

Knowledge and practice of basic obstetric and newborn care among health workers in primary health facilities in Sokoto State, Nigeria

Elizabeth E. Inoh^{1*}, Oche M. Oche², Kehinde J. Awosan², Ahunna Z. Ezenwoko¹,
Aisha Attahiru¹, Mfon I. Inoh³

¹Department of Community Medicine, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria

²Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria

³Department of ENT, University of Uyo Teaching Hospital, Uyo, Nigeria

ABSTRACT

Background: The World Health Organization states that about 15% of anticipated births worldwide will result in life-threatening complications during pregnancy, delivery, or postpartum. Because of the erratic nature of childbirth, emergency obstetric care has been called the bedrock in the arch of safe motherhood. Health workers are expected to possess good knowledge and appropriate practices to offer the signal functions that are the interventions for treating major causes of maternal complications and resuscitation of the newborn after delivery. **Aim:** This study aimed to determine the knowledge and practice of basic emergency obstetric and newborn care (BEmONC) among health workers in primary health facilities in Sokoto State, Nigeria. **Methods:** A cross-sectional study was conducted among 216 randomly selected health workers in the primary health facilities in Sokoto State, Nigeria. A structured self-administered questionnaire was used to collect data on the research variables. Data were analyzed using the IBM SPSS version 25 statistical computer software package. **Results:** Less than half of respondents had good knowledge (46.3%) and adequate practice (49.3%) of BEmONC with cadre being the sole predictor. Unskilled health workers were 99.2% less likely to have good knowledge of EmONC (aOR: 0.008; 95% CI: 0.002 – 0.027; $p < 0.001$) and 78.0% less likely to have adequate practice of EmONC (aOR: 0.022; 95% CI: 0.008 – 0.057; $p < 0.001$) as compared to the skilled health workers. **Conclusion:** This study showed that less than half of the respondents had good knowledge and adequate practice of basic EmONC with cadre being the sole predictor. The Sokoto State Primary Health Care Development Agency in conjunction with the Sokoto State Ministry of Health should provide a sufficient number of skilled health workers for the primary health facilities in the state in addition to organizing periodic on-the-job training for them.

Keywords: Knowledge, practice, basic EmONC, health workers, primary health facilities

INTRODUCTION

Mothers give and protect lives; they encourage the growth or development of potentials and render support to their communities in various ways based on their capabilities. However, for many women worldwide, bringing children into the world can be at the detriment of their lives because of the uncertainty of the birth outcome.¹ The high number of maternal and neonatal deaths in some areas of the world is evidence of inequities in access to health services and highlights the wide gap between the rich and poor.¹ About 2.7 million newborn babies die every year; in addition to this, another 2.6 million are stillborn, most of which die at home due to lack of skilled care that could greatly increase the possibility of them staying alive.² Most of these newborns die in rural areas of underdeveloped

countries from highly preventable causes.³ It is because of the erratic nature of childbirth that emergency obstetric and newborn care (EmONC) has been called the bedrock in the arch of safe motherhood.⁴

The EmONC care package addresses the main causes of maternal and early neonatal deaths.⁵ The World Health Organization (WHO) estimates that at least 88–98% of maternal and neonatal deaths can be averted with timely access to existing EmONC interventions.⁶ The quality of care in EmONC involves institutional and staff preparedness in the provision of appropriate emergency services while responding to the needs and rights of the clients. These include having skilled staff, functional equipment and supplies, and adequate infrastructure.⁷ Health workers' preparedness to provide

*Corresponding Author: Dr. Elizabeth E. Inoh, Department of Community Medicine, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria. E-mail: lizyino@gmail.com

Received: 19-09-2021

Revised: 05-11-2021

Accepted: 16-11-2021

Published: 30-12-2021

EmONC is the most critical element in the provision of quality care, in that they must have the knowledge and adequate skills to recognize an obstetric emergency and then respond appropriately.⁷ Health workers' knowledge and practice in EmONC services are important, especially in primary health facilities in countries with a high burden of maternal and neonatal mortality, because for most people, the primary healthcare centres (PHCs) are the only health facilities they can access.⁷

There are pieces of evidence from studies that in developing countries at least 15% of all pregnancies are expected to require emergency intervention, and the outcome of the majority of the attendant complications are unpredictable.^{8,9} Hence, deliveries should occur in facilities where health workers can provide appropriate management for complications during delivery.¹⁰ Almost 100% of births in developed countries occur with skilled birth attendants (SBAs), but more than half of births in sub-Saharan Africa still take place without the aid of SBAs.^{11,12} According to NDHS 2018, only 39% of births in Nigeria and 7.8% of deliveries in Sokoto State, Nigeria take place in health facilities. Only 43% of births in Nigeria and 9.2% of deliveries in Sokoto State, Nigeria are assisted by an SBA.¹⁰ There are more SBAs in secondary and tertiary healthcare facilities than primary healthcare facilities.¹⁰ The majority of health workers in PHC facilities across all states in Nigeria are Community Health Extension Workers (CHEWs).^{13,14} When complications occur, a timely diagnosis and appropriate intervention, both of which require good knowledge, practice and skills can prevent death, morbidity, and severe disability.^{15,16} Many of the health workers in the primary health facilities lack the knowledge and skills that are necessary to prevent, recognize and manage the major causes of maternal and newborn deaths.^{17,18}

