0000 live births, placing Nigeria in the twelfth position among nations with the worst results. [5]However the figure amounted to a decline rate in MMRs from 1990 to 2013 of 52%. [2]The good news is that the Nigerian National Bureau of Statisticsgave a figure 243:100000 as the MMR in Nigeria in 2014. The MDG 5 was achieved before the scheduled date. The maincausesof maternal death in Nigeria are obstetric haemorrhage, sepsis,obstructed labour, hypertensive disorders, malaria, anemia, and HIV/AIDS. Almost all the deaths are preventable. [6, 7]The predictors of maternal mortality are poor maternal education, high parity, emergency caesarean delivery, high risk patients, [8] the three delays namely (delay in decision to seek care, delay in reaching care and delay in receiving adequate health care), [9]non-attendance of antenatal services, poverty, care in Traditional Birth Attendants homes, Churches and Prayer houses, [10]etc.During 2009-2013, the neonataland the postneonatal (after the first month of life but before the first birthday)mortality rates in Nigeria were 37 and 31 deaths per 1,000life births respectively. [11]The majority of these deaths occur within the first week of life, mainly due to complications during pregnancy and delivery reflecting the intimate link between newborn survival and the quality of maternal

care. However, there has been some improvement – a reduction of 53 per 1000 life births to 37 per 1000 from 2003.

The main causes of neonatal deaths are birth asphyxia, severe infection including tetanus, premature birth, pneumonia and septicaemia. [12 - 17]The predictors of perinatal mortality are mother's age (more in those less than 20 and more than 36 years), lack of prenatal care, unbooked status, prematurity, [18, 19]single motherhood, rural residence, large for date babies,birth interval less than 24 months, maternal body mass index (BMI), maternal literacy, poverty and others. [20, 21]In the quest to reduce maternal and perinatal mortality rates in Nigeria, different measures have been taken by both public and private organisations in Nigeria and abroad. [22]Some of these measures are administration of highly active antiretroviral therapy from early pregnancy to prevent mother-to-child HIV transmission (PMTCT), [23]free Maternal and Child Health Care in Enugu State leading to significant increases in the uptakes for antenatal booking, hospital delivery and consequently decreased maternal and perinatal mortality, [7]training of doctors and midwives in six Teaching Hospitals to manage eclampsia using magnesium sulfate according to the Pritchard protocol, [24]]training of 458 private medical doctors and 839 nurses and midwives to offer high-quality postabortion care, postabortion family planning, and integrated sexually transmitted infection/HIV care [25] and many other measures.The applied measures have been effective in reducing maternal and perinatal mortality to certain extent but the problem is that many of those measures were not applied in the general population and also, they are not sustainable for a long time. Lack of skilled obstetric practitioners as one of the predictors of maternal and perinatal mortality and morbidity act in synergism with other factors to bring about the high MMR and PNMR that are experienced in the Niger Delta. The aim of the study is therefor to determine the categories of obstetric practitioners in the Niger Delta, evaluate their association with maternal and perinatal outcomes and if there are shortcomings in their care, to recommend urgent need for their structured training.

II. Materials And Methods

2.1 Study site: This study was carried out in the deartment of obstetrics and gynaecology, University of Port Harcourt Teaching Hospital UPTH, Port Harcourt, Rivers State, Nigeria. The obstetric unit serves as a referral centre for both urban and rural health facilities in Rivcrs State. Part of the data was collected from Health facilities in the four local Government areas LGAs of Rivers State that refer patients to the maternity unit of the University of the UPTH. The names of the LGAs, their area, population and administrative headquarters are shown in table 1

Table . Rivers State four Local Government areas of interest.

