

PROVISION OF EMERGENCY OBSTETRIC CARE IN RIVERS STATE, SOUTH-SOUTH NIGERIA: IMPLICATION FOR MATERNAL AND NEWBORN SURVIVAL

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Abstract

The study examined the provision of Emergency of Obstetric Care (EmOC) in Rivers State health service in Nigeria. A cross-sectional research design was adopted and 31 Heads of public health facilities drawn from six Local Government Areas in Rivers State using a multistage sampling procedure participated in the study. The instrument for the study was a questionnaire. Data were analyzed using Statistical Package for Social Sciences, Analyzed data were presented using descriptive statistic of frequencies and percentages. The study revealed that provision of EmOC was moderate (54.6%) in sufficiency in theory. In compliance with United Nations recommendation, actual provision of EmOC was low (29.4%) in sufficiency for all nine signal functions. The most provided signal function was signal function-1(54.8%), signal function-2 (51.6%) and signal function-7 (51.6%) which provision were moderately sufficient. Provision of signal function-4 (41.9%) was slightly sufficient, while the provision of signal function-8 (19.4%), signal function-3 (16.3%), signal function-5 (16.3%), signal function-6 (9.7%) and signal function-9 (3.2%) were low in sufficiency. The study concluded that provision of EmOC was too low in sufficiency to reduce maternal and newborn mortality rate in Rivers State. The study recommends that political commitment is a key to ensuring maternal and newborn survival.

Key words: Provision, EmOC, signal functions, Rivers State

Introduction

Maternal mortality is a public health challenge especially in developing countries which account for about 99 per cent of the world maternal deaths (WHO Media Centre, 2017). Maternal death is death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (International Classification of Disease, 2004). The situation is more worrisome in Nigeria who has maintained an unpopular and demeaning second position in global maternal mortality with an estimated 814/100,000 live births in 2015 (Trading Economics, 2017). These aggregate figures by implication are tributaries from component states including Rivers State. The maternal mortality ratio (MMR) in Rivers State put at 889/100,000 live births is described as one of the highest in the world (Rivers State Ministry of Health, 2010). Literature, however, has it that great disparity exists in MMR between developed and developing countries. The

MMR is 239/100,000 live births in developing countries versus 12/100,000 live births in developed countries (WHO Media Centre, 2017). This disparity attests to the fact that major causes of maternal mortality can be prevented if pregnancy and childbirth-related complications are addressed. WHO, UNICEF, UNFPA and World Bank (2012) stated that approximately 15 per cent of expected births worldwide will result in life-threatening complications during pregnancy, delivery or postpartum period. According to WHO Media Centre (2017) the complications that account for about 75% of all maternal deaths are: severe bleeding (mostly bleeding after childbirth), infections, high blood pressure due to pregnancy (pre-eclampsia and eclampsia), and complications from delivery, unsafe abortion. In specific terms, globally MMR is accounted by hemorrhage (27.1%), hypertensive disorders (14.0%), and sepsis (10.7%). The rest are abortion (7.9%), embolism (3.2%) and other direct

causes (9.6%) (Say, 2014). In Nigeria, the five leading causes of maternal death include obstetric haemorrhage, eclampsia, sepsis, obstructed labour and complications of unsafe abortion (Igwegbe, Eleje, Ugboaja & Ofiaeli, 2012).

Maternal mortality due to these complications can be averted with sufficient care given at critical time points in the lives of women such as during pregnancy, childbirth and postpartum period. According to Wagstaff and Claeson (2004), an estimated 74 per cent of maternal mortality can be averted if all women received appropriate EmOC. Safe Birth (2016) also noted that EmOC is critical to reducing maternal mortality. Paxton, Bailey and Lobis (2006) defined EmOC as care provided in health facilities to treat direct obstetric emergencies that cause the vast majority of maternal deaths during pregnancy, at delivery and during post partum period. According to Say and Chou (2011), causes of maternal deaths are classified into four. These include direct, indirect, unanticipated complications of management and lastly, unknown causes. Direct causes are those related to obstetric complications of the pregnancy state (including pregnancy, childbirth and the puerperium to 42 days) such as deaths as a result of obstetric haemorrhage. Indirect causes are those related to previous existing diseases or disease that developed during the pregnancy which was not a result of direct obstetric causes but which was aggravated by the physiologic effects of pregnancy, such as cardiac conditions aggravated by pregnancy. Unanticipated complications of management are deaths related to interventions, omissions, incorrect treatment or from a chain of events resulting from any of the above during pregnancy, childbirth or the puerperium. Unknown causes are those whose causes cannot be determined and thus not attributable to either direct or indirect causes.