A cross-sectional study in Banke, Nepal, found that the majority (89%) of auxiliary nurse midwives had good knowledge of maternal and newborn care.¹⁹ A study in Ethiopia showed that 88% had poor knowledge of danger signs and complications in pregnancy.²⁰ A study in southwest Nigeria showed that 91% of health workers had poor knowledge of EmOC.²¹ Another study in Rivers State, Nigeria showed that 28.9% urban and 16.4% rural health workers had good knowledge of EmONC.²² A study in Nigeria showed the most common signal function performed in the primary health care centers was manual removal of placenta (66.7%), followed by administration of parenteral oxytocics (65.0%) and antibiotics (63.3%).²³

Due to the shortage of skilled manpower in Sokoto State, Community Health Extension Workers (CHEWs) are trained alongside Community Health Officers (CHOs), nurses, and midwives through the modified life-saving skills to conduct deliveries and perform the basic EmONC signal functions.^{24,25} Despite the need to proffer solutions to the health workforce shortage, it is important to have providers with good knowledge and adequate practice providing basic EmONC services, particularly in places with a high burden of maternal and newborn mortality like Sokoto State. This study will provide data on the level of knowledge and practices of health workers in offering EmONC services, especially as the majority of the health workers in the primary health facilities in the state are not statutorily expected to take deliveries but are now part of the workforce in the maternity units of these facilities. This study was conducted to determine the knowledge and practice of basic emergency obstetric and newborn care among health workers in primary health facilities in Sokoto State, Nigeria.

MATERIALS AND METHODS

Study Design and Population

This cross-sectional study was carried out in Sokoto State, Nigeria from April to June 2019. The state is made up of twenty-three Local Government Areas (LGAs) of which four are metropolitan.²⁶ The study population comprised midwives, nurses, CHOs, SCHEWs and JCHEWs offering maternity services in the primary healthcare facilities in the state. All those who have been in the maternity unit of the respective facilities for at least 6 months before the commencement of the study were considered eligible and enrolled into the study, while those who were on leave at the commencement of the study were excluded.

Sample Size Estimation and Sampling Technique

Two hundred and sixteen eligible participants were selected by a two-stage sampling technique and enrolled into the study following sample size estimation. In stage 1, two of the three senatorial zones in the state were selected by simple random sampling using the balloting option. In stage 2, four of the eight LGAs in each of the selected senatorial zones were selected by simple random sampling using the balloting option. All the 10 primary health facilities in each of the selected LGAs (making a total of 80) were used as study centers. Also, all the eligible health workers in the maternity unit of the selected primary health facilities were enrolled into the study.

Data Collection and Analysis

A structured interviewer-administered questionnaire was adapted from the instrument used in previous studies^{15,19,27-31} and used to obtain information on the respondents' socio-demographic characteristics, and their knowledge and practices regarding EmONC. The questionnaire was reviewed by senior researchers in the Department of Community Health, Usmanu Danfodiyo University Sokoto, Nigeria to ascertain content validity. Ten Community Health Officers (CHOs) 2nd year students were recruited as research assistants and trained on the objectives of the study, selection of study subjects, field activities and questionnaire administration. The questionnaire was pretested on 12 health workers in Wurno LGA (being one of the LGAs that were not selected for the study) by the principal researcher and the research assistants (after their training).

Knowledge of EmONC was assessed on a 69-item scale, one point was awarded for a correct response, while a wrong response or none response received no point; this gives a minimum of 0 and a maximum of 69 points. Those who scored ≥ 35 points were graded as having good knowledge, while those who scores < 35 points were graded as having poor knowledge. Practice of EmONC was assessed on a 30-item scale, one point was awarded for observing a practice, while zero was awarded for not observing it; this gives a minimum of 0 and a maximum of 30 points. Those who scored ≥ 15 points were graded as having adequate practice, while those who scores < 15 points were graded as having inadequate practice. Data were analyzed using the IBM SPSS version 25.0 statistical software package. Quantitative variables were summarized using mean and standard deviations, while qualitative variables were summarized using frequencies and percentages. Binary logistic regression analysis was used to determine the predictor of good knowledge and adequate practice of EmONC. All levels of statistical significance were set at $p < 0.05$.