LGA Name	Area (km^2)	Census 2006 Population	Administrative capital
Port Harcourt	109	541,115	Port Harcourt
Obio-Akpor	260	464,789	Rumuodumaya
Emohua	831	201,901	Emohua
Ikwerre	655	189,726	Isiokpo
Total	1855	1,397,531	

Table 2. Health Facility sites and their respective carers in the River State of Nigeria

Health facilities	Service Provider	Number
Private Hospitals	Consultant obstetrician and Gynaecologist	5
	Non-obstetric consultants	2
	Partly managed by an obstetric trainee (Senior Registrar, Registrar, Senior House officer)	3
	Non-obstetric medical officers that also work in General Hospitals	4
	General practitioners with no formal training in obstetrics	12
General Hospitals	Medical officers with no formal training in obstetrics nor neonatal resuscitation	2
	Trained nurses and midwives	
	Auxiliary nurses / midwives	
Health centres	Nurses and midwives	10
	Community Extension worker	
	Sometimes covered by medical officers	
	Auxiliary nurses / midwives	
	No Specialist Obstetrician and Gynaecologist	
Private maternities	Trained nurses/midwives	4
	Auxiliary nurses / midwives	2
Traditional birth attendant's health facilities	Traditional birth attendant	8
Churches	Faith healers	5

Chemist/Pharmacist store	Untrained chemist/Pharmacist	7

2.2 **Methods**:

This wass a descriptive observational cross-sectional study.Firstly, were collected from 58 different health facilities in the four local Government areas of Rivers State that refer patients to the maternity unit of the University of Port Harcourt Teaching hospital UPTH. In Rivers state where this study was carried out just like any other State in Nigeria, the Primary Healthcare centres can refer patients directly to Tertiary centres. All the patients were referred with complications of pregnancy or labour. The following data was collected: the nature of the health facilities, the person that offers obstetric service (Table 2); the obstetric qualifications of the staff were also noted. Secondly, A four-years review of the pregnancy outcomes in both booked and unbooked patients with the UPTH, using the annual report for the years 2011-2014 was also carried out The booked patients were managed by skilled obstetric practitioners SOP while the unbooked patients were mostly managed by unskilled obstetric practitioners USOP. The following data were extracted from the reports: admission diagnoses of the patients, obstetric outcomes of pregnancies, caesarean section rates, MMR and causesof the mortalities.

2.3 Statistical Analysis

Data was entered in an excel file and then analysed, using Epi Info 7.2.1 software package 2015 (epi-info.reviewsoft.com). Simple proportions were used in the descriptive analysis. Bivariate analysis wascarried out. Comparison of related variables was conducted, using the Chi-square X^2 and the P-values as shown in tables 3, 4, 5 and 6. When an expected count was lower than 5 in a cell, Fisher Exact test was used. When the P-value was less than 0.05, the difference between two variables was said to be statistically significant.

III. Results

14 categories of obstetric practitioners in the four local Government areas of Rivers State were formally identified. 5 categories are skilled obstetric practitioners SOP and they are Obstetric Consultants, Senior Registrars, Registrars, Obstetric Medical Officers, andTrained Nurses/Midwives. The remaining 9 categories are unskilled obstetric practitioners USOP and they are non-obstetric

Table 3. Admission diagnoses to the antenatal and the labour wards. (UPTH Maternity Annual reports 2014).

Admission diagnosis.	Unbooked patients		Booked patients		X^2	P-Value	OR	CI
	Numb-er	% of the unboo-ked (N=293)	Num-ber	% of the booked (N=292)				
Hypertensive disorders in Pregnancy	37	12.63	46	15.75	0.68	0.4111	0.80	0.50, 1.27
PIH	0		23	7.88		0.001		
Preeclampsia	22	7.51	17	5.82	0.36	0.5488	1.29	0.67, 2.48
Eclampsia Antepartum Postpartum	15. 9 6	5.12	0	0		0.001		
Chronic hypertension	0	0	06	2.05		0.030		
Anaemic heart failure	2	0.68	0	0		0.500		
2 previous caesarean section in labor	32	10.92	0	0		0.001		
Obstructed labor	23	7.85	0	0		0.001		
Antepartum Hemorrhage	13	4.44	8	2.74	0.71	0.400	1.62	0.66, 3.97
Ruptured uterus	10	3.41	0	0		0.001		

