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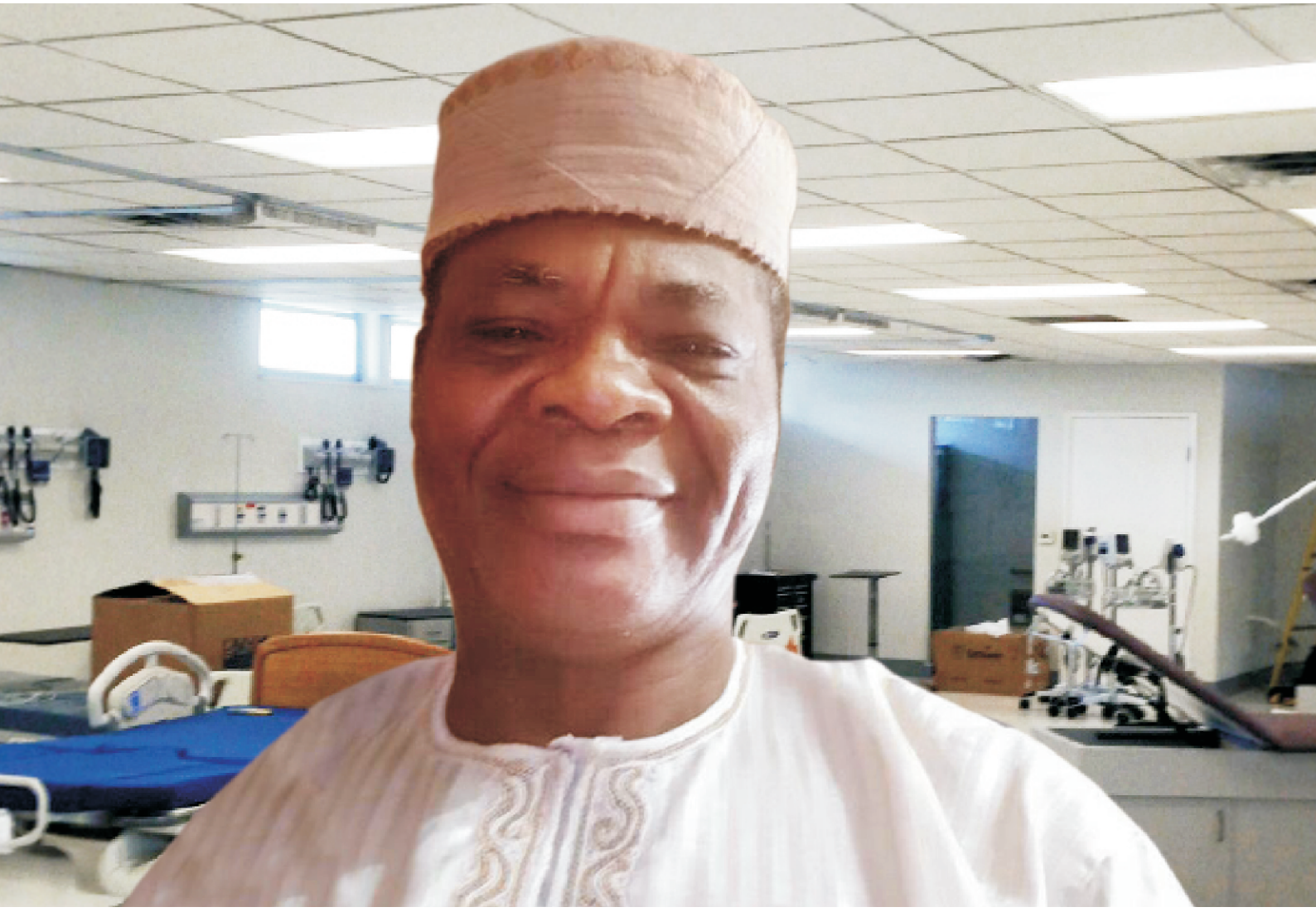

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AVAILABILITY OF ESSENTIAL COMPONENTS OF MATERNAL HEALTH CARE IN HEALTH INSTITUTIONS

CHIKA C. H. ODIRA; PAULINE O. M. EZENDUKA & EDITH N. CHIEJINA

ABSTRACT

Ensuring that essential components of maternal health care are available is central to aversion of maternal morbidities and mortalities. This Cross-sectional study design was aimed at determining the availability of essential components of maternal health care in health facilities in South-East Nigeria . Thirty-three health facilities comprising of 16 primary, 14 secondary and 3 tertiary health facilities in South-East Nigeria were randomly sampled. The instrument used to collect data from 33 facility heads and 162 maternal healthcare providers respectively are Facility Inventory Checklist and questionnaire on Maternal Healthcare Services which is validated and the reliability score is 0.71 and 0.84 respectively. The data analysis used were summarized in table of frequency and percentages. Fisher's exact and Mann-Whitney U tests were used to test the null hypotheses at 0.05 level of significance. The findings of this study revealed that the level of essential components of maternal health care services is high (80.6%) in health facilities of South-East Nigeria, Secondly 51.5% of health facilities have all components of maternal healthcare and secondly, the extent of provision of maternal health care services to childbearing women is very high (80.18% among primary, secondary and tertiary health facilities. The hypothesis tested revealed that there is no significant association between the level of health services and availabilities of some components and maternal services. Secondly, only blood transfusion service shows significant association with location of health facilities (p=0.01). Lastly, there is a significant difference in the provision of maternal services between facilities in rural and urban settings of South-East Nigeria. It is therefore recommended that facilities at primary and secondary levels need technical support by Federal and State Ministry of Health to enable them prepare adequately for skilled service provision.