It is the direct causes of maternal mortality that EmOC addresses. WHO, UNFPA, UNICEF and AMDD (2009) published a handbook which focuses on the critical role of EmOC in saving the lives of women with complications during pregnancy and childbirth and saving the lives of newborns intrapartum. This handbook also referred to as United Nations Handbook for monitoring emergency obstetric care (EmOC) was earlier published in 1997 as guideline for monitoring the availability and use of obstetric services. The 1997 version contained only seven signal functions and was revised in 2009. The 2009 version replaced “guideline” with “handbook” and “essential” with “emergency”. It contains a list of nine life-saving services or signal functions that define a health facility with regard to its capacity to treat obstetric or newborn emergencies. Signal functions are defined as key medical interventions that are used to treat the direct obstetric complications that cause the vast majority of maternal deaths around the globe (WHO, UNFPA, UNICEF & AMDD, 2009). The nine signal functions include: signal function 1- administration of parenteral antibiotic, signal function 2- administration of uterotonic drugs; signal function 3-administration of parenteral anti-convulsants and signal function 4-performing manual removal of placenta. Others are signal function 5- performing manual removal of retained products, signal function 6- performing assisted vaginal delivery, signal function 7-performing newborn resuscitation, signal function 8- performing blood transfusion, and signal function 9- performing surgery such as caesarean section. As contained in the Handbook, signal functions 1-7 are referred to as Basic EmOC (BEmOC) and are expected to be performed at Basic EmOC facilities while all nine signal functions referred to as comprehensive EmOC (CEmOC) are expected to be performed at CEmOC facilities. Thus BEmOC are provided at primary health care facilities (PHCFs) while CEmOC are provided at secondary health care facilities (SHCFs) which include general hospitals and zonal hospitals in Rivers State.

The UN Handbook has also identified eight broad indicators for EmOC and defined acceptable levels for each indicator. However, Calvello, Skog, Tenner and Wallis (2015) has posited that while the indicator can be used to evaluate an entire system performance, the care being provided for each type of major emergency at the facility level also needs to be assessed. The present study is thus not focused on assessing each indicator for the purpose of categorizing facilities as basic or comprehensive EmOC facilities but in assessing individual signal functions and their level of provision in the state with particular reference to possible constraints in their provision.

The importance of EmOC in reducing maternal and newborn deaths cannot be overemphasized. WHO, UNFPA, UNICEF and AMDD (2009) has stated that in order to reduce maternal mortality, EmOC must be available. EmOC is thus an important tool for ensuring the survival of mothers and their newborns. Nour (2008), however, pointed out that pregnant women in many developing nations have minimal access to skilled labour and emergency obstetric interventions such as antibiotics, oxytocics, anticonvulsants, manual removal of placenta and instrumental vaginal

delivery which are vital to improve the chances of survival. Women in Rivers State may also share in this experience of low access to EmOC services. WHO, IJNFPA, UNICEF and AMDD (2009) stated that for women to receive prompt and adequate treatment for complications of pregnancy and childbirth facilities for providing EmOC must: exist and function; be geographically and equitably distributed; be used by pregnant women; be used by women with complications; provide sufficient life saving services; and provide good quality care. All the six items are important and are used in measuring different aspects of EmOC such as the availability, quality and utilization of EmOC. This present study is interested in measuring the sufficiency of EmOC services provided for women who have accessed the health facilities in Rivers State for health service. Provision of EmOC services is an aspect of indicator-one which focuses on availability of EmOC in facilities.

Provision of services is an aspect of quality assessment. Observation of services provided assesses the extent to which service providers adhere to service delivery standards (Measure Evaluation, 2006). In assessing level of provision of EmOC services, Donabedian model of quality was employed to ascertain provision of EmOC services (in theory). This implies ability of health facilities to perform signal functions without a specified period of time. There are three dimensions of the Donabedian model. First is the structural dimension which is concerned with availability of resources for provision of care. Second is the process dimension which is concerned with the interaction between the providers and users, that is, provision of the required care using the resources. The process dimension comprises two aspects which include, the interpersonal aspect and the technical aspect. The interpersonal aspect is concerned with the psychological aspect of care, that is, the manner in which care was provided. The technical aspect is concerned with the provision of services according to recommended standards. The third dimension of quality is the outcome dimension which centres on the result of care on the population receiving care. The present study measured the technical aspect of the process dimension of EmOC to ascertain theoretical provision of signal functions in the health facilities in Rivers State health service.

To ensure that measurement of the provision of EmOC is not only theoretical, the study also employed the recommendations of the UN to measure the actual provision of the signal functions in a consecutive three months period prior to the survey. For this purpose, the UN Handbook was employed. The UN Handbook recommends that a copy of "Form 2" be used at each facility to record the type and amount of services provided. The information compiled on this Form, the Handbook added, will enable research staff to determine whether a given facility is actually providing EmOC services (WHO, UNFPA, UNICEF & AMDD, 2009). The Handbook also recommends that if a signal function was not performed in the past three months prior to the survey, the reason as to why it was not performed should be stated. In this regard, a range of five reasons were outlined in the Handbook. These reasons and their definitions as provided in the Handbook include:

1. Training Issues: This means a situation where authorized cadre is available but not trained or there is lack of confidence in providers' skills.
2. Supplies, equipment issues: This is concerned with a situation where supplies or equipment are not available, not functional or broken or needed drugs are unavoidable.
3. Management issues: This involves a situation where providers desire compensation to perform this function, providers are encouraged to perform alternative procedures or providers are uncomfortable or unwilling to perform procedure for reasons unrelated to training.
4. Policy issues: This is concerned with a situation where required level of staff is not posted to the facility in adequate number (or at all), or national or hospital policies.
5. No indication: This implies a situation where no client needing this procedure came to the facility during this period.

Furthermore, the Handbook recommended other areas to be assessed using "Form 2". These include, number of women giving birth, number of caesarean sections, number of women with direct obstetric complications, number of maternal deaths due to direct obstetric causes and number of indirect maternal deaths.

