ORIGINAL RESEARCH ARTICLE

Quality of labour and uncomplicated delivery care: a formative assessment of selected health facilities in Ebonyi and Kogi States, Nigeria

DOI: 10.29063/ajrh2020/v24i4.8

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Abstract

Maternal Child Survival Program (MCSP) worked in Ebonyi and Kogi States between 2014 to 2018 to improve quality of maternal, child and newborn health care. A formative assessment was conducted in selected health facilities to examine the quality of care received by mothers and their newborns at all stages of normal birth on the day of birth. Health providers attending deliveries at 13 facilities in the two states were observed by trained health professionals. Forty health facilities with a high volume of at least 50 Antenatal Care visits per month and deliveries were purposively selected from 120 quality improvement health facilities. Screening for danger signs at admission was conducted for only 10.5% cases in labor and providers adhered to most recommended infection prevention standards but only washed hands before birth in 19.5% of cases. Chlorhexidine gel was applied to the newborn's umbilical stump in only 2% cases while partograph was used in 32% of the cases. No newborns received the full package of essential care. Potentially harmful practices were observed especially holding newborn babies upside down in 32% cases. Improved provider training and mentoring in high-quality care on the day of birth and strengthened supportive supervision may help to reduce maternal and newborn morbidity and mortality. *(Afr J Reprod Health 2020; 24[4]:69-81).*

Keywords: Maternal, Newborn, Quality, Nigeria, Delivery Care

Résumé

Le programme de survie de la mère et de l'enfant (MCSP) a travaillé dans les États d'Ebonyi et de Kogi entre 2014 et 2018 pour améliorer la qualité des soins de santé maternelle, infantile et néonatale. Une évaluation formative a été menée dans certains établissements de santé pour examiner la qualité des soins reçus par les mères et leurs nouveau-nés à tous les stades de l'accouchement normal le jour de la naissance. Les prestataires de santé assistant aux accouchements dans 13 établissements des deux États ont été observés par des professionnels de la santé formés. Quarante établissements de santé avec un volume élevé d'au moins 50 visites de soins prénatals par mois et les accouchements ont été sélectionnés à dessein parmi 120 établissements de santé améliorant la qualité. Le dépistage des signes de danger à l'admission n'a été effectué que pour 10,5% des cas pendant le travail et les prestataires ont adhéré à la plupart des normes de prévention des infections recommandées, mais ne se sont lavés les mains avant la naissance que dans 19,5% des cas. Un gel de chlorhexidine a été appliqué sur le moignon ombilical du nouveau-né dans seulement 2% des cas, tandis que le partogramme a été utilisé dans 32% des cas. Aucun nouveau-né n'a reçu l'ensemble complet des soins essentiels. Des pratiques potentiellement néfastes ont été observées, notamment en tenant les nouveau-nés à l'envers dans 32% des cas. L'amélioration de la formation et du mentorat des prestataires de soins dans les soins de haute qualité le jour de la naissance et le renforcement de la supervision formative peuvent contribuer à réduire la morbidité et la mortalité maternelles et néonatales. *(Afr J Reprod Health 2020; 24[4]:69-81).*

Mots-clés: Maternelle, nouveau-né, qualité, Nigéria, soins à l'accouchement

Introduction

Poor quality of labor and delivery care on the day of birth is a major contributor to poor maternal and newborn outcomes in low and middle-income countries[1]. In 2015 Nigeria recorded the highest number of estimated maternal deaths globally[2]. The quality of care offered at maternity facilities not only affects pregnant women both emotionally and physically but also has an impact on the long-term

health and survival of mothers and neonates[2,3]. Nigeria, with 58,000 annual maternal deaths, accounts for 19% of the global burden of maternal mortality[4]. Improved quality of maternal and newborn services on the day of birth is necessary to achieve the global Sustainable Development Goal targets of <70 maternal deaths per 100,000 live births and neonatal mortality rate (NMR) of <12/1000 live births in Nigeria[5]. Yet a study in 2015 in Nigeria found that there was suboptimal coverage of quality maternal and child health services in 90% of cases[6].

Globally, 42% of all maternal deaths, 1.02 million stillbirths, and 904,000 neonatal deaths occur annually during the intrapartum period[7]. About 99% of these occur in low- and middle-income countries[7] because of weak health systems, including insufficient human resources for health and poor health care financing. Modelling indicates that with good-quality emergency obstetric and newborn care, about 613,000 intrapartum-related neonatal deaths per year could be averted[8].