Keywords: Maternal healthcare; Signal Functions; health institutions.

INTRODUCTION

Maternal health is a crucial indicator of the quality of health care in any country. According to Alkema, Chou, Hogan *et al* (2016) and *Kruk, Leslie, Verguet, Mbaruku, Adanu and Langer (2016), t*he United Nation's adoption of the Sustainable Development Goals (SDGs) in September, 2015, reaffirmed reduction of maternal and new-born mortality as global priorities in the coming decades, hence the SDGs' target to reduce maternal mortality to fewer than 70 deaths per 100 000 live births by 2030 (United Nations, 2015; United Nations, 2016). In Nigeria, one of every 16 women dies during childbirth (United Nations, 2015) and more than three-fourths of maternal deaths are related to direct obstetric causes which are easily preventable and treatable. Chaturvedi, Randive, Diwan and De Costa (2014) stated that 77% of these deaths occur during or soon after childbirth. Many of these deaths could be prevented by providing optimal maternal healthcare at health facilities, therefore essential lifesaving interventions need to be delivered at facilities (*Andriantsimietry, Rakotomanga, Rakotovao, Ramiandrison, Razakariasy and Favero, 2016).*

Existing studies have shown that there have been improvements in access to maternal health care in South East region of Nigeria (Emelumadu, Ukaegbu, Ezeama, Kanu, Ifeadika, and Onyeonoro, 2014; United Nations, 2014; Okoronkwo, Odira, Nwaneri, Okpala, and Okafor, 2017) but there has not been corresponding reduction in maternal morbidity and mortality ratio (WHO, 2020). There are still large disparities between urban and rural areas (National Population Commission, 2013; Nnebue, Ebenebe, Adogu, Adinma, Ifeadika and Nwabueze, 2014; Odira, Chiejina and Ezenduka, 2020). Data from low-income and middle-income countries (LMICs) show large variability in maternal mortality in

health-care facilities, suggesting inconsistent quality of care (Souza, Gulmezoglu, and Vogel, 2013).

According to WHO, UNFPA, UNICEF and AMDD (2009), a useful output indicator for monitoring supply-side progress towards sufficient services for reducing maternal mortality is the availability of facilities capable of providing lifesaving Emergency Obstetric and Neonatal Care (WHO *et al,* 2009; Gabrysch, Civitelli, Edmond, Mathai, Ali and Bhutta, 2012). Availability of important components of maternal health services is therefore a key factor for elimination of unnecessary deaths among childbearing women and an important pre-requisite for women's advancement (Gabrysch *et al,* 2012; Nuamah *et al*, 2019).

Internationally accepted guidelines have defined the essential components of maternal health services necessary for safe delivery and improved maternal and newborn outcomes (Ghani, 2014). They are basic essential obstetric care (BEOC) and emergency obstetric care (EmOC). BEOC includes preventive services as well as medical interventions and procedures that can be provided by well-trained health care providers.

This includes Ante Natal Care (ANC) with preventive interventions, early detection and treatment of common problems of pregnancy, and the ability to manage simple problems of pregnancy, as well as first aid for complications of pregnancy and labor to minimize the need for emergency interventions (Ghani, 2014). EmOC covers lifesaving interventions of blood transfusion and surgery. EmOC interventions are carried out at referral health facility (Ghani, 2014). Together, BEOC and EmOC form the basis of what is considered comprehensive essential obstetric care [CEOC] (WHO et al, 2009). CEOC has been adopted by the Ministry of Health and Population, and forms the strategy of programs to improve maternal health (Ugal, Ushie, Ushie and Ingwu, 2012).

To monitor the availability, utilization, and quality of EmOC services, a set of guidelines is issued and developed by experts from the Mailman School of Public Health at Columbia University, with support from UNICEF and WHO (Banke-Thomas, Wright, Sonoiki, Banke-Thomas, Ajayi, and Ilozumba, 2016). This guideline proposes nine different care packages referred to as 'signal functions', which are described as life saving treatments and procedures (Tembo, Chongwe, Vwalika and Sitali, 2017). Seven of the nine care packages constitute basic emergency obstetric care (BEmOC). They include parenteral antibiotic, parenteral oxytoxics, parenteral anticonvulsants, manual removal of placenta, removal of retained products (manual vacuum aspiration), assisted vaginal delivery, and basic neonatal resuscitation (WHO *et al*, 2009; Tembo, Chongwe, Vwalika and Sitali, 2017).

These seven care packages in addition to the provision of caesarean section and blood transfusion services make up comprehensive emergency obstetric care [CEmOC] (WHO *et al*, 2009). Signal functions are used to treat direct obstetric complications which have been noted to cause the majority of maternal deaths (WHO *et al*, 2009; Bintabara, Ernest & Mpondo, 2017). This study considers only 'Eight Signal Functions' which are directly related to maternal health, hence, 'neonatal resuscitation' is not included. According to Paxton, Bailey, Lobis and Fry (*2006),* the availability of these signal functions in a health care system is crucial for maternal survival.

