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Maternal and Child Health
Integrated Program

Quality of Antenatal and Delivery Care Services in Six Countries in Sub-Saharan Africa

INTRODUCTION

Achieving both high quality and high coverage of evidence-based maternal, newborn, and child health (MNCH) interventions is essential in order to reduce maternal, newborn, and child deaths globally and achieve Millennium Development Goals 4 and 5 [1].

Evidence suggests that the most important factor in reducing maternal and early neonatal mortality is the attendance of a skilled provider at birth [2]. However, the quality of the care provided by skilled birth attendants varies widely and is often unknown [3]. Quality improvement in the provision of MNCH services is a neglected but essential approach to reducing maternal and newborn mortality [4].

In 2010–2012, the Maternal and Child Health Integrated Program (MCHIP) conducted a series of health facility surveys examining the quality of care that mothers and newborns received in facilities in Sub-Saharan Africa¹. The main objective of these surveys was to determine the frequency and quality of evidence-based MNH interventions performed by antenatal care and delivery care providers. The definition of quality applied in this study was that key practices were correctly carried out per globally accepted, evidence-based guidelines for maternal and newborn health [5]. Facility readiness was measured by determining if a qualified health worker offered an index service in a facility that had the needed commodity or equipment.

These surveys were intended to provide key information for policymakers and other stakeholders in the study countries as they develop their health workforce and policy action plans. Specifically, findings from the surveys are being used to:

- Guide quality improvement activities for maternal and newborn care at the facility, regional, and national levels;
- Provide baseline estimates for countries to monitor improvements in care; and
- Develop indicators and data collection tools that can be used in multiple countries, in ongoing quality improvement assessment efforts.

This brief presents a summary of study findings from six of the seven countries surveyed: Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, and Tanzania (including Zanzibar). The seventh country, Zimbabwe, is not included here.

METHODS

Data collection methods and instruments

The descriptive health facility surveys were conducted either as components of a program evaluation or as independent cross-sectional assessments. They included both quantitative and qualitative observational and audit approaches. The Johns Hopkins School of Public Health Institutional Review Board and the appropriate ethical review authorities in each study country gave ethical approval for the surveys. Informed verbal or written consent was obtained from all participating providers and clients.

¹ MCHIP is the United States Agency for International Development (USAID) Bureau for Global Health's flagship MNCH program led by Jhpiego.

The survey instruments consisted of direct observations of antenatal care (ANC) and labor and delivery (L&D) services, audits of supplies and equipment, provider knowledge tests, and reviews of records and national policies (see Table 1). The tools were largely based on existing obstetric facility assessment [6] and service provision tools, and were adapted primarily from ICF's Service Provision Assessment surveys and the instrument developed and used in the Prevention of Postpartum Hemorrhage Initiative (POPPHI) project [7,8]. The new observational labor and delivery checklist was developed based on Jhpiego program experience, review of the POPPHI L&D observational tool, and international WHO guidelines [5]. New observation checklists for maternal and newborn complications and a new tool for measuring provider knowledge related to these services were developed. Content validity of the tools was ensured by linking the item content to the evidence-based literature.

Table 1: Survey tools and their purpose

The following tools were used in the MNH quality of care facility surveys:

1. A comprehensive listing of all cadres of health workers who provide services to mothers and newborns, and the clinical qualifications, education, and experience that prepared them for the role
2. A facility inventory documenting conditions of the infrastructure and the availability and condition of commodities, supplies, and equipment
3. Review of record and/or Health Management Information System (HMIS) to extract data on service utilization and outcomes (number of ANC consultations, deliveries, births, deaths, and obstetric complications for the prior year)
- 4 and 5. Clinical practice observation tools for ANC (4) and L&D (5) focused on provider implementation of the evidence-based practices for routine care and screening; prevention and management of major obstetric and newborn complications at the time of birth, including postpartum hemorrhage (PPH), pre-eclampsia/eclampsia (PE/E), newborn asphyxia; and respectful provider/client interactions
6. Health worker interview and knowledge test assessing health worker knowledge of how to identify, manage, and treat common MNCH complications, including newborn resuscitation skills
7. A key informant interview and review of national MNCH care policies in the country's essential drug lists or formularies, clinical practice policies and guidelines, and curricula/syllabi on relevant topics for both pre- and in-service education for health professions

Procedures

A common data collector training and fieldwork implementation approach was designed for use in this multi-country study. A country-based investigator was responsible for implementing the study in each country, supervising the data collectors, and monitoring all aspects of data entry, transmission, and security. MCHIP provided technical support for the survey in all countries. Ministry of Health and other appropriate governmental organizations were also active partners. The validity of the observational data collection process was assessed before fieldwork was initiated. Observers' scores recorded on the observational checklists were compared against a gold standard.