Ethical Consideration

Ethical approval for the study was obtained from the Research and Ethics Committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission was obtained from the State Primary Health Care Development Agency before proceeding with the study, while informed consent was obtained from the participants.

RESULTS

Socio-demographic characteristics of respondents

The ages of the respondents ranged from 20-62 years with a mean age of 34.6 ± 8.9 years and majority of them 133 (61.6%) were aged 30-49 years. Majority of the 216 respondents were females 179 (82.5%) and married 176 (81.4%). Most of the respondents 200 (92.6%) were Moslems, and the majority of them were Community Health Extension Workers 135 (62.5%) and have being in practice for less than 10 years 128 (59.3%). Less than a half of respondents 95 (44.0%) attended a training program on EmONC in the past one year [Table 1].

Table 1: Socio-demographic characteristics of respondents

Variables	Frequency (%) n = 216
Age group (years)	
20-29	67 (31.0)
30-39	85 (39.4)
40-49	48 (22.2)
50-59	13 (6.0)
≥ 60	3 (1.4)
Sex	
Male	37 (17.1)
Female	179 (82.9)
Religion	
Islam	200 (92.6)
Christianity	16 (7.4)
Marital status	
Single	34 (15.7)
Married	176 (81.4)
Separated	1 (0.5)
Divorced	4 (1.9)
Widowed	1 (0.5)
Cadre	
Midwife	19 (8.8)
Nurse	15 (6.9)
CHO	47 (21.8)
SCHEW	64 (29.6)
JCHEW	71 (32.9)
Years of practice	
< 10	128 (59.3)
≥ 10	88 (40.7)
Attended training on EmONC in the past one year	95 (44.0)

Respondents' knowledge of types and components of EmONC

None of the respondents knew the types of EmONC. Although, the majority of the 216 respondents knew parenteral oxytocin 138 (63.9%), assisted vaginal delivery 134 (62.0%) and manual removal of placenta 128 (59.3%) as a component of EmONC, only about a third of them knew neonatal resuscitation 65 (30.1%), blood transfusion 85 (39.4%), and caesarean section 69 (31.9%) as components of EmONC (Table 2).

Table 2: Respondents' knowledge of components of emergency obstetric and newborn care

Variables	Correct responses Frequency (%) n = 216
Types of EmONC	0 (0)
Components of EmONC	
IV antibiotics	109 (50.5)
IV anticonvulsants	121 (56.0)
IV oxytocin	138 (63.9)
Assisted vaginal delivery	134 (62.0)
Manual removal of placenta	128 (59.3)
Removal of retained product	53 (24.5)
Neonatal resuscitation	65 (30.1)
Blood transfusion	85 (39.4)
Caesarean section	69 (31.9)

Respondents' knowledge of causes of maternal mortality and complications averted by EmONC

Whereas, the majority of the 216 respondents knew postpartum haemorrhage 138 (63.9%), eclampsia 147 (68.1%) and obstructed labour 131 (60.6%) as direct causes of maternal mortality, only 51 (23.6%) knew that malaria is not a direct cause of maternal mortality, and the most commonly identified complications that can be averted by EmONC were haemorrhage 136 (63.0%) and pre-eclampsia/eclampsia 134 (62.0%) [Table 3].

Table 3: Respondents' knowledge of causes of maternal mortality and complications averted by EmONC

Variables	Frequency (%) n = 216
Causes of maternal mortality	
Postpartum haemorrhage	138 (63.9)
Postpartum psychosis	50 (23.1)
Eclampsia	147 (68.1)
Prepartum migraine	36 (16.7)
Sepsis	116 (53.7)
Obstructed labour	131 (60.6)
Septic abortion	100 (46.3)
Malaria	51 (23.6)
Anaemia	90 (41.7)
Multiple gestation	115 (53.2)
Seizures	67 (31.0)
Complications averted by EmONC	
Haemorrhage	136 (63.0)
Pre-eclampsia/Eclampsia	134 (62.0)
Malaria in pregnancy	81 (37.5)
Prolonged obstructed labour	113 (52.3)
Sepsis	100 (46.3)
Foetal distress	103 (47.7)

Respondents' knowledge of management of the commonest causes of maternal and neonatal mortality

The majority of the 216 respondents knew that oxytocin is used in the management of post-partum haemorrhage

142 (65.7%). Depressed breathing was the most commonly known sign of birth asphyxia 171 (79.2%), while weakness was the least known sign of birth asphyxia 107 (49.5%). Less than a half 100 (46.3%) of them had good knowledge of the management of the commonest causes of maternal and neonatal mortality (Table 4).