In addition, global discussions have centered on expansion of the signal functions to encompass activities related to routine care for mothers and new-borns because they enable prediction, prevention, and early intervention to mitigate life-threatening complications (Gabrysch *et al,* 2012). These expanded functions include such services as infection prevention and management for mothers and infants, monitoring and management of labour using partograph, active management of the third stage of labour and HIV prevention (Otolorin, Gomez, Currie, Thapa, and Dao, 2015). Furthermore, studies have shown that the internationally recommended maternal health services cover preconception or periconception care, care during pregnancy, care during childbirth and postnatal care (WHO, 2015). Real challenge in preventing unnecessary deaths among women is ensuring that these high-impact interventions are available on demand, and used by women who need them. Service availability and readiness are prerequisites to quality services (WHO, 2013). In this study, maternal health services are considered to include CEOC, preconception care and their expanded functions.

Objectives of the study

1. To determine the extent of availability of essential components of maternal health care in health facilities in South-East Nigeria.
2. To assess the proportion of health facilities in South-East Nigeria with all the essential components of maternal healthcare.
3. To determine the extent to which maternal healthcare is provided in health facilities in South-East Nigeria.

Research questions

1. To what extent are essential components of maternal healthcare available in health facilities in South-East Nigeria?
2. What proportion of health facilities in South-East Nigeria has all components of maternal health services?
3. To what extent are maternal healthcare provided in South-East Nigeria?

Hypotheses

1. There is no significant association between the levels of health facilities and the availability of essential components of maternal health services
2. There is no significant association between the location of health facilities and the availability of essential components of maternal health services.
3. There is no significant difference between the extent of maternal health services provided in facilities in rural setting and that provided in urban setting.

METHODOLOGY

Design: An analytical cross-sectional design was used for the study.

Setting: The study setting was South East Region of Nigeria. South-East Region is one of the six geo-political zones in Nigeria consisting of Abia State, Anambra State, Ebonyi State, Enugu State and Imo State. Statistics from Measurement and Evaluation unit of FMOH as notified by Makinde *et al,* (2014) showed that documented total number of health facilities in South-East Nigeria was 4317.

Target Population: The target populations for this study were the health facilities and healthcare providers.

Sampling Technique: A facility sample size of 33 was estimated using the Measure of Rel-variance for determining facility sample size (Turner, Angeles, Tsui, Wilkinson and Magnani, 2001). The 33 health facilities were proportionately sampled from three randomly selected States out of the five States of South-East Nigeria using 4317 documented health facilities as sample frame. The distribution of the sampled facilities consisted of 3 tertiary, 14 secondary and 16 primary health facilities. Thirty-three (33) facility heads were purposively selected from each sampled health facility and 162 maternal healthcare providers were conveniently selected from maternity wards of each sampled health facility.

Instrument: Two instruments were used for data collection. They are Facility Inventory Checklist (FIC) and Questionnaire on Maternal Healthcare Services (QMHS). FIC was used to assess the availability of components of maternal health services. Section A of the instrument elicited information on general characteristics of the health facilities (e.g., type of the facility, location of the facility, type of health care services provided by the health facility). Availability of 24 components of maternal health services including eight signal functions that directly relate to maternal health care were assessed using checklist rated 1 for YES and 0 for NO. One point was recorded for each component of maternal health services that was available and 0 point was recorded if the component was not available. A score of 24 was expected from each facility and this was multiplied by 100 to obtain the percentage score expected. QMHS was used to collect data from maternal healthcare provider on the provision of maternal health services.

It consists of 4-point rating scale categorized under five main domains of maternal healthcare services which include preconception health care, antenatal care, labour care, postnatal and Prevention of Mother-to-child Transmission (PMTCT) of HIV. The scale ranged from 1 point for Never, 2 points for rarely, 3 points for Mostly, 4 points for Always. The responses were scored, divided by the maximum score obtainable and then multiply by 100. Score of 75% and above were considered good.

Reliability: The reliability and internal consistencies of FIC and QMHS were determined using Cronbach Alpha and Split half method and scores of 0.71 and 0.89 were obtained.

Data Analysis: Data were collated and entered into SPSS version 20. Proportions of health facilities with all essential components of maternal health services were summarized using of frequency and percentages. Extent of availability and provision of basic components of maternal health services were determined by calculating Rate/benchmark*100%. A score of 75% was considered good availability (WHO, 2013). Fischer's exact (F) test at 0.05 level of significance was used to determine associations between the levels and location of health facilities and the availability of basic components of maternal health services while Mann-Whitney U test at 0.05 level of significance was used to determine the difference between facilities in rural and urban settings in the provision of maternal health services.

Ethical Consideration: Ethical approvals to carry out the study were obtained from the three Health Research Ethics Committees instituted in the three sampled States. Verbal consent was obtained from facility/unit heads of various health facilities involved in the study. Informed consent was obtained from each participant. Data was collected from the facility heads using FIC. The researcher verified the existence of items and components that were being assessed with the checklist. QMHS was interviewer administered to the maternal healthcare providers available in the facility on each day the facility was visited. Some of the facilities were visited more than once in order to carry out proper investigations.

RESULTS

Objective 1

To determine the extent to which essential components of maternal healthcare is availability in health facilities in South-East Nigeria.