Survey data were recorded using HTC Smart Phones or Samsung Galaxy Tablets with Mobile Data Studio software.² Data collectors entered information directly into the preprogrammed software application. The software accommodated multiple questions per screen, including simple "yes/no/don't know" entries, drop-down and fill-in boxes, and multiple choice selections. The programming included forced data quality checks before data transmission to a central server, which could be accessed by all study team members. The data processing system was two-directional; it accommodated off-site monitoring of the data flow and allowed software updates to be uploaded at the country level, when indicated.

Sample

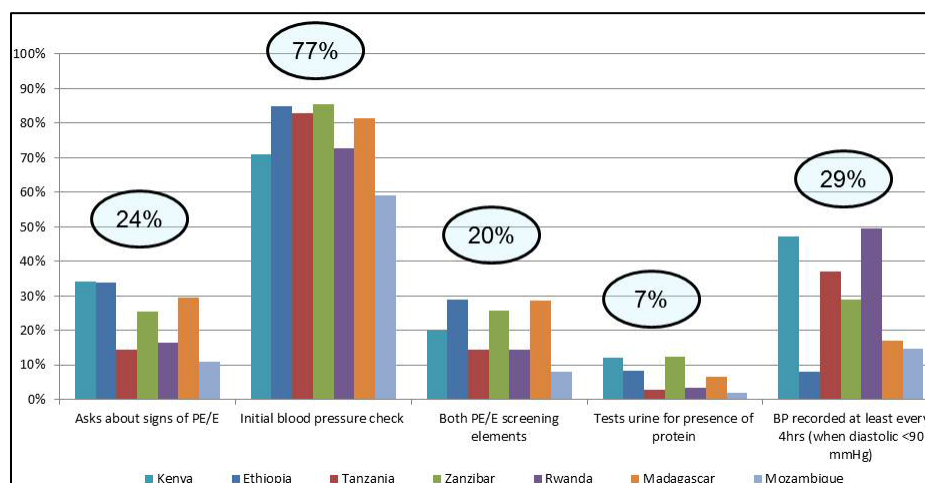
The sample size in each country was determined based on the country's health system design and survey objectives. In that country The Kenya survey, which was integrated into the 2010 Kenya Service Provision Assessment, was nationally representative. The sampling frame in the other countries consisted of facilities providing maternity services by level of facility, delivery caseload, and/or location in MCHIP project areas. Service utilization data were drawn from national HMIS and/or facility log books to determine

² <http://www.creativitycorp.com/mds/>

Table 2: Summary of study samples

Sample	Kenya	Ethiopia	Tanzania	Zanzibar	Rwanda	Madagascar	Mozambique	Total
Facilities	409	19	52	9	72	36	46	643
-Hospital	52%	100%	23%	56%	58%	75%	46%	53%
-Health Center/dispensary	48%	0%	77%	44%	42%	25%	54%	47%
Observations of care	2035	318	880	274	604	670	828	5609
-Deliveries	626	192	489	217	293	347	525	2689
*Initial assessment	452	107	306	106	187	268	378	1804
*1st stage of labor	580	139	288	113	241	255	455	2071
*2nd and 3rd stage of labor	563	117	415	201	225	288	507	2316
*newborn & postpartum care	571	115	419	203	225	336	508	2377
-Complications								
*newborn resuscitation	42	18	37	12	44	49	28	230
*pre-eclampsia/eclampsia	10	9	11	1	0	10	9	50
*postpartum hemorrhage	32	11	11	1	4	15	6	80
-ANC consults	1409	126	391	57	311	323	303	2920
Health workers interviewed	249	79	206	51	146	140	186	1057

Figure 1: Screening for PE/E during L&D



weights for delivery observations only. Table 2 summarizes the samples by country.