Quality of care is defined as the extent to which health care services provided to individuals and patient populations improve desired health outcomes[9]. To improve outcomes, health care must be safe, effective, timely, efficient, equitable, and people-centered[9,10]. To achieve optimal care for pregnant women and reduce the maternal mortality ratio (MMR) and NMR, regular assessment of the quality of care pregnant women receive on the day of birth is necessary[11].

Recognizing the quality of care as a key factor in preventing maternal and child deaths, the World Health Organization (WHO) developed a maternal and newborn health quality of care framework[12], built upon the Donabedian model for quality of care[9]:

1. Structure: Physical and organizational characteristics where health occurs
2. Process: Focus on the care delivered to patients (e.g., assessments, services, diagnostics, treatments)
3. Outcome: Effect of health care on the status of patients and population

Nigeria is among the first wave of countries working with WHO to operationalize the quality of care framework[12].

It is globally recognized that day of birth is the most dangerous period for mothers and newborns[9]. An analysis showed that despite major differences in skilled birth attendance rates in the six geopolitical zones of Nigeria (Northwest, Northeast, Northcentral, South-south, Southwest, and Southeast zones), the NMR and perinatal mortality rate are quite similar across the zones[13]. This finding shows the importance of examining factors that affect the quality of care, especially in services being provided on the day of delivery.

In the southern part of Nigeria, the proportion of deliveries attended by skilled health personnel and the number of neonatal deaths in the Southeast zone is relatively high compared to the other southern zones. In the northern part of the country, the proportion of deliveries with a skilled birth attendant in Northcentral zone (which includes Kogi State) is the highest, yet there is not much difference in the NMR between Northcentral and the other northern zones. In Ebonyi and Kogi, 85.1% and 87.5% of pregnant women attend antenatal care (ANC), while 62.1% and 70.9% deliver under the care of skilled birth attendants, respectively. The MMR for Kogi is similar to the national average of 576/100,000 live births, while Ebonyi's is lower at 286/100,000 live births[13,14]. These geographic disparities call into question the quality of care that mothers and newborns receive in health facilities.

This study, therefore, provides insight into areas of strength and weakness in the provision of health care for mothers and their newborns in Ebonyi and Kogi States. Specifically, this includes health care processes and capacities of health service providers concerning labor and delivery care in health facilities that were selected to receive technical assistance from the United States Agency for International Development (USAID)-funded Maternal and Child Survival Program (MCSP).

To address these challenges to quality maternal and newborn health service provision in Ebonyi and Kogi, USAID asked MCSP to work in these states to improve service quality in health facilities as they were priority areas for USAID programs. The presence of other USAID investments, such as the Malaria Action Program for States and the Fistula Care Project, also informed the choice of these two states. Study

results were intended to be used to inform the design of program interventions to improve the quality and utilization of maternal and newborn services in public and faith-based health facilities in Ebonyi and Kogi states.

MCSP conducted the current study to inform the design of MCSP's program activities. The research questions were: Do service providers in assessed health facilities: (i) provide quality labor and delivery services, including recommended high-impact interventions; (ii) practice any harmful or non-recommended procedures during labor and delivery?

Methods

Design

A cross-sectional formative observational study of health service providers interacting with and providing care to women giving birth and their newborns was conducted in May 2016. The study used a standardized observation checklist for assessing the skills and practices of providers who attended deliveries, including:

- Examination and preparation for delivery
- Care provided during the first to third stages of labor
- Care provided to mothers and newborns up to 1 hour after delivery

Study participants and sample size

Study participants were health providers attending deliveries in the maternity wards and pregnant women with spontaneous, uncomplicated labor who consented to participate. Forty health facilities out of 120 that MCSP selected to support by providing essential equipment and training of health care providers to provide quality care maternal and newborn care were selected purposively. The 40 health facilities were selected based on high volumes of ANC visits (a minimum of 50 new ANC clients per month) and consideration for the number of births that occurred in the health facilities. We selected health facilities conducting labour and deliveries and that are more likely to have deliveries during the visits based on the high volume of ANC visits already recorded. As the caseload of deliveries at most facilities in the two states was relatively low, that was not used to power the study. Therefore, the research team decided to observe all deliveries that took place in the facilities on the days the study team visited to collect data.

The distribution of selected facilities was as follows: 2 tertiary health facilities, 20 secondary health facilities, 4 private facilities, 4 mission facilities, and 10 primary health centers (PHCs). The expectation was that more of the direct observations would take place in tertiary health facilities and fewer would take place at the PHC level, with the distribution of cases proportional to facility caseloads.