Table 4: Respondents' knowledge of management of commonest causes of maternal and newborn mortality

Variables	Frequency (%)	n
		= 216
Eclampsia		
IV fluids	134 (62.0)	
IM MgSO ₄ (5g on each buttock)	134 (62.0)	
IV MgSO ₄ (5g)	39 (18.1)	
IM MgSO ₄ (5g on alternate buttock)	54 (25.0)	
Postpartum haemorrhage		
IV fluids	98 (45.4)	
Oxytocin	142 (65.7)	
Antibiotics	98 (45.4)	
Refer	106 (49.1)	
Obstructed labour		
IV fluids	131 (60.6)	
IM MgSO ₄ (5g on each buttock)	67 (31.0)	
Oxytocin	125 (57.1)	
Antibiotics	151 (69.9)	
Caesarean section	116 (53.7)	
Refer	161 (74.5)	
Birth asphyxia signs and management		
Depressed breathing	171 (79.2)	
Weakness	107 (49.5)	
Increased heart rate	154 (71.3)	
Cyanosis	142 (65.7)	
IV fluids	101 (46.8)	
Suctioning	166 (76.9)	
Use of face mask/ambu bag	174 (80.6)	
Refer	165 (76.4)	
Overall knowledge grade		
Good knowledge	100 (46.3)	
Poor knowledge	116 (53.7)	

Respondents' practice of basic EmONC signal functions and routine observation and practices during labour

Only 79 (36.6%) of the 216 respondents often looked out for convulsion in pregnant women. About half of the respondents 115 (53.2%) often looked out for high blood pressure in pregnant women. Also, half of the respondents 109 (50.5%) often looked for oedema in pregnant women (Table 5).

Sixty-eight (31.5%) of the respondents routinely use partograph to monitor the progress of labour. The most commonly performed signal function was parenteral oxytocic 153 (70.5%), less than half 91 (42.1%) had

performed manual removal of placenta in the past 3 months, and less than half, 106 (49.1%) of the 216 respondents had adequate practice of basic EmONC signal functions (Table 6).

Table 5: Respondents' routine observation for danger signs in pregnant women

Danger signs	Frequency (%) n = 216
Vaginal bleeding	109 (50.5)
Prolonged labour	104 (48.1)
Convulsion	79 (36.6)
Oedema	109 (50.5)
Anaemia	111 (51.4)
High blood pressure	115 (53.2)
Fetal heart rate	89 (39.4)
Malpresentation	76 (35.2)
Severe headache	91 (42.1)
Severe vomiting	91 (42.1)
Offensive vaginal discharge	101 (46.8)
High fever	111 (51.4)
Low blood pressure	91 (42.1)
Blurred vision	79 (36.6)
Abdominal pain with fainting attack	77 (35.6)
Burning epigastric pain	74 (34.3)
Premature rupture of membrane	82 (38.0)
High pulse rate	85 (39.4)

Predictor of knowledge and practice of EmONC among respondents

The only predictor of good knowledge and adequate practice of basic EmONC among the respondents was their cadre. Unskilled health workers (i.e., SCHEWs and JCHEWs, as they were not statutorily trained to perform EmONC functions) were 99.2% less likely to have good knowledge of EmONC (aOR: 0.008; 95% CI: 0.002 – 0.027; $p < 0.001$) and 78.0% less likely to have adequate practice of EmONC (aOR: 0.022; 95% CI: 0.008 – 0.057; $p < 0.001$) as compared to the skilled health workers [Table 7].

DISCUSSION

This study assessed the knowledge and practice of basic emergency obstetric and newborn care among primary healthcare workers in Sokoto State, Nigeria. Majority of the health workers in this study were CHEWs, and this is similar to finding in a study conducted in the southwestern part of Nigeria,²¹ but differs from the finding in a study conducted in Rivers State²² where most of the respondents were midwives/nurses.

Table 6: Respondents' practice of basic emergency obstetric and newborn care signal functions and routine observation and practices during labour

Danger signs	Frequency (%) n = 216
Used partograph routinely	68 (31.5)
Parenteral antibiotics	145 (67.1)
Parenteral oxytocics	153 (70.8)
Manual removal of placenta	91 (42.1)
Removal of retained products	122 (56.5)
Newborn resuscitation	99 (45.8)
Inadequate dilatation of the cervix	158 (73.1)
Irregular uterine contraction	164 (75.9)
Discharge of bloody mucus	154 (71.3)
Breaking of water/rupture of membrane	150 (69.4)
Immediate oxytocin	202 (93.5)
Controlled cord traction	212 (98.1)
Overall practice grade	
Adequate practice	106 (49.1)
Inadequate practice	110 (50.9)

The preponderance of CHEWs in this study and among the health personnel of the state may be because their emolument is less than those of nurses/midwives, making it economically expedient for government to employ more CHEWs as compared to the other health workers in the state's health workforce.