Table 1 shows the extent of availability of essential components of maternal health in South-East Nigeria: preconception services 29 (87.9%); routine antenatal care services 31(93.9%); diagnosis and treatment of malaria is available in (100%); diagnosis and treatment of hypertension in pregnancy 25(75.8%); diagnosis and treatment of diabetes in pregnancy 25(75.8%); services for prevention of mother-to-child transmission of HIV 28(84.8%); post abortion care 29(87.9%); post abortion family planning 29(87.9%); normal delivery and newborn care 31(93.9%); postnatal care 31(93.9%); postnatal family planning 29(87.9%); laboratory diagnostic services 28(84.8%).

Among the 24 components of maternal health services, the most available service is diagnosis and treatment of malaria, which is available in all the facilities (100%), while the least available is WHO Service Availability and Readiness Assessment (SARA) guidelines available in only 9 (27.3%) of the 33 facilities surveyed, however, 75.8% make use of National guidelines for service delivery. Over sixty-three percent of the facilities do not have partograph for monitoring of labour.

Table 1 also reveals availability of signal functions to treat major obstetric complications which includes assisted vaginal delivery 23(69.7%); cesarean section 14(48.5%); blood transfusion 15(54.5%); parenteral administration of anticonvulsant for hypertensive disorders of pregnancy 25(75.8%); Induction of labour for prolonged pregnancy 28(84.8%); Manual removal of placenta 31(93.9%); Manual removal of retained products of conception 31(93.5%); Management of PPH e.g. Uterotonics, uterine massage 28(84.8%) and Parenteral administration of antibiotic 32(97.0%). The result shows cesarean section as the least signal function most available in tertiary health facilities (100%); less available in secondary health facilities (78.6%) and not available primary health care while parenteral administration is the most available signal functions available in 97% of the facilities.

The overall mean score for extent of availability of maternal health services is 80.6%. The mean scores for tertiary, secondary and primary health facilities are 94.2%, 83.8% and 75.2% respectively.

Table 1: Components of maternal healthcare services available in health institutions

SN	Availability		FACILITY TYPE		Total	Frequency%
			Primary health(16)	General hospital (14)	Teaching hospital (3)	
1	Preconception services	No	2 (12.5)	2 (4.3)	0 (0)	4(12.1)
		Yes	14(87.5)	12(85.7)	3 (100)	29(87.9)
2	Routine Antenatal care services	No	0 (0)	2 (14.3)	0 (0)	2 (6.1)
		Yes	16(100)	12(85.7)	3 (100)	31(93.9)
3	Diagnosis & treatment of malaria	Yes	16(100)	14(100)	3 (100)	33(100)
4	Diagnosis & management	No	7(43.8)	1(7.1)	0 (0)	8 (24.2)
	hypertension in pregnancy	Yes	9(56.3)	13(92.9)	3 (100)	25(75.8)
5	Diagnosis & management	No	7(43.8)	1(7.1)	0(0)	8 (24.2)
	diabetes in pregnancy	Yes	9(56.3)	13(92.9)	3 (100)	25(75.8)
6	Service for prev ention of mother -	No	0(0)	5(35.7)	0(0)	5(15.2)
	to-child HIV transmission	Yes	16(100)	9(64.3)	3 (100)	28(84.8)
7	Post abortion care	No	3 (18.8)	1(7.1)	0(0)	4(12.1)
		Yes	13(81.3)	13(92.9)	3 (100)	29(87.9)
8	Routine offers of family planning	No	2(12.5)	1(7.1)	1(33.3)	4(12.1)
	after post abortion care	Yes	14(87.5)	13(92.9)	2 (66.7)	29(87.9)
9	Normal delivery and newborn	No	0(0)	2(14.3)	0(0)	2(6.1)
	care	Yes	16(100)	12(85.7)	3 (100)	31(93.9)
10	Assisted vaginal delivery	No	6(37.5)	4(28.6)	0(0)	10(30.3)
		Yes	10(62.5)	10(71.4)	3(100)	23(69.7)
11	Cesarean section	No	16(100)	3(21.4)	0(0)	19(57.6)
		Yes	0(0)	11(78.6)	3(100)	14(42.4)
12	Postnatal care services	No	0(0)	2(14.3)	0(0)	2(6.1)
		Yes	16(100)	12(85.7)	3(100)	31(93.9)
13	Routine offers of f amily planning	No	0(0)	4(28.6)	0(0)	4 (12.1)
	after delivery	Yes	16(100)	10(71.4)	3(100)	29(87.9)
14	Lab diagnostic services, including	No	4(25.0)	0 (0)	1 (33.3)	5(15.2)
	any rapid diagnostic testing	Yes	12(75.0)	14(100)	2(66.7)	28(84.8)
15	Blood transfusion service	No	14(87.5)	1(7.1)	0(0)	15(45.5)
		Yes	2(12.5)	13(92.9)	3(100)	18(54.5)
16	Parenteral administration of	No	6(37.5)	2(14.3)	0 (0)	8(24.2)
	anticonvulsant	Yes	10(62.5)	12(85.7)	3(100)	25(75.8)
17	Induction of labour for prolonged	No	2(12.5)	3(21.4)	0(0)	5(15.2)
	pregnancy	Yes	14(87.5)	11(78.6)	3(100)	28(84.8)
18	Manual removal of placenta	No	0(0)	2(14.3)	0(0)	2(6.1)
		Yes	16(100)	12(85.7)	3(100)	31(93.9)
19	Manual removal of retained	No	1(6.3)	1(7.1)	0(0)	2(6.1)
	products after delivery	Yes	15(93.8)	13(92.9)	3(100)	31(93.9)
20	Management of PPH (e.g.,	No	4(25.0)	1(7.1)	0(0)	5(15.2)
	Uterotonics, uterine massage	Yes	12(75.0)	13(92.9)	3(100)	28(84.8)
21	Parenteral administration of	No	1(6.3)	0(0)	0(0)	1(3.0)
	antibiotic	Yes	15(93.8)	14(100)	3(100)	32(97.0)
22	Use of partograph	No	9(56.3)	9(64.3)	3(100)	21(63.6)
		Yes	7(43.7)	5(35.7)	0(0)	12(36.4)
23	WHO SARA guidelines	No	14(87.5)	8(57.1)	2(66.7)	24(72.7)
		Yes	2(12.5)	6(42.9)	1(33.3)	9 (27.3)
24	National guidelines for service	No	2(12.5)	6(42.9)	0(0)	8(24.2)
	delivery	Yes	14(87.5)	8(57.1)	3(100)	25(75.8)
	Mean availability of components of MHS		72.2%	83.8%	94.2%	80.6%