Tool and data collection

Observers collected data using a standardized, structured, and pretested observation checklist relating to labor and delivery services that were previously used in quality" to MCSP[15, 16, 17]. The tool for the assessment consisted of five sections including (1) initial client assessment (2) intermittent observation of first stage of labor (3) continuous observation of second and third stage of labor (4) immediate newborn care and (5) outcome and documentation. The contents of the checklists were based on the World Health Organization's IMPAC manual and guidelines for a routine and correct use of Partograph, AMTSL; Infection prevention behaviors; Quality of essential newborn care; Respectful maternity care developed by Jhpiego under MCHIP regarding the WHO IMPAC manual.

The study team recruited and trained 22 currently practicing medical personnel, including doctors, nurses, midwives, to serve as data collectors for the assessment. Data collectors' clinical skills in maternal, newborn health and family planning were standardized before data collection training. During a 2-week data collector training workshop, the data collectors' observational skills were standardized, and inter-rater reliability tested. As part of the training, the data collectors pilot-tested the checklist tool in 2 private hospitals, 2 PHCs, 1 Tertiary and 1 General Hospital for 2 days in Lokoja. These facilities were excluded from the study. The data collector training also included briefings on the background and rationale of the study and technical instructions on using the mobile device and CommCare application for

data collection. Data collection and entry was done directly on Android-enabled tablet PCs using custom-created data entry programs developed with CommCare software package that is password protected. GPS positioning coordinates of the data collectors were also captured and recorded. Cleaning of the data was done at different points starting from the field by the supervisors and before submissions are made to the central server. Daily, the submitted data was downloaded, reviewed and cleaned. At the end of the data collection period, the data files from all teams from the two states were merged into a central database and exported as SPSS and/or Excel files for analysis. Data collection lasted for a total of 14 days.

Data analysis and variable definitions

The unit of analysis was the delivery/case (client-provider interaction) and there was some clustering of the data since providers attended to many deliveries during the period of the study and there was more than one delivery observed at some facilities. Descriptive data analyses were conducted to answer the research questions. The analyses included percentage distributions, cross-tabulations, and means for priority indicators. Frequency of performance of checklist items expressed as a percentage of observed deliveries was calculated.

For this study, we measured the quality of services using six technical labor and delivery domains: (1) screening for danger signs at the time of admission to the facility in labor, (2) monitoring of labor and delivery, (3) prevention of postpartum hemorrhage, (4) essential newborn care, (5) infection prevention, and (6) disrespectful maternal care and harmful practices. Quality of care for these domains was assessed using study measures outlined in Table 1.

As done in a similar study in India[2,34] we also examined disrespectful, potentially harmful and non-recommended practices during delivery, specifically to measure woman-centred respectful care practices during the birthing process.

Results

A total of 47 (19 in Ebonyi and 28 in Kogi) normal deliveries took place during the hours the study teams were present at 13 of the 40 study health facilities selected to be assessed—five in Ebonyi and eight in Kogi—during the data collection period. The 13 facilities included two public tertiary hospitals, four public secondary hospitals, two mission facilities, two private facilities, and three PHCs. The majority of the health service providers who attended the deliveries in both states were female (Table 2). Obstetricians were the largest category of providers assessed in both states given the high percentage of hospitals in the sample.

Providers screened 43% of the cases observed at the time of admission to the facility in labor for danger signs. However, providers conducted a full screening for all labor danger signs in only 10.5% of cases observed. Table 3 summarizes other service quality findings by component and location. Notable findings are detailed following the table.

Infection prevention measures

Adherence to infection prevention practices is an important aspect of providing quality care during and after labor and delivery services as the mother, newborn, and provider must be protected from infections. For a high percentage of the cases observed, providers adhered to the infection prevention measures related to wearing protective clothing and gloves during the second stage of labor, especially in Kogi, but handwashing was poor in both states. In only 7% of the cases in Ebonyi and 23% in Kogi did providers adhere to all three infection prevention practices in the second stage of labor. After the delivery, in most cases providers adhered to recommended infection prevention measures with one exception: removing their apron and wiping it with chlorine solution after the delivery. Handwashing after the delivery was notably higher (90%) than before the delivery (19%).