FINDINGS

The survey focused on health workers who provided antenatal care and labor and delivery care services. The majority of these providers were nurses and midwives. Only a few observed deliveries were conducted by providers who were not skilled birth attendants according to the WHO definition [9]. However, the pre-service education curriculum leading to the health workers' professional, medical, or technical credentials varied by country. Providers also had different degrees of exposure to current policy recommendations for best practices

(i.e., through in-service education) and varying opportunities to update or acquire related knowledge and skills.

Infection prevention

Patient safety is at the core of quality of care. Participants were observed in L&D settings to determine the degree to which they performed any of 10 infection prevention tasks/activities when providing care to clients. The percentage of providers who washed their hands before procedures ranged from less than 4% (Ethiopia) to 78% (Madagascar) and the percentage that washed their hands after conducting a delivery ranged from 55% (Rwanda) to 93% (Madagascar). Wearing protective gloves during procedures was

prevalent (> 75%) across all countries. Proper procedures for waste disposal and instrument disinfection were also generally performed.

The availability of infection prevention supplies in the delivery room varied by resource, but these items were generally available ($\geq 64\%$) in all six countries. Soap and piped water and clean or sterile gloves were the commodities that were most often absent.

Pre-eclampsia/eclampsia

Pre-eclampsia/eclampsia (PE/E) is a multisystem disorder affecting 2%–8% of all pregnant women worldwide. It is one of the most common causes of maternal and perinatal morbidity and mortality in low- and middle-income countries. Approximately 63,000 women die of PE/E each year, and it is the cause of an estimated 9% of maternal deaths in Asia and Africa [10].

Identification of early onset of the disorder and symptom management during antenatal care are key to the prevention of disease progression. Magnesium sulfate is the drug of choice for preventing seizures and is part of comprehensive management of the disease [11]. Diazepam is an often used but less effective therapeutic drug [12].

Structured clinical observation checklists generated data on ANC practices for PE/E screening. Best PE/E screening practices (e.g., asking about at least one of two danger signs: headache or blurred vision, or swelling of hands or face) were demonstrated for 30%–60% of ANC clients across seven countries (average 38.5%). A range of 46%–96% (average 67.6%) of ANC clients had their blood pressure (BP) measured using the appropriate technique. Urine testing for protein was performed in 9%–86% of cases (average 45.5%).

Clinical observation was also used to document screening and management of PE/E during L&D. The elements of care observed included inquiry about symptoms, testing for protein in the urine, and measurement of BP at the time of admission. Measurement of BP on admission was

conducted often (average of 76.8% of observations; range of 59%–85%), but other elements were performed less frequently (Figure 1). The observed availability of magnesium sulfate in the labor and delivery service area ranged from 55% (Madagascar) to 100% (Mozambique) in hospitals, although in Ethiopia it was observed in only 16% of the hospitals visited. Availability of magnesium sulfate in health centers was very inconsistent, ranging from a low of 4% in Rwanda to 96% in Mozambique, despite the fact that policy and guidelines promote use of the drug, and it is both registered for use and included in the essential drug list in all survey countries.³

Health care providers were queried about their knowledge of recommended practices for management of PE/E. Fewer than 57% of providers in the six countries were able to identify all of the equipment and supplies recommended for use. Provider knowledge about diagnosis of PE/E exceeded 80% in all countries; however, knowledge of first actions to take ranged from only 32.6% (Madagascar) to 77% (Kenya). Similarly, knowledge about actions to take in the event of a convulsion, and one hour after a convulsion, did not exceed 51% in any country.

Use of the partograph for labor monitoring

The partograph (or partogram) is a tool that is intended to help health care providers record, interpret, analyze, and use data to make clinical management decisions during labor. WHO recommends universal use of the partograph to identify, prevent, and manage prolonged or obstructed labor, which caused an estimated 42,000 deaths (8% of maternal deaths worldwide) in 2000 [13]. Various versions of the tool have been introduced over time. Regrettably, evidence of the effectiveness of any of the versions is limited [14].