*Score of 75% and above = good

Objective 2

To determine the proportion of health facilities in South-East Nigeria with all the essential components of maternal health care.

Table 2 shows that only 10 (30.3%) of 33 selected health facilities have all the twenty-four components of maternal health services assessed while 69.7% do not have. The proportion of primary health facilities with all the components of maternal health services is 18.8%; secondary health facilities, 35.7% and tertiary health facilities, 66.7%. Only 40% of health facilities in urban areas and 22.2% of facilities in rural areas have all the components of maternal health services.

Table 2 also shows that only 31.3% of primary health facilities have all the six signal functions expected of BEmOC facilities while 64.3% of secondary and 100% of tertiary health facilities have all the eight signal functions expected of CEmOC facilities. Sixty percent (60%) of facilities located in urban areas have all the eight signal functions, while only 44.4% of health facilities in rural areas have all the eight signal functions. On the overall, 51.5% of health facilities have all the maternal health services while 48.5% do not have.

Table 2: Proportion of health facilities with all components of maternal healthcare Services

Facility type	Components of maternal health services		Total
	Complete Components	Incomplete Components	
Primary	3(18.8%)	13(81.2%)	16(100.0%)
Secondary	5(35.7%)	9(64.3%)	14(100.0%)
Tertiary	2(66.7%)	1(33.3%)	3(100.0%)
Overall facility	10(30.3%)	23(69.7%)	33(100.0%)
Facility location			
Urban	6(40.0%	9(60%)	15(100%)
Rural	4(22.2%)	14(77.8%)	18(100%)
Overall facility	10(30.3%)	23(69.7%)	33(100.0)
Signal Functions			
Facility type	Complete Signal Functions	Incomplete Signal Functions	
Primary	5(31.3%)	11(68.7%)	16(100.0%)
Secondary	9(64.3%)	5(35.7%)	14(100.0%)
Tertiary	3(100.0%)	0	3(100.0%)
Overall facility	17(51.5%)	16(48.5%)	33(100.0%)
Facility location			
Urban	9(60.0%)	6(40%)	15(100.0)
Rural	8(44.4%)	10(55.6%)	18(100.0%)
Overall facility	17(51.5%)	16(48.5%)	33(100.0%)

Objective 3:

To determine the extent to which maternal healthcare is provided in health facilities in South-East Nigeria.

Table 3 shows that the extent to which preconception services are provided to child bearing women in health facilities in South-East Nigeria was 85.69%; antenatal services (83.27%); delivery services (88.01%); postnatal services (82.76%) and PMTCT of HIV (88.32%). The overall mean score of extent of provision of maternal healthcare services to childbearing women is 80.18%. The primary, secondary and tertiary health facilities score 81.08%, 79.40% and 78.4% respectively for extent of provision maternal healthcare services.

Table 3: Extent of provision of maternal healthcare services to childbearing women

Domains of Maternal Health Services	Mean Scores			Total Score
	Primary Health Care	General Hospital	Teaching Hospital	
Preconception services.	85.14	78.96	75.69	81.69*
Antenatal services	84.53	81.76	83.17	83.27*
Delivery services	88.85	87.28	84.51	88.01*
Postnatal services	82.75	83.26	80.78	82.76*
Services for PMTCT of HIV	84.58	93.94	83.85	88.32*
Overall mean score	81.08*	79.40*	78.4*	80.18*

Hypothesis one

There is no significant association between the levels of health facilities and the availability of essential components of maternal health services.