Table 1: Labor and delivery quality of care measurement domains and associated tasks

Domain	Task/Step
Screening for danger signs at the time of admission in labor (6 items)	Takes the client's temperature on admission Takes blood pressure Notes amount of urine output Tests for protein in the urine Checks fetal heart rate with a fetoscope Checks fetal presentation
Infection prevention procedures (8 items)	Washes hands with soap and water before delivery Puts on clean protective clothing Wears sterile gloves Disposes of all sharps in a puncture-proof container Decontaminates all reusable instruments in 0.5% chlorine solution Sterilizes or uses high-level disinfection for all reusable instruments Removes apron and wipes it with the chlorine solution Washes hands with soap and water or uses alcohol hand rub after delivery
Monitoring of labor and delivery (3 items)	Uses a partograph to monitor labor Initiates partograph use at the appropriate time (from the onset of labor) Fills out partograph
Prevention of postpartum hemorrhage (3 items)	Uses the preferred type of uterotonic (oxytocin) Gives uterotonic intramuscularly Gives uterotonic at the appropriate time (within 1 minute of delivery)
Essential newborn care (4 items)	Dries baby immediately and thoroughly with a towel Places baby skin-to-skin with the mother immediately after birth Applies chlorhexidine immediately to the umbilical cord Mother commences breastfeeding within 60 minutes after birth
Disrespectful and harmful practices (14 items)	Slaps hits, or pinches the woman during or after labor Holds newborn upside down Slaps the newborn Shouts at, insults, or threatens the woman at any time; Restricts food and fluids during labor; Performs routine aspiration of newborn mouth and nose at birth Manually explores the uterus after delivery Stretches the perineum Applies fundal pressure to hasten delivery Uses episiotomy Bathes baby within the first hour of birth Starts routine intravenous line without indication Lavages the uterus after delivery Uses enema

Adapted from Tripathi V (2016) The Labor and Delivery Quality of Care Short Observational Index: A User Guide[19]

Table 2: Selected demographic characteristics of providers observed

Characteristic	Ebonyi n = 15 (%)	Kogi n = 19 (%)
Sex		
Male	6 (40.0)	4 (21.1)
Female	9 (60.0)	15 (78.9)
Cadre		
Midwife	1 (6.7)	3 (15.8)
Nurse-midwife	0 (0.0)	1 (5.3)
Obstetrician	7 (46.7)	10 (52.6)
Pediatrician	0 (0.0)	1 (5.3)
General Medical Practitioner	4 (26.7)	0 (0.0)
Community health extension worker	3 (20.0)	4 (21.1)

Table 3: Components of labor and delivery services observed

Checklist item (number of observations)		Ebonyi n (%)	Kogi n (%)	Total n (%)
Infection prevention in the second stage of labor				
Washes hands with soap and water or uses alcohol hand rub before any examination of the woman during the second stage of labor (n = 41 Ebonyi n=15, Kogi n=26)		2 (13.3)	6 (23.1)	8 (19.5)
Wears clean protective clothing in preparation for birth (n = 47: Ebonyi n=19, Kogi n=28)		15 (78.9)	26 (92.9)	41 (87.2)
Wears sterile surgical gloves (n = 41 Ebonyi n=15, Kogi n=26)		11 (73.3)	24 (92.3)	35 (85.4)
Infection prevention after delivery				
Disposes of all sharps in a puncture-proof container immediately after use (n = 41 Ebonyi n=15, Kogi n=26)		12 (80.0)	23 (88.5)	35 (85.4)
Decontaminates all reusable instruments in 0.5% chlorine solution (n = 41 Ebonyi n=15, Kogi n=26)		8 (53.3)	24 (92.3)	32 (78.0)
Sterilizes or uses high-level disinfection for all reusable instruments (n = 41: Ebonyi n=15, Kogi n=26)		6 (40.0)	22 (84.6)	28 (68.3)
Removes apron and wipes with chlorine solution (n = 41: Ebonyi n=15, Kogi n=26)		3 (20.0)	5 (19.2)	8 (19.5)
Washes hands with soap and water or uses alcohol hand rub after examination after birth (n = 40 Ebonyi n=15, Kogi n=25)		12 (80.0)	24 (96.0)	36 (90.0)
Partograph use during labor and delivery				
Uses partograph to monitor any part of labor (n = 47: Ebonyi n=19, Kogi n=28)		8 (42.1)	7 (25.0)	15 (31.9)
Initiates plotting on time[a] (n = 15)		7 (87.5)	6 (85.7)	13 (86.7)
Partograph use by component[a] (n = 15: Ebonyi n = 8, Kogi n = 7)	Plots fetal heart rate at least every hour	8 (100.0)	5 (71.4)	13 (86.7)
	Plots cervical dilation at least every 4 hours	7 (87.5)	5 (71.4)	12 (80.0)
	Plots descent of head at least every 4 hours	6 (75.0)	4 (57.1)	10 (66.7)
	Plots frequency of contractions at least every hour	5 (62.5)	5 (71.4)	10 (66.7)
	Plots maternal pulse at least every hour	5 (62.5)	4 (57.1)	9 (60.0)
	Records blood pressure at least every 4 hours	6 (75.0)	5 (71.4)	11 (73.3)
	Records time of birth	8 (100.0)	6 (85.7)	14 (93.3)
Completes partograph fully[a] (n = 15: Ebonyi n = 8, Kogi n = 7)		4 (50.0)	4 (57.1)	8 (53.3)
Uses partograph correctly (n = 47: Ebonyi n=19, Kogi n=28)		3 (15.8)	4 (14.3)	7 (14.9)
Use of uterotonic and prevention of postpartum hemorrhage				
Supports perineum gently as baby's head is delivered (n = 41: Ebonyi n=15, Kogi n=26)		13 (86.7)	22 (84.6)	35 (85.4)
Checks for another baby before giving uterotonic (n=41: Ebonyi n=15, Kogi n=26)		7 (46.7)	7 (26.9)	14 (34.1)
Administers uterotonic (n = 41: Ebonyi n=15, Kogi n=26)		13 (86.7)	25 (96.2)	38 (92.7)
Timing of uterotonic (n = 38: Ebonyi n=13, Kogi n=25)	Within 1 minute of delivery	9 (69.2)	15 (60.0)	24 (63.2)
	Within 3 minutes of delivery	3 (23.1)	5 (20.0)	8 (21.1)
Route of uterotonic administration (n= 38: Ebonyi n=13, Kogi n=25)	Intramuscular	10 (76.9)	16 (64.0)	26 (68.4)
	Intravenous	3 (23.1)	3 (12.0)	6 (15.8)
	Oral	0 (0.0)	4 (16.0)	4 (10.5)
	Other	0 (0.0)	2 (8.0)	2 (5.3)
Type of uterotonic (n = 38: Ebonyi n=13, Kogi n=25)	Misoprostol	0 (0.0)	5 (20.0)	5 (13.2)
	Ergometrine	1 (7.7)	0 (0.0)	1 (2.6)
	Oxytocin	12 (92.3)	20 (80.0)	32 (84.2)