Within the past one year, less than half of the respondents in this study had received training on EmONC, implying that their exposure to in-service training on EmONC was inadequate. It is therefore not surprising that none of them could mention the types of EmONC, and most of them did not know the components of basic EmONC. This contrasts with the findings from a study in Rivers State, Nigeria where most of the respondents could mention the types and identify the components of EmONC.²² The dissimilarity may be attributed to the frequency of training, and the cadre of respondents. Not knowing the types and components of EmONC means they would not also know what complications they are expected to manage and the ones to refer to the next level of care. This is dangerous because a woman who needs to be referred may be retained at the PHC level where they lack the facilities and skills to manage her condition which could result to death, thereby increasing maternal and neonatal deaths. These findings underscore the need for the State Primary Healthcare Development Agency to organize periodic on-the-job training particularly on EmONC for the primary healthcare workers in the state in

Table 7: Predictor of knowledge and practice of EmONC among respondents

Variables	Knowledge				Practice			
	aOR	95% CI		p-value	aOR	95% CI		p-value
		Lower	upper			lower	upper	
Age (<40 vs > 40*)	0.700	0.235	2.080	0.520	1.417	0.516	3.896	0.499
Sex (Female vs Male*)	0.633	0.229	1.750	0.378	0.965	0.364	2.557	0.943
Marital Status (Unmarried vs Married*)	0.730	0.256	2.086	0.557	0.991	0.367	2.677	0.985
Religion (Islam vs Christianity*)	0.573	0.097	3.391	0.540	1.655	0.442	6.203	0.455
Cadre (Skilled vs Unskilled*)	0.008	0.002	0.027	<0.001**	0.022	0.008	0.057	<0.001**
Years of practice (<10yrs vs ≥10yrs*)	0.958	0.556	1.650	0.878	0.958	0.556	1.650	0.878

aOR = adjusted Odds Ratio; CI = Confidence Interval; * Reference group; **Significant (p < 0.05)

in conjunction with the State Ministry of Health, Non Governmental Organizations, and other stakeholders who are involved in promoting maternal and child health.

The most identified major cause of mortality by the respondents in this study was eclampsia followed by postpartum haemorrhage; this is similar to the finding in a study in south-south Nigeria which reported haemorrhage topping the list followed by pregnancy-induced hypertension.²² The risk factors for haemorrhage are common in the study area; hence the health workers are faced with many cases of haemorrhage. Majority of the respondents did not know that malaria is an indirect cause of maternal mortality. This is a direct contrast from the finding in a similar study in southern Nigeria, where 69.9% of respondents could identify malaria as an indirect cause of maternal mortality.²² Since malaria is endemic in Nigeria, it's a common presentation of pregnant women at various health facilities, it is erroneously assumed by many to be a major direct cause of maternal mortality. The majority of the respondents knew that haemorrhage and eclampsia could be averted by BEmONC. This may not be surprising as they knew that haemorrhage and eclampsia were major causes of maternal mortality. Their knowledge of this may improve their response when they encounter patients with these conditions, which may help in reducing deaths as a result of haemorrhage and eclampsia.

The least reported assessment from a partograph by the respondents in this study was dehydration in mother, this is also similar to the finding of the study conducted in Ethiopia.³² The majority of the respondents did not know the correct dosage of intravenous MgSO₄ for the management of eclampsia. The dosage was changed to 5g and the majority of the respondents still considered it to be correct. An overdose of drugs could result to other complications which may affect the newborn's health, hence, prolonging their hospital stay. Only a quarter knew that the drug should be given on alternate buttocks. This may be because they only administer a loading dose of MgSO₄ and refer. This increases the workload for health workers at the next level of care. It is imperative for midwives and nurses to acquire the basic knowledge and skills that are required to manage eclampsia. To achieve this, training institutions should pay sufficient attention to it in their training curriculum, while heads of institution and policymakers should facilitate periodic on-the-job training on how to carry out this function effectively when the need arises.

More than half of them thought antibiotics should be given as part of the management for postpartum haemorrhage and obstructed labour. The severity of an illness is perceived to be higher when a patient receives intravenous fluids and antibiotics. Many health workers often consider a management regimen incomplete when antibiotics are not administered. Studies have shown there is an over-prescription of antibiotics by health workers, and overuse by the public.^{33,34}

This has contributed to the abuse of antibiotics in Nigeria; it is also a contributing factor to antibiotic resistance which could also increase the duration of hospital stay, increase medical cost, and result to more deaths.³⁴ About half of them did not know that the caesarean section is a part of the management for obstructed labour. This is similar to the finding in a study in Malawi where only (56.0%) of the respondents could identify the right management for pre-eclampsia and eclampsia.³⁵ Not knowing the right management for certain conditions is endangering the lives of pregnant women and their newborns; especially when the wrong management is given, resulting in very devastating consequences.