In addition to the above, Calvello, Skog, Tenner and Wallis (2015) stated that the successful completion of a signal function indicates the existence of a functional system of emergency care which implies a culmination of knowledge, intervention and supplies. The authors added that if any

aspect of the signal function is absent, then the function can not be accomplished. By implication, successful completion of any signal function in Rivers State health service indicates the existence of a functional EmOC in the system and vice versa. Given the understanding that some degree of EmOC are provided in health facilities by skilled birth attendants and with requisite supplies, there is need to study the sufficiency of provision of EmOC services. Thus, individual signal functions, resources available for provision of the particular signal function and reasons for not performing the particular signal function in a consecutive three months period preceding visit to the health facility for the survey were considered in this study as provided in the UN Handbook. Furthermore, the guideline in its "Form 2" added that the most common causes of maternal mortality as well as obstetric cases that occurred in the facility should be identified. Thus the study also sought to identify the common causes of maternal mortality and the obstetric cases that occurred during a one calendar year period in health facilities under the Rivers State health service.

Rivers State Government is committed to reducing her maternal and child deaths. This is evidenced in the implementation of global and national programmes such as Safe Motherhood Initiative (SMI), Integrated Maternal, Newborn and Child Health (IMNCH), Midwifery Service Scheme and many others which are aimed at reducing maternal and child mortalities. EmOC are provided in PHCFs and SHCFs according to respective capacities of the health facilities. In spite of the availability of these facilities and provision of services maternal and newborn mortalities are still high suggesting need for investigation. Health service including, EmOC provision in Rivers State is by public and private sectors. Private individuals or groups own and finance the private sector while the public sector is owned and financed by government. The public (governmental) sector in Rivers State provide health services through three predominant health agencies which include, University of Port Harcourt Teaching Hospital, owned by federal government; PHCFs run by Rivers State Primary Health Care Management Board (RSPHCMB) and SHCFs including zonal and general hospitals run by Rivers State Hospitals Management Board (RSHMB) (Rivers State Ministry of Health, 2010). RSPHCMB and RSHMB as well as their health facilities which they oversee, constitute Rivers State health service.

Much, however, has been published about EmOC in different parts of the world. Previous studies carried out at international, national and sub-national levels have reported inadequacy or lack of EmOC services. At the international level, a study conducted on status of EmOC in six developing countries including, Kenya, Malawi, Sierra Leone, Nigeria, Bangladesh and India by Ameh et al. (2012) reported lack of availability of EmOC across the six countries. The study also found that quality of services offered was inadequate with many of the health facilities unable to provide all nine signal functions. In Nigeria, a study conducted by Saidu et al. (2013) in South West Nigeria found that most of the UN indicators were not met by the health facilities in Kwara State. In addition, a study in Rivers State, South-South Nigeria carried out by Meze-Okoye, Adeniji, Tobin-West and Babatunde (2012) also reported that no facility met the UN recommendations for Basic EmOC facility. Another study in Rivers State on EmOC by Ebuchi, Chinda, Sotunde and Oyeto Yan (2013) compared health worker knowledge, attitude and practice regarding EmOC in rural and urban areas. The study found that knowledge and practice of EmOC is higher among urban health workers, whereas rural health workers had more positive attitude than their urban counterparts. Most of the above studies have centred on assessing broad indicators as provided in the Handbook and classifying facilities as BEmOC and CEmOC (Mezie-Okoye et al., 2012; Saidu et al., 2013). Another study has assessed health workers' knowledge, attitude and practice in Rivers State (Ebuchi et al., 2012).

From the foregoing, EmOC in Rivers State is yet to be fully explored. Yet, United Nations (2014) has emphasized that in the post-2015 era, emphasis is being placed on the need to capture disaggregated data that would allow for identifying areas at most need, type of need in those areas and how best to implement interventions that address those needs. Banke-Thomas et al. (2016) stated that there is need to capture signal function performance based on three indices critical for its conduct including, drugs, equipment and personnel. To the best knowledge of the researcher, no study has been reported in Rivers State that have tried to disaggregate provision of signal functions with particular reference to resources for provision of signal functions and reasons for not performing each signal function in a consecutive three months preceding survey. This study was carried out to fill this gap in literature. The findings of this study will help policy-makers and Rivers State Government to plan strategies that can help achieve maternal and newborn survival in the state.

Statement of the Problem

Primary and secondary health care facilities in Rivers State health service provide EmOC as basic and comprehensive EmOC respectively. This is to avert complications which may arise during pregnancy, childbirth or postpartum period. This is on the premise that while some pregnancies and childbirth sail through normally without harm to mother and/or her newborn, about 15 per cent end up with life threatening complications that may lead to disability or death of the mother, newborn or both. Sufficient provision of EmOC services implies that maternal and newborn lives will be saved thereby reducing maternal and newborn deaths to as low as possible.

The reverse is however the case in Rivers State as her MMR put at 889/100,000 live births is described as one of the highest in the world. However, it is a well documented fact that availability of EmOC is one strategy that can prevent maternal and newborn deaths. The status of maternal and newborn mortality ratio in Rivers State therefore, leaves doubt as to the sufficiency of EmOC provided in Rivers State health service. This paper is set to examine the sufficiency of provision of EmOC services in Rivers State health service.