In Table 4, Fisher's exact test shows that there is a significant associations between the levels of facility and the availability of preconception services, routine antenatal care, diagnosis and treatment of malaria, post abortion care, post abortion family planning, normal delivery and newborn care, assisted vaginal delivery, postnatal care, labouratory diagnostic services, parenteral administration of anticonvulsant, Induction of labour, Manual removal of placenta, Manual removal of retained products of conception, Management of PPH e.g.uterotonics, Parenteral administration of antibiotic, WHO guidelines, and National guidelines for service delivery ($p > 0.05$). On the hand, there are significant association between the levels of facility and the availability of diagnosis and management of hypertension in pregnancy ($p = 0.05$), diagnosis and management of diabetes in pregnancy ($p = 0.05$), prevention of mother-to-child transmission of HIV ($p = 0.02$), cesarean section ($p<0.001$), postnatal family planning ($p = 0.05$) and blood transfusion services ($p<0.001$). This study reveals that there is a significant association between the levels of health facilities and availability of some components of maternal healthcare

Table 4: Ass ociation between levels of health facilities and availability of components of maternal healthcare

SN	Availability		FACILITY TYPE			Total	Fisher's Exact	p
			Primary health	General hospital	Teaching hospital			
1	Preconception services	No	2 (6.1)	2 (6.1)	0 (0)	4(12.1)	0.43	1.0
		Yes	14(42.4)	12(36.4)	3 (9.1)	29(87.9)		
2	Routine Antenatal care services	No	0 (0)	2 (6.1)	0 (0)	2 (6.1)	2.56	0.35
		Yes	16(48.5)	12(36.4)	3 (9.1)	31(93.9)		
4	Diagnosis & management hypertension in pregnancy	No	7(21.2)	1(3.0)	0 (0)	8 (24.2)	5.63	0.05*
		Yes	9(27.3)	13(39.4)	3 (9.1)	25(75.8)		
5	Diagnosis & management diabetes in pregnancy	No	7(21.2)	1(3.0)	0(0)	8 (24.2)	5.63	0.05*
		Yes	9(27.3)	13(39.4)	3 (9.1)	25(75.8)		
6	Service for prevention of mother-to-child HIV transmission	No	0(0)	5(15.2)	0(0)	5(15.2)	6.96	0.02*
		Yes	16(48.5)	9(27.3)	3 (9.1)	28(84.8)		
7	Post abortion care	No	3 (9.1)	1(3.0)	0(0)	4(12.1)	1.09	0.73
		Yes	13(39.4)	13(39.4)	3 (9.1)	29(87.9)		
8	Routine offer of family planning after post abortion care	No	2(6.1)	1(3.0)	1(3.0)	4(12.1)	1.98	0.40
		Yes	14(48.5)	13(39.4)	2 (6.1)	29(87.9)		
9	Normal delivery and newborn care	No	0(0)	2(6.1)	0(0)	2(6.1)	2.56	0.35
		Yes	16(48.5)	12(36.4)	3 (9.1)	31(93.9)		
10	Assisted vaginal delivery	No	6(18.2)	4(12.1)	0(0)	10(30.3)	1.31	0.55
		Yes	10(30.3)	10(30.3)	3(9.1)	23(69.7)		
11	Cesarean section	No	16(48.5)	3(9.1)	0(0)	19(57.6)	25.38	<0.001*
		Yes	0(0)	11(33.3)	3(9.1)	14(48.5)		
12	Postnatal care services	No	0(0)	2(6.1)	0(0)	2(6.1)	2.56	0.35
		Yes	16(48.5)	12(36.4)	3(9.1)	31(93.9)		
13	Routine offer of family planning after delivery	No	0(0)	4(12.1)	0(0)	4 (12.1)	5.21	0.05*
		Yes	16(48.5)	10(30.3)	3(9.1)	29(87.9)		

14	Lab diagnostic services, including any rapid diagnostic testing	No	4(12.1)	0 (0)	1 (3.0)	5(15.2)	4.96	0.11
		Yes	12(36.4)	14(48.5)	2(6.1)	28(84.8)		
15	Blood transfusion service	No	14(48.5)	1(3.0)	0(0)	15(45.5)	22.77	<0.001*
		Yes	2(6.1)	13(39.4)	3(9.1)	18(54.5)		
16	Parenteral administration of anticonvulsant	No	6(18.2)	2(6.1)	0 (0)	8(24.2)	2.59	0.23
		Yes	10(30.3)	12(36.4)	3(9.1)	25(75.8)		
17	Induction of labour for prolonged pregnancy	No	2(6.1)	3(9.1)	0(0)	5(15.2)	0.80	0.79
		Yes	14(48.5)	11(33.3)	3(9.1)	28(84.8)		
18	Manual removal of placenta	No	0(0)	2(6.1)	0(0)	2(6.1)	2.56	0.35
		Yes	16(48.5)	12(36.4)	3(9.1)	31(93.9)		
19	Manual removal of retained products of conception	No	1(3.0)	1(3.0)	0(0)	2(6.1)	0.76	1.00
		Yes	15(45.5)	13(39.4)	3(9.1)	31(93.9)		
20	Administration of uterotonics	No	4(12.1)	1(3.0)	0(0)	5(15.2)	1.88	0.46
		Yes	12(36.4)	13(39.4)	3(9.1)	28(84.8)		
21	Parenteral administration of antibiotic	No	1(3.0)	0(0)	0(0)	1(3.0)	1.81	1.00
		Yes	15(45.5)	14(48.5)	3(9.1)	32(97.0)		
22	WHO SARA guidelines	No	14(48.5)	8(24.2)	2(6.1)	24(72.7)	3.70	0.14
		Yes	2(6.1)	6(18.2)	1(3.0)	9 (27.3)		
23	National guidelines for service delivery	No	2(6.1)	6(18.2)	0(0)	8(24.2)	4.00	0.13
		Yes	14(48.5)	8(24.2)	3(9.1)	25(75.8)		

Fisher's exact test at 0.05 level of significant

Hypothesis two

There is no significant association between the location of health facilities and the availability of essential components of maternal health services.