Regarding the practice of EmONC, most of the respondents in this study do not routinely monitor labour with a partograph. This is less than the finding in Ethiopia where 57.3% of respondents routinely use a partograph to monitor a woman in labour.²⁷ For a woman with prolonged or obstructed labour a timely decision could save her and her baby with the use of a partograph. A woman with obstructed labour may die within 72 hours in the absence of timely intervention.³⁶ The most performed signal function by the respondents in this study was the administration of parenteral oxytocin, probably because it requires little skill. This is similar to the finding in a study conducted in six countries including Nigeria but slightly different from the finding in a study conducted in Oyo State Nigeria where the most performed signal function was manual removal of placenta, followed by administration of parenteral oxytocin.^{23,37} Oxytocin has been identified as the best drug for the prevention of postpartum haemorrhage, WHO recommends it as the first-line drug for active management of the third stage of labour.³⁸ Life-threatening conditions may develop spontaneously, often in previously uncomplicated pregnancies.⁴ Hence, the need for SBAs to have the capacity to identify danger signs during pregnancy, labour and delivery; and provide timely interventions and referral when the need arises.³⁶

Just about half of the respondents check for bleeding in their patients. Bleeding remains the number one cause of death among pregnant women, and all SBAs should always lookout for it. Without prompt treatment, those with postpartum and antepartum haemorrhage may die within 2 and 12 hours respectively.³⁶ Only a third of the respondents often lookout for convulsion in pregnant women. Oedema, severe headache, epigastric pain, blurred vision, and high blood pressure are accompanying warning signs for pre-eclampsia and

eclampsia; therefore, they should not be overlooked. Women with eclampsia could die within 2 days if appropriate and timely intervention is not given.³⁶ There is a need for training and retraining of health workers; also, on the job supervision is necessary to help improve their practices.

Less than half of the respondents in this study often lookout for severe vomiting in pregnant women. Nausea and vomiting are usual signs in pregnancy, but when it is severe, it could lead to dehydration, and if it is not properly managed can result in shock and possibly death. Only half and less than half of the respondents were in check for high fever offensive and vaginal discharge respectively, these may be pointers to sepsis. Pregnant women with infection if not given appropriate medical intervention could die within 6 days.³⁶ All these deaths are preventable, but if the health workers cannot identify and manage them properly then women will keep dying because of sepsis.

Less than half and only a third of the respondents in this study assess their patients for low blood pressure and high pulse rate. These are indicators that the patient is in shock, but most of the respondents overlook these signs. A patient in shock may be missed because the signs were not observed and the consequences could be devastating. Most of the signs that were listed earlier (hemorrhage, severe vomiting, sepsis, anemia, prolonged labor, etc.) could lead to shock. A similar study in Nepal showed that the respondents had good knowledge of the danger signs, but only 26.0% of them check for and manage the danger signs seen in pregnancy appropriately.¹⁹

The labour practices of the respondents in this study were fair as most of them often lookout for inadequate dilatation of the cervix, irregular uterine contraction, discharge of blood and mucous, and rupture of membrane. The majority of the respondents gave oxytocin and performed controlled cord traction as part of active management of the third stage of labour (AMTSL), which is ideal. This is similar to the finding in a study in Rwanda where 80.0% of the respondents gave oxytocin to women in labour, but the proportion of respondents who performed controlled cord traction was low (40.2%).³⁹ A study in Nepal showed that check-up and management when danger signs were seen during delivery was 11.0%, and during the postnatal period, it was 15.0%.¹⁹ This is different from the findings in this study where labour practices were better than during pregnancy.

While the finding of cadre being the sole predictor of good knowledge and adequate practice of basic EmONC in this study with unskilled workers (i.e., JCHEWs and SCHEWs) being less likely to have good knowledge of EmONC and adequate practice of EmONC is not surprising as they were not statutorily trained to perform EmONC functions, it brings to the fore the need for the state government to ensure that the maternity units in the primary health facilities across the state are adequately staffed with skilled birth attendants in addition to organizing periodic on-the-job training on how to carry out EmONC functions for them.

CONCLUSION

This study showed that less than half of the respondents had good knowledge and adequate practice of basic EmONC with cadre being the sole predictor. The Sokoto State Primary Health Care Development Agency in conjunction with the Sokoto State Ministry of Health should provide a sufficient number of skilled health workers for the primary health facilities in the state in addition to organizing periodic on-the-job training for them.

Acknowledgments

The authors appreciate everyone who has contributed to the success of this work, especially the consultants and resident doctors in the Department of Community Medicine, Usmanu Danfodiyo University Teaching Hospital, Sokoto, Nigeria, and all the health workers that participated in the study.