Research Questions

1. What obstetric cases occurred in Rivers State health service from July 2013 to June 2014?
2. What were the most common causes of maternal deaths in Rivers State health service from July 2013 to June 2014?
3. What is the level of EmOC services provided in Rivers State health service?

Method

Area of the study

The study was carried out in Rivers State, one of the thirty six states of Nigeria located in South-South Nigeria. Its capital is Port Harcourt. The state covers an area of 11,077 square meter with an estimated population of 5,689,089 (National Population Commission, Nigeria, 2009). The state comprises 23 Local Government Areas (LGA5) distributed in three senatorial districts of Rivers East, Rivers West and Rivers South East. Of the 23 LGAs, two are urban (Port Harcourt LGA and Obio/Akpor LGA) while the rest are rural. The major source of livelihood for the Rivers people, especially the rural dwellers are fishing and farming. Health status of the citizens of Rivers State is unacceptable. MMR of 889 per 100,000 life birth is one the highest in the world. In addition, UFRM (90/100) and general mortality rate (60/1000) are higher than average (Rivers State Ministry of Health, 2010). EmOC services like other maternal and child health services are provided in public and private health facilities. The present study is focused on examining provision of EmOC services in Rivers State health service (PHCFs & SHCFs) and does not include private sector and the Teaching hospital.

Data collection

To examine the sufficiency of EmOC provision in Rivers State health service, a cross-sectional facility-based study was conducted among 31 Heads of public health facilities in Rivers State health services. The participants included, 26 Heads of PHCFs and 5 Heads of SHCFs selected using a multistage sampling procedure. Percentage area and facility coverage were based on WHO, UNFPA, UNICEF and AMDD (2009) recommendation. The agencies recommended that two stages be followed in selecting facilities for a study. These, according to the agencies include first selecting at least 30 per cent of an area-country, state or district. Thus, six LGAs representing 30 per cent of the 23 LGAs in Rivers State were studied. The second stage was to select 25 per cent of the health facilities in the selected LGAs as against 30 per cent recommended in the Handbook. This 5 per cent short fall was due to one year long industrial action by PHC workers which rendered most PHCFs inaccessible, hence 31 facilities were used for the study.

Data were collected with the aid of six trained research assistants. Heads of the facilities were given a three-sectioned questionnaire comprising sections A, B and C. Sections A and B were researcher-designed. While Section A contained 5 items on respondents' characteristics, Section B contained 9 items on signal functions to measure theoretical provision of EmOC using Donabedian model. This was with particular references to the technical aspect of process dimension of EmOC. Section C contained 38-items adapted from "Form 2" of United Nations Handbook and modified to

suit the study purpose. Ten of the 38 items addressed number of obstetric cases in the facilities on monthly basis for one year period, 19 items addressed maternal deaths in the facility on monthly basis for one year period, while 9 items focused on actual performance of signal functions in the facility in a consecutive three months period proceeding visit to the health facility as recommended by the UN Handbook. Provision of each signal function in a consecutive three months period preceding the survey was determined using "Form 2" of the United Nations Handbook. Reasons for the non-performance of each signal function within the three months period were also noted. The study also checked availability of resources such as trained staff, requisite supply and equipment; functional requisite supply and authorized facility staff for each signal function.

Data analysis

Data were analyzed using Statistical Package for Social Sciences and level of provision for each signal function was based on a five-point scale adapted from Olaosebikan (2007) where a score of 70% and above = very highly sufficient; 60-69% = highly sufficient, 50-59% = moderately sufficient; 40-49 = slightly sufficient and below 40% = low in sufficiency. Analyzed data were presented using descriptive statistics of frequency and percentage.

Ethical approval

Ethical approval to conduct the study was obtained from Rivers State Health Research Ethics Committee. Approvals were also granted by Rivers State Ministry of Health and Rivers State Primary Health Care Management Board.

Results

Obstetric Cases That Occurred in Rivers State Health Service From July 2013 to June 2014 (n = 31)

S/N	Obstetric cases	f	%
1	No. of women giving birth (normal vaginal, assisted vaginal, breech and caesarean)	4251	71.457
2	No. of caesarean sections.	1467	24.659
3	Haemorrhage (ante-and postpartum)	63	1.050
4	Obstructed or prolonged labour	50	0.840
5	Ruptured uterus	11	0.184
6	Postpartum sepsis	5	0.084
7	Severe pre-eclampsia or eclampsia	69	1.159
8	Complications of abortion (with hemorrhage or sepsis).	5	0.084
9	Ectopic pregnancy	3	0.050
10	Other direct obstetric complications that were treated but are not listed above or not specified;	25	0.42
	Total	5949	100

Table 1 depicts a list of obstetric cases that occurred in Rivers State health service from July 2013 to June 2014. The Table shows the obstetric cases that occurred to include: proportion of births (71.5%), caesarean section (24.7%), severe pre-eclampsia or eclampsia (1.2%), haemorrhage - ante or postpartum (1.1%), obstructed or prolonged labour (0.8%), ruptured uterus (0.2%), complications of abortion with haemorrhage or sepsis (0.1%), ectopic pregnancy (0.1%) and other direct obstetric complications that were treated but are not listed above or not specified (0.4%).

Most Common Causes of Maternal Deaths in Rivers State Health Service From July 2013 to June 2014 (n=31).