Consultants, non-obstetric Medical Officers, General Practitioners, Senior House Officers, Community Extension Workers, Auxiliary Midwives/ Nurses, Traditional Birth Attendants, Faith Healers in Churches and Chemists / PharmacistsThe results of the analysis of the annual reports at the UPTH are illustrated in the Tables 3-7. The number of patients who presented to the hospital with severe obstetric complications namely, eclampsia, two previous caesarean sections in labour, obstructed labour and ruptured uterus is significantly greater in the unbooked than the booked patients ($p < 0.001$) (Table 3). In 2014, significant differences were noticed between the two groups of maternities with respect to the following obstetric outcomes: emergency lower segment caesarean section in twins, stillbirth rate in singleton, stillbirth rate in multiple pregnancies, early neonatal death rate for both singleton and multiple gestation and perinatal mortality rates (Table 4).

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Table 4. Deliveries at the UPTH in 2014 (UPTH annual report 2014).

Deliveries in 2014	Unbooked patients		Booked Patients		X^2	P-Value	OR	CI
	Number	% of the booked	Number	% of the booked				
Singleton	180		852					
Twins	10		17					
Triplet	0		1					
Total birth	190		870					
Caesarean section in twins	6	60% of twins	15	88.24% of twins	0.10	0.758	0.66	0.20, 2.32
ELCSC in twins	0	0	14	82.35		0.009		
EMCSC in twins	6	60%	1	5.88%		0.035		
Singleton								
Live births	127		834		6.50	0.011	0.72	0.56, 0.92
Stillbirth	53		18		127.06	0.001	13.94	7.97, 24.36
Stillbirth rate		294.44 / 1,000		21.13 / 1000				
Multiple Pregnancy								
Live births	12		35		0.70	0.402	0.63	0.27, 1.47
Stillbirth	8		2	5.41		0.013		
Stillbirth rate		400/ 1,000		54.05/1000				
Early Neonatal death (Twins & multiple pregn.	21		38		9.61	0.002	2.46	1.41, 4.28
Early Neonatal death rate		105/ 1000	42,74/ 1000					
Total babies delivered	200		889					
Total deaths	82		58		111.16	0.001	6.28	4.34, 9.09
PNMR		410 / 1000		65.24 / 1000				

Total number of perinatal deaths in the booked and unbooked mothers = 58 + 82 = 140.
Combined PNMR for the booked and unbooked patients = 140/1089 x 1000 = 128.56/1000 births.

Table 5. Caesarean section rates in women who delivered at the UPTH 2011 – 2014

Caesarean section rates	Unbooked patients		Booked patients		X^2	P-Values	OR	CI
	Number / Total deliveries	% Of total deliveries %	Number / Total deliveries	% Of total deliveries %				
2011	306/ 641	47.74	1189/ 3019	39.38	14.92	0.001	2.14	1.94 2.36
2012	415 / 593	69.98	1305 / 2820	46.28	109.21	0.001	2.14	1.94, 2.36
2013	319 / 490	65.10	954 / 2025	47.11	50.37	0.001	2,14	1.94, 2.36
2014	118/ 190	62.11	455 / 870	52.30	5.65	0.018	2.14	1.94, 2.37

Furthermore, the number of caesarean section that was performed in the unbooked patients yearly was significantly higher than that in the booked during the years 2011 - 2013 (P< - 0.001 to < 0.007); it was also so in 2014 ($p < 0.018$) (Table 5). Again these figures are alarming because they are far higher than what is obtainable in many other African countries and the developed world.The maternal mortality rate at the UPTH from 2011 to 2014 is significantly higher in the unbooked than the booked patients (Table 6.)