Source of support

Nil.

Conflict of interest

None declared.

REFERENCES

1. USAID. Ending Preventable Maternal Mortality: USAID Maternal Health Vision for Action. United States Agency for International Developments; 2014. Available at: <https://www.usaid.gov/sites/default/files/documents/1864/MCHVision.pdf> [Last accessed on 2017 February 2].
2. WHO. Neonatal Mortality. Geneva: World Health Organization; 2019. Available at: https://www.who.int/gho/child_health/mortality/neonatal_text/en/ [Last accessed on 2020 October 29].
3. WHO. Newborn: Reducing Mortality. Geneva: World Health Organization; 2016. Available at: <https://www.who.int/mediacentre/factsheets/fs333/en/> [Last accessed on 2016 November 26].
4. Li XF, Fortney JA, Kotelchuck M, Glover LH. The postpartum period: the key to maternal mortality. *Int J Gynaecol Obstet* 1996; 54(1): 1-10.
5. Gabrysch S, Simushi V, Campbell OMR. Availability and distribution of, and geographical access to emergency obstetric care in Zambia. *Int J Obstet* 2011; 114(2): 174-9.
6. WHO. Mother Baby Package: Implementing safe motherhood in countries. A practical guide. Geneva: World Health Organization; 1996. Available at: https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/WHO_FHE_MSM_94_11/en/ [Last accessed on 2016 August 15].
7. Olenja J, Godia P, Kibaru J, Egondi T. Influence of Provider Training on Quality of Emergency Obstetric Care in Kenya. Kenya Working papers. No. 3 Calverton, Maryland, USA: Macro International Inc.; 2009.
8. Paxton A, Maine D, Freedman L, Fry D, Lobis S. The evidence of emergency obstetric care. *Int J Obstet* 2005; 88(2): 181-93.
9. Bailey P, Paxton A, Lobis S, Fry D. Measuring progress towards the MDG for maternal health: including a measure of the health system's capacity to treat obstetric complications. *Int J Gynaecol Obstet* 2006; 93(3): 292-9.
10. NPC and ICF. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria and Rockville, Maryland, USA: National Population Commission and ICF; 2019.
11. Essendi H, Mills S, Fotso J. Barriers to formal emergency obstetric care services' utilization. *J Urban Health* 2011; 88 Suppl 2(Suppl 2): S356-69.
12. Paxton A, Bailey P, Lobis S. The United Nations Process Indicators for emergency obstetric care: Reflection based on a decade of experience. *Int J Gynaecol Obstet* 2006; 95: 192-208
13. FMOH. National Human Resources for Health Strategic Plan 2008 to 2012. Abuja, Nigeria: Federal Ministry of Health; 2007.
14. WHO. Global Atlas of Healthcare Workforce. Geneva: World Health Organization; 2010. Available at: <https://www.who.int/workforcealliance/knowledge/sources/hrhglobalatlas/en/> [Last accessed on 2019 December 20].
15. Chaturvedi S, Upadhyay S, De Costa A. Competence of birth attendants at providing emergency obstetric care under India's JSY conditional cash transfer program for institutional delivery: an assessment using case vignettes in Madhya Pradesh province. *BMC Preg Childbirth* 2014; 14(174):1471-2393.
16. Canavan A. Review of global literature on maternal health interventions and outcomes related to skilled attendance. KIT Working Papers series H3. Amsterdam: KIT 2009. Available at: https://www.kit.nl/wp-content/uploads/2018/08/1552_Review-of-global-literature-maternal-health.pdf [Last accessed on 2017 November 28].
17. Khan KS, Wojdyla D, Say L, Gulmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. *Lancet*. 2006; 367(9516): 1066-1074.