a. Percentages are of cases where the provider used a partograph to monitor any part of labor (n = 15)

Monitoring of labor and delivery

The provider used a partograph to monitor labor and delivery in 32% of cases observed (n=47): 42% of cases in Ebonyi and 25% of cases in Kogi (Table 3). Of these (n=15), the provider-initiated partograph use at the appropriate time in 88% of the cases in Ebonyi and 87% of cases in Kogi and fully completed the partograph in only about half of cases in both states.

To rate the provider as having used the partograph correctly, the provider had to fulfil all three essential elements: use during labor and delivery, appropriate timing of initiation, and full completion. While the provider used a partograph in 32% of the deliveries observed across the two

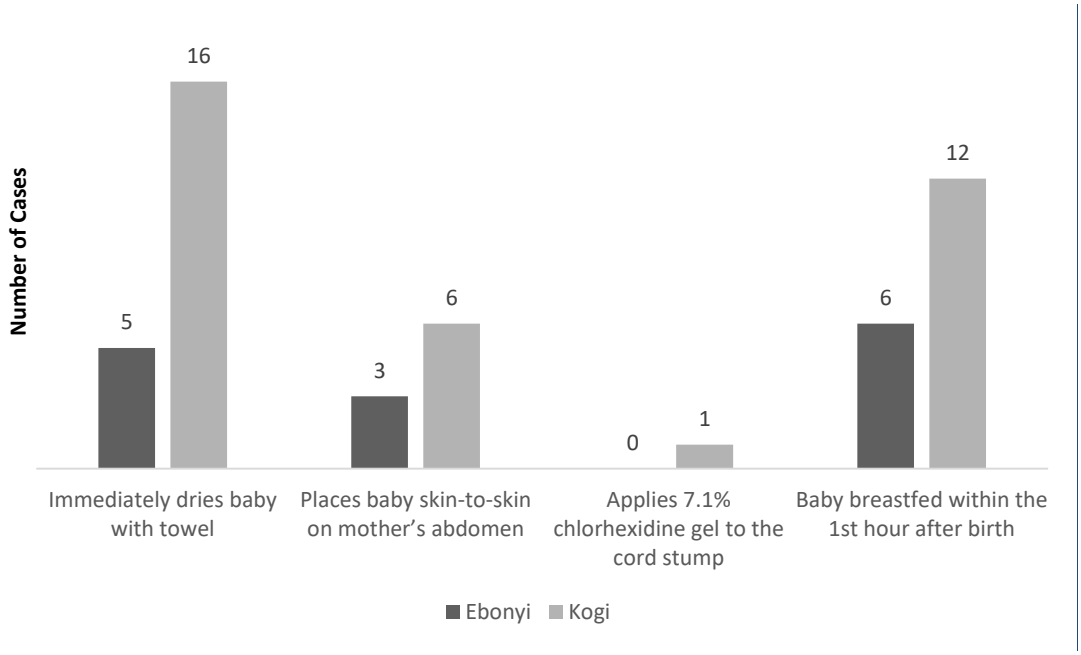

Figure 1: Essential newborn care practices observed (n=41)