Direct observation was used to determine when use of the partograph was initiated and whether it was used to track the

³ Health centers were not visited in Ethiopia, so Ethiopia is not included in this range.

progress of labor in real time. Record review following delivery was used in the survey countries to determine what information was recorded on the partograph and whether it was filled out completely and correctly. The record review indicated that partograph use ranged from a low of 12.8%–27.2% of births observed (Ethiopia, Madagascar) to a high of 83.6%–88% of births observed (Kenya, Rwanda). However, the partographs were not correctly completed in a majority of cases in any country, and in many cases they were completed only after delivery, which negates the value of their use as a clinical decision-making tool. Paper partographs were available in the two countries with the lowest partograph use (84.2% of facilities for Ethiopia and 67% for Madagascar), so shortages were not the reason for non-use.

Reasons for low utilization were not readily identifiable. One-quarter to one-half of study participants indicated that they had received training on use of the partograph with the past year, and an additional 10%–21% said they had been trained within the previous three years.

Postpartum hemorrhage

Hemorrhage is one of the leading causes of maternal deaths globally and the predominant cause in Africa (34%) [15]. Postpartum hemorrhage (PPH) (blood loss \geq 500 ml) occurs in approximately 6% of deliveries globally, and severe PPH (blood loss \geq 1000 ml) in 1.8% [16]. Active management of the third stage of labor (AMTSL) is an evidence-based intervention that reduces the risk of blood loss in the third stage of labor by 66% compared to physiologic (expectant) management [17]. The clinical protocol for AMTSL has been modified over time, as evidence continues to evolve about the independent contribution of each step of the process [18]. Current recommendations vary with respect to the timing of administration of a uterotonic [19, 20] and cutting of the cord [21, 22], inclusion of controlled cord traction [23, 24], and use of fundal massage [24]. Oxytocin is the uterotonic that is most highly recommended [25].

AMTSL was observed in the facilities, using standardized clinical checklists based on the then-current FIGO/ICM protocol definition [26].⁴ The availability of uterotonics and supplies for their administration was also observed. Provider knowledge of PPH was tested through inquiry about the steps to take for management of heavy postpartum bleeding.

Oxytocin was included in the essential drugs list in all countries surveyed and was available for use in delivery rooms in 77%–100% of hospital facilities. The drug was also available in 57%–100% of lower-level health facilities (health centers/dispensaries) in the five survey countries in which data were collected at this facility level. Country guidelines authorized health workers to dispense the drug in all six countries.

Administration of a uterotonic during the third stage of labor was observed in the majority of deliveries in all countries (average 95%), but practices varied widely when each of the additional elements of the protocol was considered (Figure 2). Timing was a key constraint, with as few as 25% receiving a uterotonic within the recommended 1 minute of birth (Rwanda). The hospitals observed in Ethiopia demonstrated the best performance of uterotonic administration (76% of births within 1 minute). Oxytocin was widely used, accounting for an average of 91% of uterotonic use. The percentage of providers correctly practicing AMTSL (according to the FIGO/ICM definition) ranged from 10% to 31% in five countries and was 61% in Kenya, for an average of 28% in the six countries. Timing of administration of the uterotonic was measured differently in the survey conducted in Kenya. Therefore, the estimate of AMTSL performance in that country (61%) may be a high.

Provider knowledge of steps to be taken when assessing heavy postpartum bleeding varied widely across the six countries for

⁴ Uterotonic within 1 minute, controlled cord traction, and fundal massage.