Table 6. **Maternal mortality rates for women who delivered at the UPTH from 2011 – 2014.**

Yrs.	Unbooked patients		Booked patients		X^2	P-Value	OR	CI
	Maternal mortality / Total births	MMR (Per 10^5 life births)	Maternal mortality / Total births	MMR (Per 10^5 life births)				
2011	21 / 641	3276.13	**4** / 3019	132.49	-	0.001		1.3217, 1.3218
201	60 / **593**	**10118.04**	17 / 2820	602.84	196.88	0.001	2.1	1.94, 2.36

2							4	
2013	**33** / 490	**6734.69**	3 / 2025	148.15	-	0.001	-	1.3217, 1.3218
2014	12 / **190**	**6315.79**	0 / **870**	0	-	0.001	-	1.3217, 1.3218

The figures for the booked patients range from **0:100,000** in 2014 to 602.84:100,000 in 2012 while those for the unbooked maternities range from 3276.13:100,000 in 2011 to 10118.04:100,000 in 2012. The above figures are equally alarming and far above the figures quoted by the WHO for Nigeria in 2013 (Trends Maternal Mortality, 2013).Table 7 shows causes of maternal death at the UPTH in 2014. 12 occurred in the unbooked patients while none occurred in the booked.

Table 7. Causes of maternal mortality at the UPTH in 2014 (UPTH maternity annual report.)

auses of maternal deaths in 2014	Number of cases
Puerperal Sepsis	4
Severe Preeclampsia/Eclampsia	2
Primary Post Partum Haemorrhage	2
Abruptio + Intrauterine Fetal Death	1
DKA + Pulmonary embolism	1
Anaemic Heart Failure	1
Ruptured Uterus	1

III. Discussion

14categories of obstetric practitioners were formally identified.On the basis of the WHO definition of skilled birth attendants SBA, in the Niger Delta, only five categories namely Obstetric Consultants, Senior Registrar and Registrar in Teaching or Specialists Hospitals, Obstetric Medical Officers and trained midwives belong to the SOP group while the remaining 9 categoriesbelong to the USOP group. The finding clearly represents what is happening today in the whole of the geopolitical regions that make up Nigeria and probably in some sub-Saharan African countries.Unfortunately, it is the USOP or USBA that provide a bigger proportion of obstetric service in the Niger Delta, especially for the unbooked patients. The last four categories namely Auxiliary Midwives / Nurses, Traditional Birth Attendants, Faith Healers in Churches and Chemists / Pharmacists have no formal training in obstetrics but prey on the ignorance of the unbooked maternities. The unchecked activities of these last four categories of USOP constitute one of the major predictors of the morbidities and the mortalities that characterise the Niger Delta, Nigeria and sub-Sahara Africa at large. There is therefore urgent need to stratify them and trainthose that are fit for training and ban those that cannot be trained.e results of the analysis of the annual reports 2011–2014 at the UPTH clearly showed worse obstetric outcomes for the unbooked patients (the category of patients that are largely managed by USBA) than the booked ones as outlined in tables 3, 4, 5, 6 and 7. Furthermore, the 12 deaths that occurred at the UPTH in 2014 were in the unbooked patients while there was none in the booked. Number one cause of deaths was puerperal infection, whichoccurred due to many factors (antenatal, intra-partum and postpartum events). The 12 deaths could have been prevented or managed appropriately if the patients were managed by skilled practitioners and timely referred to secondary or tertiary units when indicated. These findings again point out to only one conclusion - the need for training of the USBA. It also showed that those working in non-tertiary centres need to be guided by a protocol, which should identify the categories of cases to be referred for specialised care at booking and in all the trimesters of pregnancy. Trained midwives and nurses i.e. SBA continue to work independently in the Primary Healthcare across the Niger Delta.They run the booking clinic, monitor women throughout antenatal period, identify and treat or refer patients with complications of pregnancy. Worse still, they conduct labour and delivery in the health centres at night without a specialist cover. They have not been trained to do instrumental delivery nor caesarean section. Itmeans that all women in labour for whom operative delivery is indicated will not be appropriately managed. Furthermore major obstetric complications like haemorrhage, preeclampsia, Eclampsia, shoulder dystocia and many others will not be managed appropriately. The end-point of these anomalies in maternal care is increased maternal and perinatal mortality and morbidity. The situation is worse for the four last categories of obstetric practitioners that have no formal obstetric training.