Table 4: Disrespectful and potentially harmful practices observed

Practice	Ebonyi n=19 (%)	Kogi n=28 (%)	Total N=47 (%)
Slaps, hits, or pinches the woman during or after labor	0 (0.0)	0 (0.0)	0 (0.0)
Holds newborn upside down	10 (52.6)	5 (17.9)	15 (31.9)
Slaps newborn	5 (26.3)	2 (7.1)	7 (14.9)
Shouts, insults, or threatens the woman at any time	2 (10.5)	0 (0.0)	2 (4.3)
Restricts food and fluids in labor	6 (31.6)	10 (32.1)	16 (31.9)
Aspirates newborn's mouth and nose at birth (routine)	3 (15.8)	11 (35.7)	14 (27.7)
Manually explores the uterus after delivery	3 (15.8)	6 (21.4)	9 (19.1)
Stretches the perineum	0 (0.0)	6 (21.4)	6 (12.8)
Applies fundal pressure to hasten the delivery of baby/placenta	2 (10.5)	3 (10.7)	5 (10.6)
Uses episiotomy	3 (15.8)	1 (3.6)	4 (8.5)
Bathes baby within the first hour of birth	0 (0.0)	3 (10.7)	3 (6.4)
Starts intravenous line without indication	2 (10.5)	0 (0.0)	2 (4.3)
Lavages uterus after delivery	0 (0.0)	2 (7.1)	2 (4.3)
Uses enema	0 (0.0)	1 (3.6)	1 (2.1)

states, in only 15% of cases did the provider fulfil all three elements.

Prevention of postpartum hemorrhage

Overall, in 85% of the deliveries observed during the second and third stage of labor (n=41), providers gently supported the perineum as the head of the baby was delivered (Table 3). In only 34% of the cases observed did the provider check for another baby before administering a prophylactic uterotonic to prevent postpartum hemorrhage uterotonic.

Providers correctly administered a uterotonic for 93% of deliveries observed. Among those, the uterotonic was administered within 1 minute of delivery in 63% of cases, with only 16% of women receiving uterotonic intravenously. Most women received intramuscular oxytocin.

A second dose of a uterotonic was given in 12 cases observed (29%, with 7 given a different drug than the first time and 5 given oxytocin both times), which is not indicated for the prevention of postpartum hemorrhage.

Essential newborn care

In only 51% of the cases observed (n = 41) did providers immediately dry the baby with a towel, and in only 22% of the cases observed did they immediately place the baby on the mothers' abdomen for skin-to-skin care. Observers saw providers apply chlorhexidine gel to the umbilical cord to prevent infection in only 2% of the cases, while babies were breastfed within 1 hour after birth in 44% of the cases (see Figure 1). In none of the observed normal deliveries did all four elements of quality essential newborn care services occur.

Disrespectful and potentially harmful practices during labor and delivery

This study also examined disrespectful, potentially harmful and non-recommended practices during delivery. As shown in Table 4, in none of the cases observed did the provider slap, hit, or pinch the woman. Providers did hold newborn babies upside down, a practice that is now obsolete, in about 32% of cases observed in the two states. Providers restricted women from having food and fluids during labor in 32% of the cases observed; such restriction is not currently recommended.

Discussion

This study provides insights into how health care service providers render services during labour and uncomplicated delivery. This was done through direct observation of the actual care provided at selected health facilities during labor and delivery. While some positive practices were noted, important gaps were also documented, suggesting there are deficiencies in the labor and delivery skills of the frontline health service providers in Kogi and Ebonyi States to conduct safe deliveries following standard quality of care practices. The deficiencies identified informed the design of appropriate interventions necessary to address quality of care gaps identified.