S/N		f	%
1	*Haemorrhage (ante and post-partum)	13	21.3
2	*Obstructed or prolonged labour	14	22.0
3	*Ruptured uterus	4	6.6
4	*Postpartum sepsis	2	3.3
5	*Severe pre-eclampsia or eclampsia	8	13.1

6	*Complications of abortion (with haemorrhage or sepsis)	1	1.6
7	*Ectopic pregnancy	0	0
8	*Other maternal deaths due to direct causes other than those listed above or not specified above	1	1.6
9	**Malaria	0	0
10	**Anaemia	0	0
11	**HIV/AIDs	0	0
12	**Tuberculosis	0	0
13	**Heart disease	0	0
14	**Infection	0	0
15	**Unsafe abortion	0	0
16	**All other indirect maternal deaths,	18	29.5
	Overall percentage	61	100

* Direct causes ** Indirect causes

Table 2 shows that of the seven direct causes of maternal deaths, obstructed or prolonged labour was the highest (22.0%), Others include, haemorrhage (21.3%), severe pre-eclarnpsia or eclampsia (13.1%), ruptured uterus (6.6%), post partum sepsis (3.3%), complications of abortion (1.6%) and other causes of maternal deaths (1.6%). Indirect causes of maternal deaths constituted (29.5%) of all maternal deaths.

Table 3: Level of EmOC (theoretical) Services Provided in Rivers State Health Service.

Emergency Obstetric Care		Provided		Not Provided	
		F	%	F	%
1.	Administering Parenteral antibiotic	26	83.9	5	16.1
2.	Administering Parenteral oxytocin	26	83.9	5	16.1
3.	Administering Parenteral anticonvulsants	16	51.6	15	48.4
4.	Performing manual removal of placenta	24	77.4	7	22.6
5.	Performing manual removal of retained products of conception	18	58.1	13	41.9
6.	Performing instrumental delivery	4	22.6	27	77.4
7.	Performing blood transfusion	5	16.1	26	83.9
8.	Performing caesarean section	10	32.3	21	67.7
9.	Performing newborn resuscitation with bag and mask	22	71.0	9	29.0
	Overall percentage		55.2		44.8

Table 3 displays data on signal functions performed in health facilities in Rivers State health service. The Table shows that overall, provision of EmOC was moderately (55.2%) sufficient. The Table further shows that among the provided EmOC services were: administering parenteral antibiotics (83.9%), administering parenteral oxytocin (83.9%), performing manual removal of placenta (77.4%) and performing newborn resuscitation with bag and mask (71.0%) were very highly sufficient. The Table also shows that performing manual removal of retained products of conception (58.1%) and administering parenteral anticonvulsants (51.6%) were moderately sufficient. Furthermore, the Table shows that performing caesarean section (32.3%), performing instrumental delivery (22.6%) and performing blood transfusion (16.1%) were low in sufficiency

Table 4
Emergency Obstetric Care Performed in a Consecutive Three Months Period (n = 31)

Signal Functions																						
1	2	3	Administration of Parenteral Antibiotics		Administration of uteronic drugs (ie parenteral oxytocin)		Administration of parenteral anti convulsant for pre-eclampsia ie mag. Sulphate		Performing manual removal of placenta		Performing manual removal of retained product		Performing assisted vaginal delivery		Performing Newborn resuscitation		Performing blood transfusion		Performing surgery e.g. C/S.		Total	
			F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%	F	%		F
1. Performed in last 3 months		Yes	17	54.8	16	51.6	5	16.3	13	41.9	5	16.3	3.3	9.7	16	51.6	6	19.4	1	3.2		29.4
		No	14	45.2	15	48.4	26	83.1	18	58.1	26	83.9	28	90.3	15	48.4	25	80.6	30	96.8		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
2. Why not performed in last 3 months	1. Training issues		1	3.2	1	3.2	1	3.2	0	0	4	12.9	5	16.1	2	6.5	1	3.2	5	16.1		
	2. Supplies Equipment drug issues		1	3.2	2	5.6	2	6.5	2	6.5	2	6.5	0	0	0	0	2	6.5	0	0		
	3. Management issue		1	3.2	0	0	0	0	1	3.2	0	0	0	0	0	0	1	3.2	1	3.2		
	4. Policy Issue		4	12.9	4	12.9	3	9.7	1	3.2	2	5	1	2	1	3.2	8	25.8	10	32.3		
	5. No indication		7	22.6	7	22.6	14	45.2	15	48.4	12	38.7	10	32.3	10	32.3	8	25.8	2	6.5		
	No of those who say	Yes	17	54.8	17	54.8	11	35.5	12	38.7	11	35.5	13	41.9	18	58.1	11	35.5	13	41.9		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
3. Availability of resources for performing functions	1. Availability of trained staff	Yes	26	83.9	27	87.1	21	67.7	26	83.9	15	48.4	7	22.6	27	87.1	13	41.9	5	16.1		
		No	5	16.1	4	12.9	10	32.3	5	16.1	16	51.6	24	77.4	4	12.9	18	58.1	26	83.9		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
	Availability of requisite supply and equipment	Yes	26	83.9	25	80.6	15	48.4	22	71.0	14	45.2	6	19.4	25	80.6	10	32.3	4	12.9		
		No	5	16.1	6	19.4	16	51.6	9	29.0	1.7	5.48	25	80.6	6	19.4	21	67.7	27	87.1		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
	Functional requisite supply	Yes	23	74.2	23	74.2	14	45.2	22	71.0	12	38.7	6	19.4	25	80.6	6	19.4	5	16.1		
		No	8	25.8	8	25.8	17	54.8	9	29.0	19	61.3	25	80.6	6	19.4	6	19.4	26	83.9		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
	Indication for signal function	Yes	18	58.1	18	58.1	7	22.6	11	35.5	7	22.3	3	9.7	15	48.4	11	35.5	9	29.0		
		No	13	41.9	13	41.9	24	77.4	20	64.5	24	77.4	28	90.3	16	51.6	20	64.5	22	71.0		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		
	Authorized facility staff	Yes	25	80.6	23	74.2	16	51.6	21	67.7	14	45.2	7	22.6	26	83.9	13	41.9	6	19.4		
		No	6	19.4	8	25.8	15	48.8	10	32.3	17	54.8	24	77.4	5	16.1	18	58.1	25	80.6		
		Total	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100	31	100		