The case for the general medical practitioners and non-obstetric specialist doctors is not totally different from those that have been discussed. The only obstetric knowledge that those categories of carers have is that which was acquired during three months of internship after completion of medical school. Unfortunately, they engage in all aspects of obstetric care. All these shortcomings in maternal and neonatal care can only tantamount to nothing but a complete disaster – very high maternal and perinatal mortality and morbidity.

3.1 The limitations and strengths of the study

The limitations of the study lies in the fact that the personnel that constitute each category of obstetric practitioners were not tested on their competence to perform obstetric duties. Furthermore the socio-demographic and history of the patients managed by each category of the obstetric practitioners were not included in the study.

The strength of the study lies in the fact that this is the first time that the 14 categories of obstetric practitioners in sub-Sahara Africa have been clearly defined and the urgent need for their structured training and training modules recommended. The study also made a case for full coverage of Health Centres in the Niger Delta at all time by a Medical Officer who is trained to manage obstetric emergencies since the midwives cannot effectively single-handedly manage all the complications of pregnancy and labour.Furthermore this is the first time that 'Training the Trainers Principle and patients-based effective referral system have been advocated in the maternal healthcare service in the Niger Delta sub-region.

IV. Recommendation

Although not a panacea to the problem of high maternal and perinatal mortality in Nigeria, it is recommended that the SOP should engage in continuous professional development CPD programs while the USOP in the Niger Deltashould be stratified into the categories that are fit to be trained and those that cannot be trained. Structured training programshould be designed for those that meet the criteria to be trained The peculiarity of the training is the application of the principle 'Training the trainers' whereby the trainers will be trained in different specified modules and then sent out to work with and train the USOP at their place of work using the same modules as itemised below.

1. Module 1 - In-depth theoretical review of the prevention and management of common causes of maternal morbidity and death in the Niger Delta and Nigeria at large.
2. Module 2 - In-depth theoretical review of the prevention and management of the common causes of perinatal morbidity death in the Niger Delta and Nigeria at large.
3. Module 3 - Obstetric risk assessment, Referral cascade in the Niger Delta, Management in the puerperium, Leadership, teamwork, clinical service improvement and audit, Communication and counseling skills, .
4. Module 4 - Obstetric and paediatric emergency drills, Basic life supportBLS and Cardiopulmonary resuscitationCPR in pregnancy and labour, Instrumental vaginal birth and Caesarean section,
5. Module 5 - The trained trainers working with UOP at their places of primary assignment
6. Module 6 - Fetal Monitoring.

Regarding Auxiliary Midwives/Nurses, Traditional Birth Attendants, Faith Healers in churches and Chemists / Pharmacists, there should be specifically designed training modules for the motivated ones. There may also be a need of streamlining the activities of the traditional birth attendants and faith healers to only counseling and referral to primary health care;this will only be possible through the support of the Government.

V. Conclusion

14 categories of obstetric practitioners - 5 skilled SOP and 9 unskilled USOP were clearly identified with their associated pregnancy outcomes. The increased risk of maternal and perinatal morbidity and mortality associated with the care offered by USOP underscores the urgent need for their structured training and introduction and actualisation of referral guidelines in the Niger Delta

5.1 Ethical approval

This study proposal was presented before the University of Port Harcourt ethical committee and was approved in June 2016.

5.2 Consent Disclaimer

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

2.3 Competing interests

The authors declare that they have no competing interests.

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