The study observed that health care providers during the assessment screened women in labor for danger signs at the time of admission to the facility in less than half of the cases observed.
This is a major concern as early screening in labor presents opportunities to detect danger signs in the mother and fetus to avert or mitigate labor complications. That these screenings were not performed in most of the cases is an indication of a key weakness in the quality of care being provided. Screening and monitoring in pregnancy are strategies used by healthcare providers to identify high-risk pregnancies so that they can provide more targeted and appropriate treatment and follow-up care, and to monitor fetal well-being in both low- and high-risk situations[20]. Furthermore, the lack of measurement and documentation of fetal heart rate (the partograph was only used in about one-third of cases observed) is worrisome and can lead to misdiagnosis of stillbirth in babies that could benefit from newborn resuscitation. It is important to confirm the presence of a fetal heart sound on admission to the labor ward. An absent fetal heart sound may be an indication of an intrauterine fetal death while a fast or very slow fetal heart sound may be an indication of a distressed baby needing urgent delivery by the fastest and safest route. In some instances, a Pinard or Doppler device was unavailable; however, lack of use when it is available is an indication of poor practice and something that needs to be explored further. Programs and government should ensure procurement of fetal Doppler as well as other simple, low-cost equipment/supplies (e.g., Pinard fetoscope if Doppler is not feasible) and train providers on how to use such items at the time of admission or a woman in labor.

Infections prevention during labour and delivery was found to be poor in the selected facilities. This is quite similar to the findings conducted in the maternity units of health facilities in Edo State, Nigeria in which barely half of the providers practice good infection prevention measures[21]. In this study, adequate infection prevention was said to have taken place if providers adhered to all key study measures during and after delivery. We identified that while providers in this study adhered to most of the infection prevention standards, they fell short in handwashing before delivery in the second stage of labor. Because handwashing is the most important component of infection prevention, there is an urgent need to improve this practice. The identified gaps regarding infection prevention, including handwashing before the delivery and cleaning of the provider's apron

after the delivery, is consistent with other findings in the northern and southern parts of Nigeria[22,23]. Also, the findings in this study regarding gaps in infection prevention and labor management practices are consistent with another study on quality of maternal and newborn health services in Osun State reported significant gaps in infection prevention practices, particularly in rural health facilities. Poor government commitment to health care was implicated[24].

Since its invention, the partograph has transformed the way labor is managed in many settings and has helped to identify possible emerging complications and help reduce C-sections[25]. Providers used a partograph to monitor labor and delivery in only 32% of the cases observed. There are studies with similar findings on the use of patograph[2,26]. Also, we observed that even when providers used the partograph, in nearly half of cases they did not record all essential information, therefore, making it difficult to have details of the conditions of the mothers and fetus to inform the provision of essential services. While we did not explore the factors responsible for low and weak use of partograph, it might not be unconnected to poor knowledge and skills on the part of the service providers and also the time of presentation for delivery. In recognition of poor usage of the paper partograph, some investigators have explored other means of simplifying labor management, including the use of an electronic partograph[27,28].

Postpartum hemorrhage is the single most important cause of maternal mortality globally. Uterotonics are recommended by the World Health Organization to combat postpartum hemorrahage. The use of uterotonics is common and high. This is similar to findings of a study in India[2]. Providers in the selected facilities administered uterotonic in 93% of deliveries, which is excellent, but correctly administered it within 1 minute of delivery for only 63% of cases observed, leaving room for improvement. Besides, the second dose of a uterotonic was given in 29% of cases observed, which is not indicated for routine prevention of postpartum hemorrhage.

The providers in the selected health facilities during the assessment were inconsistently performing the essential newborn tasks. Providers applied chlorhexidine gel to the cord stump in only 2% of cases observed in this study. This finding was similar to findings of other studies conducted in Bauchi and Sokoto States that application of chlorhexidine gel, a recommendation shown to reduce the incidence of newborn cord sepsis, was the least performed essential newborn care intervention[29,30]. However, a national policy on chlorhexidine use at health facilities in Nigeria was only recently adopted in 2016, so these findings are not surprising.

Increasing evidence from low and middle-income countries suggests care women receive during labor and childbirth is sometimes disrespectful, abusive, or unresponsive to their needs. A lack of respectful care during childbirth is now recognized as both an indicator of poor quality of care and an obstacle to obtaining maternal/newborn health services[12,31]. This study found that in about a third of cases observed, providers held newborn babies upside down, a practice often erroneously done to stimulate breathing, or restricted women delivering from having food and fluids during labor. This is notable given the small sample of deliveries observed. A recent study in Abuja, Nigeria, also described various forms of disrespect women reported experiencing from health service providers[32]. Another review, on the mistreatment of newborns, concluded that such mistreatment often relates to neglect and non-consented care rather than outright physical or verbal abuse[33]. Other studies in sub-Saharan Africa have noted some similar concerns regarding disrespectful treatment and unindicated care[34].