Source: Questionnaire Data (2015)

Table 4 displays data as indicated by Heads of health facilities on performance of signal functions in a consecutive 3 months period prior to study. The Table shows that, overall, provision of signal function (29.4%) was low in sufficiency. The Table also shows that provision of signal function one -administration of parenteral antibiotics (54.8%) was moderately sufficient. Some reasons given for not performing this signal function include: no indication (22.6%), policy issue (12.9%), management issue (3.2%), supplies, equipment and drug issue (3.2%) and training issues (3.2%). The Table also shows that availability of resources for performing signal function include: availability of trained staff (83.9%), requisite supply and equipment (83.9%), functional requisite supply (74.2%), indication for signal function (58.1%), and authorized facility staff (80.6%).

Furthermore, the Table shows that signal function two - administration of uterotonic drugs was moderately (51.6%) sufficient. Reasons for not performing signal function include: no indication (22.6%), policy issue (12.9%), supplies, equipment and drug issue (5.6%), and training issue (3.2%). Availability of resources for performing signal functions include: trained staff (87.1%), availability of requisite supply (80.6%) and functional requisite supply (74.2%), authorized facility staff (74.2%) and indication for signal function (58.1%).

Furthermore, the Table shows that provision of signal function seven - performing new born resuscitation was moderately (51.6%) sufficient. Reasons for not performing signal function are: no indication (32%), training issue (6.5%), policy issue (3.2%). Availability of resources for performing signal functions as indicated include: trained staff (87.1%), requisite supply and equipment (50.6%) authorized clinic staff (83.9%), functional requisite supply (80.6%) and indication for signal function (48.4%).

The Table further shows that provision of signal function four - performing manual removal of placenta was slightly (41.9%) sufficient. Reasons for not performing signal function include: no indication (48.4%), supplies, equipment and drug issue (6.5%), management issue (3.2%), policy issue (3.2%). For availability of resources for performing signal function, the following were indicated: availability of trained staff (83.9%), requisite supplies and equipment (71.0%) functional requisite supplies and equipment (71.0%), authorized clinic staff (67.7%) and indication for signal function (35.5%).

In addition, the Table shows that provision of signal function eight - performing blood transfusion was low (19.4%) in sufficiency. Reasons for not performing signal function include: policy issue (25.8%), no indication (25.8%), supplies, equipment and drug issue (6.5%), training issues (3.2%), and management issue (3.2%). Availability of resources for performing signal functions as indicated include: trained staff (41.9%), indication for signal function (35.5%), requisite supply and equipment (32.3%) and functional requisite supply (19.4%).

In addition, the Table shows that provision of signal function three - administration of parenteral anticonvulsant for pre-eclampsia or eclampsia was low (16.3%) in sufficiency. Reasons for not performing signal function for the last three months include: no indication (22.6%), policy issue (12.9%), supplies equipment and drug issue (5.6%), training issue (3.2%). For availability of resources for performing signal function the following were indicated: trained staff (67.7%), authorized facility staff (67.7%), requisite supplies (48.4%), functional requisite supply (45.2%) indication for performing signal function (22.6%).

Furthermore, the Table shows that provision of signal function five-performing manual removal of retained product was low (16.3%) in sufficiency. Reasons for not performing signal function include: no indication (38.7%), training issue (12.9%), policy issue (6.5%), supplies, equipment and drug issue (6.5%). Availability of resources for performing signal functions include: trained staff (48.4%), supply and equipment (45.2%), functional requisite supply (38.7%), authorized clinic staff (45.2%) and indication for signal function (22.3%).

The Table further shows that provision of signal function six-performing assisted vaginal delivery was low (9.7%) in sufficiency. Reasons for not performing signal function include: no indication (32.3%), authorized facility staff (22.6%), training issue (16.1%) and policy issue (3.2%). Availability of resources for performing signal function as indicated include: trained staff (22.6%), supply and equipment (19.4%), functional requisite supply (19.4%) and indication for signal function (9.7%).

Finally, the Table indicates that provision of signal function nine-performing surgery for example, caesarean section was low (3.2%) in sufficiency. Reasons for not performing signal function

for the last three months include: policy issue (32.3%), training issue (16.1%), indication (6.5%), and management issue (3.2%). The Table also indicates that availability of resources for performing signal function include: indication for signal function (29.0%), authorized facility staff (19.4%), functional requisite supply (16.1%), and availability of requisite supply (12.9%).