Figure 2: Correct Practice of AMTSL According to FIGO/ICM Definition

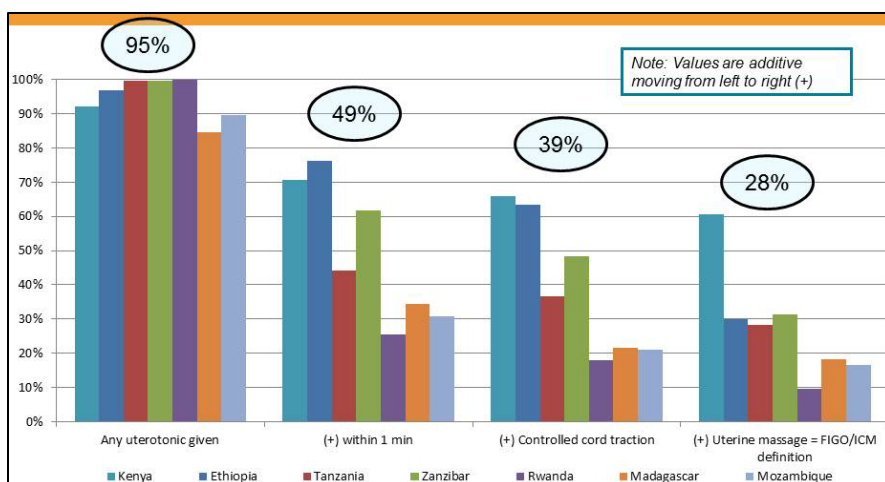
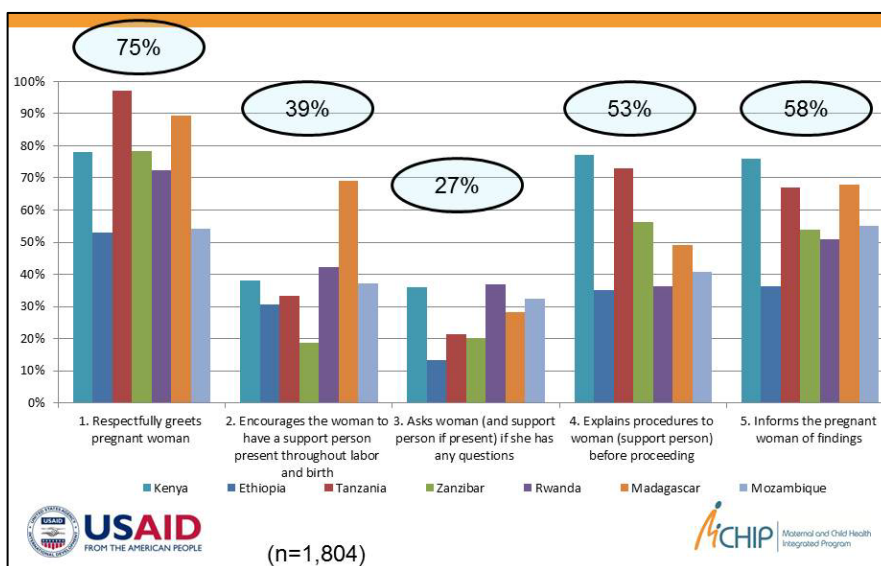


Figure 3: Interpersonal Communication: Initial Assessment



which this information was available, ranging from 40% to 81% on any of seven possible signs, but with much lower scores for assessment of bladder status. Knowledge of interventions for heavy postpartum bleeding was generally higher on fundal massage, giving a uterotonic, and starting IV fluids than on the other seven (of 10) possible action steps.

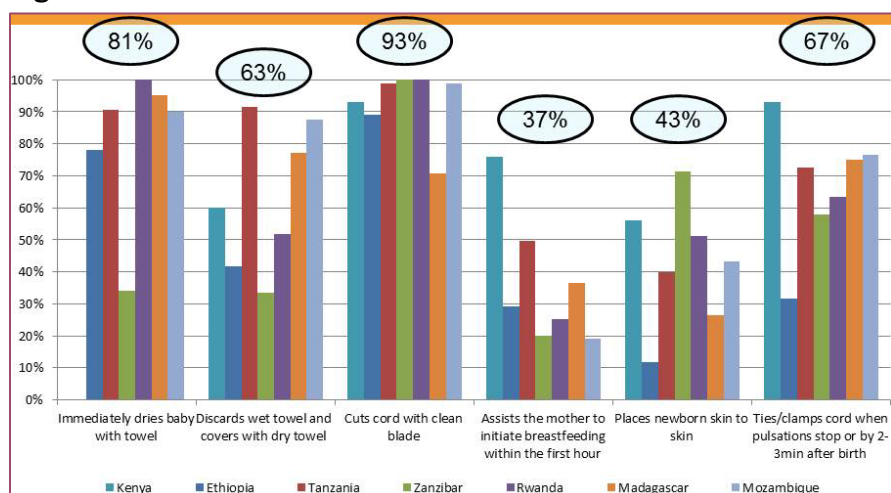
Respectful care in childbirth

Disrespectful and abusive treatment by health care providers has been identified as a factor that constrains the utilization of skilled birth care [27, 28]. Communication between women and providers and

approaches to maintaining confidentiality of personal information and personal privacy were assessed through observations of provider/client interactions in L&D settings.