Table 5 shows that there is no significant association between location of health facilities and signal functions like assisted vaginal delivery, cesarean section, parenteral administration of anticonvulsant, Induction of labour, Manual removal of placenta, Manual removal of retained products of conception, Management of PPH using uterotonics, and Parenteral administration of antibiotic ($p<0.05$). Only blood transfusion service shows significant association with location of health facilities ($p = 0.01$).

Table 5: Association between the location of health facilities and availability of signal functions

SN	Signal functions	Availability	FACILITY LOCATION				
			Urban	Rural	Total	Fisher's exact	P
1	Parenteral administration of antibiotic	No	0(0.0)	1(5.6)	1(3.0)		
		Yes	15(100.0)	17(94.4)	32(97.0)	0.86	1.00
		Total	15(100.0)	18(100.0)	33(100.0)		
2	Parenteral oxytocics	No	1(6.7)	4(22.2)	5(15.2)		
		Yes	14(93.3)	14(77.8)	28(84.9)	1.54	0.35
		Total	15(100.0)	18(100.0)	33(100.0)		
3	Manual removal of placenta	No	0(0.0)	2(11.1)	2(6.1)		
		Yes	15(100.0)	16(88.9)	31(93,9)	1.77	0.49
		Total	15(100.0)	18(100.0)	33(100.0)		

4	Manual removal of retained products of conception	No Yes Total	0(0.0) 15(100.0) 15(100.0)	2(11.1) 16(88.9) 18(100.0)	2(6.1) 31(93.9) 33(100)	1.77	0.49
5	Parenteral administration of anticonvulsant	No Yes Total	3(20.0) 12(80.0) 15(100.0)	5(27.8) 13(72.2) 18(100.0)	8(24.2) 25(75.8) 33(100.0)	0.27	0.70
6	Assisted vaginal delivery	No Yes Total	3(20.0) 12(80.0) 15(100.0)	7(38.9) 11(61.1) 18(100.0)	10(30.3) 23(69.7) 33(100.0)	1.38	0.28
7	Blood transfusion service	No Yes Total	3(20.0) 12(80.0) 15(100.0)	12(66.7) 6(33.3) 18(100.0)	15(45.5) 18(54.5) 33(100.0)	7.19	0.01*
8	Cesarean section	No Yes Total	6(40.0) 9(60.0) 15(100.0)	13(72.2) 5(27.8) 18(100.0)	19(57.6) 14(42.4) 33(100.0)	3.48	0.09

Fisher's exact test at 0.05 level of significant

Hypotheses three

There is no significant difference between the extent of maternal health services provided in facilities in rural setting and that provided in urban setting.

Table 6 shows that Mann-Whitney U test indicates there is a statistically significant difference between the provision of maternal health services and facilities in rural and urban settings. These provisions include: the provision of preconception services (p = 0.27), antenatal services (p = 0.82), delivery services (0.28), postnatal services (0.99) and PMTCT of HIV (0.07).

Table 6: Comparative analysis of provision of maternal health services between facilities in the rural and urban settings

Domains of Maternal Health Care Services	Facility Location	N	Mean Rank	Mann-Whitney U (z)	P – Value
Preconception services	Urban	67	86.13	2872.0	0.266
	Rural	95	78.23		
Antenatal	Urban	62	75.05	2700.0	0.823
	Rural	89	76.66		
	Rural	95	87.41		
Delivery services (Labour care)	Urban	67	86.28	2862.0	0.275
	Rural	95	78.13		
Postnatal services	Urban	67	81.54	3180.0	0.993
	Rural	95	81.47		
PMTCT services	Urban	67	89.34	2657.50	0.074
	Rural	95	75.97		
Overall	Urban	67	82.08	3143.50	0.894
	Rural	95	81.09		

Mann-Whitney U test at 0.05 level of significant

DISCUSSION

This study assesses the availability of essential components of maternal health services in health facilities in South-East Nigeria.

The extent to which essential components of maternal healthcare is available in health facilities in South-East Nigeria

The findings of this study indicates that the level of essential components of maternal health care services is high (80.6%) in health facilities of South-East Nigeria. This study is in line with World Health Organization, (2013) that propounds that a score of 75% and above is considered good. The writers posited that all the signal functions for emergency obstetric care (EmOC) are available in most of the facilities although the availability varies across health facilities. They observe that health facilities providers in South-East Nigeria are making tremendous efforts to reduce maternal morbidity and mortality.

This study also agrees with the findings of Bintabara *et al* (2017) that observe that the health facilities assessed in Tanzania has seven signal functions. This study is in contrast with Erim *et al.* (2012) that indicate that only 40% of primary healthcare facilities they studied could provide EmOC, although, most of the referral facilities could provide EmOC. This is contrary to the findings of MEASURE Evaluation PIMA (2016) that opine that there is sub-optimal availability of basic and emergency obstetric care among health facilities they assessed in Kenya. This study also differs from findings of Nwala *et al.* (2013) that report lower availability of maternal health services in Ezeagu, Enugu State, South-East, Nigeria. The writers posit that difference might likely be as a result of difference in the setting.

The proportion of health facilities in South-East Nigeria with all the essential components of maternal healthcare services

This study reveals that majority of health facilities (51.5%) have all the essential components of maternal healthcare services.