Discussion

Data presented in Table one showed that the major obstetric emergencies that occurred in Rivers State health service were severe pre-eclampsia or eclampsia, haemorrhage (ante or post partum), obstructed or prolonged labour and others. These findings are in agreement with WHO Media Centre (2017) that the complications that account for most maternal deaths severe bleeding (mostly bleeding after childbirth), infections, high blood pressure due to pregnancy (pre-eclampsia and eclampsia, complications from delivery and unsafe abortion.

Data in Table two showed that the most common cause of maternal death were obstructed or prolonged labour, haemorrhage (ante and post partum) and severe pre-eclampsia or eclampsia. Others were ruptured uterus, post partum sepsis and complications of abortion. This is in agreement with the findings of where it was reported that the five leading causes of death in Nigeria were obstetric haemorrhage, eclampsia, sepsis, obstructed labour and complications of unsafe abortion.

Data as presented in Tables 3 on level of EmOC provision showed that overall theoretical provision of EmOC (55.2%) was moderately sufficient while overall provision of actual EmOC was low (29.4%) in sufficiency. Signal functions such as administration of parental antibiotics (54.8%), administration of parenteral uterotonic drugs (51.6%) and performing newborn resuscitation (51.6%) were moderately sufficient in provision. This is in agreement with Ameh et al (2012) who found that in all six countries studied, parenteral oxytocin and antibiotics were the most frequently available EmOC signal functions with an average of 6-7 out of 10. Similar findings were also reported by Mezie-Okoye et al. (2012).

The study also revealed the least provided signal functions to include: administration of parenteral anticonvulsants (16.3%) which was low in sufficiency. This is at variance with Ameh et al. (2012) report that while 70% of facilities in Sierra Leone and Kenya were able to provide parenteral anticonvulsants, only 44% and 56% of facilities in the surveyed districts in Nigeria and Malawi respectively provided. Parenteral anticonvulsants are given using magnesium sulphate for prevention and treatment of pre-eclampsia and eclampsia. The use of magnesium sulphate is low in many low resource countries like Nigeria due to challenges of its availability at all times and cost barriers (Tukur, 2009). The low sufficiency in the provision of this signal function as found in this study is not expected given the understanding that magnesium sulphate is very useful in reducing death due to eclampsia and pre-eclampsia. A study in Nigeria by Ezeugu et al (2012) found that there was over 80% reduction in case fatality rate for eclampsia after the introduction of an intervention using magnesium sulphate for the treatment of eclampsia and pre-eclampsia. The finding of the present study also concurs with that of Mezie-Okoye et al. (2012) which stated that only one facility out of 19 performed parenteral anticonvulsants.

Other signal functions which were low in sufficiency as shown in Table 4 were performing caesarean section (3.2%), performing assisted vaginal delivery (9.7%) performing manual removal of retained product (16.3%), administering parenteral anticonvulsant (16.3%), and performing blood transfusion (19.4%). This finding is not surprising as Ameh, et al (2012) reported that removal of retained products of conception and assisted vaginal delivery were the least performed signal functions. Performing assistant vaginal delivery which was found to be low in sufficiency is also expected as this has also been found to be one of the least performed EmOC functions in most countries of the world (WHO, UNFPA, UNICEF and AMDD, 2009). This findings also agrees with Mezie-Okoye et al. (2012) which stated that only one manual removal of retained products was carried out in the study area. Performing blood transfusion is another signal function which provision was found to be low in sufficiency. This is contrary to the findings of Ameh, et al (2012) who found that blood transfusion was readily available in the countries surveyed. For caesarean section, this findings of the present was in agreement with that of Ameh et al (2012) where they reported that most facilities in the surveyed countries could not provide caesarean section.

In addition, Table 4 showed that different reasons accounted for the inability of the facilities to provide some EmOC. The major reason for not performing all the signal functions was no

indication for the signal functions. However, the major reason for not performing signal function nine on caesarean section were policy issues, training issues and no indication. This implies that cases requiring caesarean section were indicated yet policy and training issues hindered the provision of the service. This concurs with Paxton, Bailey, Lobis and Fry (2006) who stated that in many developing countries, health facilities are not performing the expected functions according to their level. The finding of the present study also echoes the findings of Ugal, Ushie and Ugal (2012) in Nigeria where it was indicated that maternal health care facilities are available but majority of them do not satisfy the international standards for both basic and comprehensive EmOC. Ali, Ayuz, Rizwah, Hashimr and Kuroiwa (2006) had earlier found that almost all indicators were below minimum recommended UN levels. The number of facilities providing basic EmOC services was much too low to be called providing comprehensive coverage. A low percentage of births took place in hospitals and few women with complications reached EmOC facilities. Caesarean section was either under utilized or unavailable. Paxton, Bailey, Lobis and Fry (2006) noted that the basic EmOC and comprehensive EmOC facilities are more concentrated in the province containing the capital city. This is not the case in Rivers State because PHCFs and SHFs alike are evenly distributed in the rural and urban areas. Except in two LGAs where SHFs are nonexistent. These include Oyigbo and Tai Local Government Areas (Okankwu, 2016). Paxton, et al identified some factors to be responsible for the lack of availability of basic EmOC facilities. These factors according to them, include, prioritization of governments on resources for hospitals over lower level facilities, difficulty of maintaining equipment and supplies in relatively more rural locations and difficulty in retaining qualified staff in smaller facilities. Paxton et al. maintained that, with the upgrading of services, more obstetric complications can be treated closer to the communities where women live without constructing new buildings. Upgrading, according to the authors, involve identification and provision of or repair of essential equipments; minor renovations in physical plant, provision of required supplies and planning for continuous supply. Others include, in- service training of facility staff preferably with competency-based training, supportive supervision, both internal and external to facility and improved management systems in the facility.