18. Fortney JA. Emergency obstetric care: the keystone in the arch of safe motherhood. *IJOG*. 2001; 74:95-97
19. Dhital SR, Dhital MK, Aro AR. health staff perspectives on the quality of maternal and newborn care in Banke, Nepal. *Health Sci J* 2015; 5:55-61.
20. Medhanyie A, Spigt M, Dinant G, Blanco R. Knowledge and performance of the Ethiopian health extension workers on antenatal and delivery care: a cross-sectional study. *Human Resources Hlth* 2012; 10(44): 2-8.
21. Ijadunola KT, Ijadunola MY, Esimai OA, Abiona TC. New paradigm old thinking: the case for emergency obstetric care in the prevention of maternal mortality in Nigeria. *BMC Women's Health* 2010; 10: 6.
22. Ebuehi OM, Chinda GN, Sotunde OM, Oyetoyan SA. Emergency obstetric care: urban versus rural comparison of health workers' knowledge, attitude and practice in Rivers State, Nigeria-Implications for maternal health care in Rivers State. *Clinical Med Diag* 2013; 3(2): 29-51.
23. Bamgboye EA, Adebisi AO, Fatiregun AA. Assessment of emergency obstetric care services in Ibadan- Ibarapa Health Zone, Oyo State, Nigeria. *Afr J Repro Hlth*. 2016; 20(1): 88-97.
24. FMOH. Task-Shifting and Task Sharing Policy for Essential Health Care Services in Nigeria. Abuja, Nigeria: Federal Ministry of Health 2014. Available at: <https://advancefamilyplanning.org/sites/default/files/resources/Nigeria%20taskshifting%20policy-Aug2014%20REVISED%20CLEAN%20Approved%20October%202014.pdf> [Last accessed on 2019 November 18]
25. SSPHCDA. Agenda for 28 Days Modified Life Saving Skills Program in Sokoto State. Sokoto: Sokoto State Primary Health Care Development Agency 2017.
26. Tsoho UH. Growth and History of the Establishment of Makera Assada in Sokoto Metropolis. B.A project, History Department, Usmanu Danfodiyo University Sokoto 2007.
27. Traore M, Arsenaault C, Schoemaker-Marcotte C, Coulibaly A, Huchon C, Alexandre D, et al. Obstetric competence among primary health care workers in Mali. *Int J Gynaecol Obstet* 2014; 126(1):50-55.
28. Das JK, Kumar R, Salam RA, Lassi ZS, Bhutta ZA. Evidence from facility level inputs to improve quality care for maternal and newborn health: interventions and findings. *Reprod Health* 2014; 11(Suppl 2): S4.
29. Mirkuzie AH, Sisay MM, Bedane MM. Standard basic emergency obstetric and newborn care training in Addis Ababa: trainees reaction and knowledge acquisition. *BMC Med Educ*. 2014; 14: 201.
30. Kim YM, Ansari N, Kols A, Tappis H, Currie S, Zainullah P, et al. Assessing the capacity for newborn resuscitation and factors associated with providers' knowledge and skills: a cross-sectional study in Afghanistan. *BMC Pediatr*. 2013; 13:140.
31. Wakgari N, Tessema GA, Amano A. Knowledge of partograph and its associated factors among obstetric care providers in North Shoa Zone, Central Ethiopia: a cross sectional study. *BMC Res Notes* 2015; 8:407.
32. Yisma E, Dessalegn B, Astatkie A, Fesseha N. knowledge and utilization of partograph among obstetric caregivers in public health institutions of Addis Ababa, Ethiopia. *BMC Pregn Childbirth* 2013; 13:17.
33. Akerele J, Ahnokhai I, Amadasun J. Proportionate cost of component of antibacterial agents in prescriptions: a retrospective study of a teaching hospital in Benin City, Nigeria. *Pharm Pract Continuing Edu* 2000; 3(2):6-9.
34. WHO. Antimicrobial resistance and primary health care. Geneva: World Health Organization 2018. Available at: <https://apps.who.int/iris/bitstream/handle/10665/326454/WHO-HIS-SDS-2018.56-eng.pdf> [Last accessed on 2019 December 20].
35. Bayley O, Colbourn T, Nambiar B, Costello A, Kachale F, Meguid T, et al. Knowledge and perceptions of quality of obstetric and newborn care of local health providers: a cross-sectional study in three districts in Malawi. *Malawi Med J* 2013; 25(4): 105-108.
36. WHO, UNFPA, UNICEF, AMDD. Monitoring Emergency Obstetric Care a Handbook. Geneva: 2009. Available from <https://www.unfpa.org/publications/monitoring-emergency-obstetric-care>. Accessed on 31/7/2017. [Last accessed on 2017 July 31]
37. Ameh C, Msuya S, Hofman J, Raven J, Mathai M. Status of emergency obstetric care in six developing countries five years before the MDG targets for maternal and newborn health. *PLoS ONE*. 2012; 7(12): e49938.
38. WHO. WHO Statement Regarding the Use of Misoprostol for PPH Prevention and Treatment. Geneva: World Health Organization 2009. Available at: http://apps.who.int/iris/bitstream/handle/10665/70053/WHO_RHR_09.22_eng.pdf;jsessionid=F3CB15A4FB7511EAEC702481F13B33B6?sequence=1 [Last accessed on 2017 November 28]
39. Puri R. Knowledge, attitudes and practice of obstetric care providers in Bugesera District Rwanda. Duke Global Health Institute, Duke University. Dissertation. 2011.

How to cite this article: Inoh EE, Oche OM, Awosan KJ, Ezenwoko AZ, Attahiru A, Inoh MI. Knowledge and practice of basic obstetric and newborn care among health workers in primary health facilities in Sokoto State, Nigeria. *Int Arch Med Health Res* 2021; 2(2): 10-18.