This study further reports that only 31.3% of primary health facilities have all the six signal functions expected of BEmOC (basic EmOC facilities) facilities. The writers note that there is gap in availability of components of maternal health services, as well as, availability of signal functions across facility levels and between facilities in urban and rural areas. In health centers, very few facilities indicate availability of all the six signal functions directly related to maternal health services. These findings are of great concern because they indicate that many pregnant women who develop obstetric complications might not be benefiting from these needed services which are not available in many facilities.

This study is similar to the studies of Erim *et al* (2012) and Saidu *et al* (2013) that found that most primary healthcare facilities in Nigeria are unable to adequately provide basic EmOC services compared to most of the referral facilities which would provide EmOC. This study also agrees with Worku *et al* (2013) that reveal that majority of health facilities in North Gondar, Northwest Ethiopia are not fully functioning for EmOC according to their levels. Worku *et al* (ibid) further opine that the presence of all the six signal functions in the basic essential obstetric care facility (health center) positively contributes to utilization of all indicators of skilled maternal services, and its effect is significant on skilled attendance rate. Other researchers note that the availability of basic and comprehensive emergency obstetric care in a health care system is crucial for maternal survival (Bintabara *et al*, 2017; Bailey, Paxton, Lobis and Fry, 2006). Functional obstetric facility should be performing the essential services for normal situations and performing each signal functions for complications (Saidu, Augustin, Alio, Salihu, and Saka, 2013). These services should be available 24 hours a day and 7 days a week (Tembo, 2017). Availability and readiness of health facility is pre-requisite for quality health care (WHO, 2013). According to Worku, Yalew and Afework (2013) providing incomplete maternal service has damaging effect on health-seeking behavior of mothers.

The extent to which maternal health care is provided in health facilities in South-East Nigeria

The extent of provision of maternal health care services to childbearing women in health facilities of South-East Nigeria is high (80.18%.). This study is in support of the finings of Erim, Kolapo and Resch (2012 that all the visited facilities in Nigeria provided some form of antenatal care and/or delivery services. This study is similar to Nwala *et*

al's (2013) opinion that prenatal and delivery services are mostly available and maternal health services are made accessible to childbearing women. This study is not in line with the findings of Worku *et al.* (2013) poor accessibility to skilled delivery of maternal health services.

There is no significant association between the levels of health facilities and the availability of essential components of maternal health services.

The results of the study indicat that there is a significant association between the levels of health facilities and availability of some components of maternal health care. These include Diagnosis and management of hypertension in pregnancy, Diagnosis and management diabetes in pregnancy, Service for prevention of mother-to-child HIV transmission, Cesarean section, Routine offer of family planning after delivery and Blood transfusion service. This study shows similarity with Bintabara *et al*'s (2017) position that there is a significant association between **l**evels of health facilities and availability of signal functions of services in Tanzania.

There is no significant association between the location of health facilities and the availability of essential components of maternal health services

This study observes that there is no significant association between the location of health facilities and the availability of essential components of maternal health services except blood transfusion service. The writers note that many mothers living in the rural areas might be obliged to travel long distance to get functional facility at the time of complications that require blood transfusion.

There is no statistically significant difference between the provision of maternal health services and facilities in rural and urban settings.

The results of the study observe that there is a statistically significant difference between the provision of maternal health services and facilities in rural and urban settings. This study is not similar to Leslie, Spiegelman, Zhou and Kruk's (2017) observation that there is no significant difference between urban hospitals and rural hospitals in most of the countries studied. They however observe that urban health centres score significantly higher than rural health centres in Bangladesh, Haiti, Malawi and the United Republic of Tanzania. This study is in accordance with Majrooh, Hasnain, Akram, Siddiqui and Memon's (2014) who observed that significant differences exist between urban and rural primary health care provided by community health centres in Greece. The writers note that provision of services like preconception care, delivery care, postnatal services and PMTCT services are better in urban facilities than rural facilities while services such as antenatal care services and frequency of monitoring labor progress are better in rural facilities than urban facilities. They further assert that it might be linked to influence of excess workload. Considering that client flow is more in urban facilities than in facilities that are in rural (ILO, 2015), providers in urban facilities may be so much overworked that they may not have time to carryout needed routine client examinations during antenatal and monitoring of client during labor.

CONCLUSION

Although health facilities in South-East Nigeria show good availability of maternal health services, there is still an unmet need for maternal health services as many health facilities surveyed are not performing all the signal functions. Federal and State Ministries of Health must embark on enhancing human resource capacity and supply of basic amenities and drugs to ensure availability of all essential components of maternal health services and provision of signal functions. Rural health facilities mainly primary and secondary facilities need adequate considerations in form of monitoring and evaluation, as well as, technical support by the Federal and State Ministry of Health to enable them to be adequately prepared for skilled service provision.

This is very important because primary and secondary health facilities are the first port of call for healthcare services in South-East Nigeria and most clients utilize services from the facilities at these levels. Considering that assisted vaginal delivery is best option to cesarean section especially in BEmOC facilities and that most of the facilities surveyed do not perform this function, care providers should be trained and encouraged to conduct assisted vaginal delivery where indication is appropriate. This will help to prevent unnecessary cesarean section and/or with its possible related post-surgical complications which can lead to increased maternal morbidity and mortality.

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Conflict of interest

The authors declared that they have no conflict of interest.

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