Findings from the present study suggest provision of more SHCFs to accommodate the teeming EmOC needs of the population since the SHCFs are better equipped and staffed to provide EmOC services especially comprehensive services. It also suggests the need for retraining available service providers on EmOC skills to enhance their skills on obstetric care. There is also need to provide necessary equipment to enable service providers carry out the task before them as required.

Implication for Maternal and Newborn Survival

Low sufficiency of provision of EmOC services in the face of identified preventable causes of maternal mortality has serious implication for maternal and newborn survival. It is an established fact that most of the interventions that prevent maternal death also help to prevent newborn death. EmOC has been described as life saving interventions that can avert majority of pregnancy and childbirth complications. The insufficient provision of EmOC revealed in the study in Rivers State health service implies that pregnancy and childbirth-related complications are not yet prioritized in practice. This is contrary to expectation as Rivers State has implemented most global and national programmes geared towards reduction of maternal and newborn mortality. The present study found that the obstetric cases that occurred in Rivers State in one year period were vaginal deliveries, caesarean section and obstetric complications such as severe pre-eclampsia, haemorrhage, obstructed labour, ruptured uterus, post-partum sepsis and complications of abortion. These obstetric complications that occurred in the state health service did not deviate from the causes of maternal mortality in Rivers State health service in the same time period. The most common causes of maternal mortality as found in the study in order of magnitude from highest to the least include: obstructed or prolonged labour, haemorrhage, severe eclampsia or pre-eclampsia, ruptured uterus, post partum sepsis, complications of abortion (with haemorrhage or sepsis).

From the forgoing, it is seen that women in Rivers State are still dying from preventable causes. This also affects their newborns negatively. The implication for maternal and newborn survival is that the situation calls for a review of existing policies where the health system will come up with evidence-based policies and interventions suited to local context for each of the causes of maternal death geared towards reduction of maternal and newborn death. This method was helpful in

the reduction of maternal mortality in Enugu State University Teaching Hospital. There was 43.5% reduction in MMR following the adoption of the interventions where Pritchard regimen was used for treatment of pre-eclampsia and eclampsia and active management of third stage of labour with intramuscular oxytocin was used for prevention and treatment of post partum haemorrhage. There was over 80% reduction in case fatality rate for eclampsia. The case fatality rate for PPH also dropped by 82%. There was about 30% decline in prevalence of PPH. This was achieved by first understanding that the most common causes of maternal mortality in their study context, were pre-eclampsia/eclampsia and post-partum haemorrhage and then applying these interventions which resulted in the reduction of MMR. The study believes that the findings of this study in relation to the most common causes of maternal mortality have provided a baseline data upon which various evidence-based and cost-effective interventions will be tried out in small scales to understand what intervention suits best.

The insufficiency found in the provision of EmOC services in this study also has implication on stakeholders at the facility and health system level. Effort should be made to investigate the reasons for insufficient provision and what method works most. For instance, the least provided signal function was the performing caesarean section (3.2%) which was well below the minimum UN acceptable limit of (5-15%). Even though WHO has declared no level of caesarean section is most suitable. There is need to ensure that those who need caesarean section should receive care. This can be by way of community sensitization by health educators on use of available health facilities and retraining service providers on early recognition of pregnancy and childbirth complications and what immediate actions should be taken for each of the obstetric complications. There is also need for good referral system from PHCFs to SHCFs so as to ensure that EmOC is available to women who have accessed Rivers State Health Service.

Conclusion

The study identifies the most common causes of obstetric deaths to include obstructed or prolonged labour, haemorrhage, severe pre-eclampsia or eclampsia. Others are ruptured uterus, post partum sepsis and complications of abortion. These did not deviate from the obstetric cases that occurred besides deliveries and caesarean section. The study concludes that the low sufficiency in the provision of EmOC indicates that Rivers State is yet to prioritize reduction of maternal mortality. There is need for greater political commitment on the part of government by way of providing human and material resources necessary for the provision of EmOC. There is also need to put worthwhile policies into meaningful actions. These can help to achieve maternal and newborn survival.

Recommendation

1. Supplies and requisite necessary equipment should be made available in each health facility.
2. Upgrading of BEmOC facilities to CEmOC facilities to improve coverage.
3. Improving referral system to ensure that women who have accessed any level of the health system get required care necessary to prevent death of mother, newborn or both.
4. Service providers at the PHCFs should always refer women promptly who come from PHCFs to SHCFs.
5. Government should ensure retraining of service providers on early recognition of obstetric emergencies and necessary actions.
6. Facility heads should ensure that guidelines on actions for obstetric emergencies are published at strategic places in the antenatal, labour and postnatal units.

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