There are some key limitations to our study. The caseload of deliveries occurring during the study period was relatively low, affected in some places by staff industrial strikes and security challenges, and thus the sample size is small. We also observed that many deliveries took place at night and the study did not make provision for data collectors to stay overnight within or around the health facilities due to financial constraints. Future studies should consider making provisions for data collectors to sleep at the health facilities so they can observe more deliveries. We were conscious of the fact that the health care providers can modify their behaviors and try to alter the processes that they normally attend to delivery cases if they are

conscious or suspicious of being observed which can compromise the quality of the data. To mitigate what technically is referred to as the Hawthorne effects at the point of data collection, data collectors were trained on how to inform participants of the purpose of the assessment to gain their confidence. Data collectors were also trained on interpersonal relation skills to enable them to establish a good rapport with health care workers and make them comfortable conducting their activities as normally as possible. This involved informing the health care workers that the outcome of the assessment will be used for process improvement in their health facilities and not as a prelude for censure[18].

Qualitative research would also be useful in the future to explore the perceptions and reasons behind what the providers did and did not do and propose ways to improve performance.

Using the gaps in critical skills and performance on the day of birth identified through this study, MCSP has worked with stakeholders at the state Ministries of Health in Kogi and Ebonyi to design interventions for improving quality of health services, including:

- Informing the design of provider training curricula for technical clinical updates on basic and emergency obstetric and newborn care, and routine labor and delivery care, including essential newborn care and infection prevention practices.
- Strengthening training modules on respectful maternity care,

These improvements were expected to contribute to reducing MMR and NMR in implementation areas while improving women's labor and delivery experiences.

Ethical Clearance

Both the National Health Research Ethics Committee in Nigeria and the Johns Hopkins Bloomberg School of Public Health institutional review board approved the study (NHREC /01/01/2007/16/11/2015; IRB 00006632, 2015). Data collectors obtained informed verbal consent from all participating providers and clients and written permission to visit each health facility from either the facility's director or head of the maternity unit. Verbal consent was collected from pregnant women in the presence of their next of kin or/and the health care providers by reading out a prepared oral statement informing them of the purpose of the study and the process of conducting the observation. All verbal consent was recorded and follow-up confirmation was made to the health facilities. It was after consents were given by the women or their next of kin that the assessment was done.

Data collectors were trained to be observers only but told that they could intervene to provide life-saving care to mothers and their newborns if an emergency arose where sub-standard care was being provided by the facility staff being observed. No observation form was discarded at the data analysis stage in this assessment, but the data collectors were asked to score the case as zero if they intervened in the care provided.

Conclusion

This study identified strengths and deficiencies in the labor and delivery skills and practices of health service providers at participating facilities in Ebonyi and Kogi States. In the two states, infection prevention practices appear to be weak. There was no single case in which all infection prevention practices were observed. Similarly, there was poor monitoring of labour and delivery in the selected facilities. Postpartum hemorrage prevention services were offered in at least 4 out of every 5 deliveries. The assessment suggests that the essential newborn care practices are poor and this may contribute to high mortality of newborns. Improved provider training in high-quality care, including respectful maternity care, and strengthened supportive supervision, may help to reduce maternal and newborn morbidity and mortality and increase the use of facility-based delivery services in Ebonyi and Kogi states.

Contribution of Authors

Gbenga Ishola: Conceptualized the manuscript topic, contributed to the methodology and data analysis plan, conducted data analysis, interpreted results, and led the preparation of the manuscript.
Adebayo Ajala: Conceptualized the manuscript topic, conducted data analysis, helped interpret findings, contributed to the preparation of the manuscript and reviewed the manuscript.

Emmanuel Ugwa: Interpreted the results and helped write the manuscript.
Gabriel Alobo: Worked on the literature review and reviewed the results.
Chibugo Okoli: Reviewed the manuscript.
Barbara Rawlins: Contributed to study design, training of data collectors, analysis and interpretation of findings, and drafting of the manuscript.
Mark Kabue: Contributed to interpretation of findings and preparation of the manuscript.
Adebayo Oluwatobi: Reviewed the manuscript.
Adetiloye Oniyire: Reviewed the manuscript.
Emmanuel Otolorin: Contributed to the study design and reviewed the manuscript.

Acknowledgements

The authors acknowledge Dr Ibrahim Kabo, Hannatu Abdullahi and Dr Gladys Olisaekee for their all-round support. We also thank the study participants and USAID/Nigeria.
This study is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of the Cooperative Agreement AID-OAA-A-14-00028. The contents are the responsibility of the Maternal and Child Survival Program and do not necessarily reflect the views of USAID or the United States Government.

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