During the initial assessment of labor, most providers displayed relatively poor communication with women in labor, aside from the initial respectful greeting (which occurred in an average of 75% of cases) (Figure 3). The presence of a support person throughout L&D was encouraged by the health provider during only about one-third of the births in the various countries. Madagascar was the exception at 69%.

Figure 4: Immediate Newborn Care



Other aspects of communication with clients at the time of initial assessment included explaining procedures (average of 53.5%) and informing women of findings (average of 58.1%). Similarly, approximately 50% of providers were observed taking any of four actions to keep women informed and comfortable and to maintain their privacy during the L&D period. Providing friendly labor support was the single exception (mean of 85%).

Immediate newborn care

The quality of care surveys observed provider practices and tested provider knowledge of the essential elements of immediate newborn care (thermal care, cord care, and breastfeeding within the first hour of birth).

The *Helping Babies Breathe* approach to neonatal resuscitation emphasizes skilled attendance at birth, assessment of every baby, appropriate thermal care, stimulation to breathe if needed, and assisted ventilation as needed, all within the first minute after birth [29]. The availability of essential supplies for immediate newborn care and management of asphyxia was documented. Provider skill in newborn resuscitation was determined through observation of management of actual cases as well as simulated practice with the NeoNatalie anatomic model.

Drying the newborn was a common practice in all countries (but not Zanzibar) (Figure 4). Appropriate practice of clean cord care was observed in the majority of countries (average of 93%, range of 71%–100%). There was wide variation in the practice of delayed cord clamping (range of 32%–93%) and use of skin-to-skin contact for newborn warming (range of 12%–72%). Early initiation of breastfeeding was also uncommon; on average, 37% of newborns were breastfed within the first hour after birth. Kenya was a notable exception (mean 76%).

Provider knowledge of correct actions and the appropriate order of steps to be taken for newborn resuscitation was tested using a case study approach in Kenya and Ethiopia and a simulation activity in four countries (including Zanzibar). Scores on the case study ranged from 14% to 21% on knowledge of the 10 steps to be taken to stimulate the newborn and from 24% to 42% on the seven steps to be taken during ventilation and post-resuscitation. Participants in the simulation activity answered questions that addressed knowledge of essential equipment and supplies for effective newborn resuscitation. Mean knowledge scores ranged from 24% to 52%.

Results of observations of newborn resuscitation simulations indicated the need for continued professional development to promote retention of skills. The correct protocol for the actual ventilation procedure

was documented in less than 34% of observations across all countries. An inventory of supplies for management of asphyxia indicated their general availability (mean score ranged from 50% in Tanzania to 86% in Ethiopia and Zanzibar). However, it should be noted that most providers were not familiar with the NeoNatalie anatomic model.

CONCLUSIONS AND IMPLICATIONS FOR POLICY, SERVICE DELIVERY, AND RESEARCH

The MCNH quality of care facility surveys conducted in seven countries in Sub-Saharan Africa fill an important gap in the available information about the quality of antenatal care and skilled attendance at births in the surveyed countries. It is rare that direct observation of delivery care is conducted and even rarer that is conducted as part of a large facility survey. Overall findings indicate that there are key areas of strength in the prevention, screening, and management of the major causes of maternal and newborn mortality at the time of birth, including provision of a uterotonic immediately after birth. Yet there also remain critical weaknesses in areas such as comprehensive screening for PE/E during both ANC and childbirth and appropriate thermal care for the newborn. The organization of clinical services (such as location and “at hand” availability of resources) needs to be strengthened in several respects. Respectful care of clients should always be a moral and ethical priority in service provision. Continuing education of providers in the emerging and ever-evolving art and science of clinical care is fundamental.

Findings from these studies are being used to inform quality improvement activities in the participating countries. A few recommendations are shared below:

1. There is continued need for policy and advocacy and provider education, training, and support to promote the wide-scale use of essential lifesaving interventions for mothers and newborns,

according to standards (skilled attendance). Providers also need to be oriented to changes in policies, and they need updated service delivery guidelines and job aids in the corresponding service areas.

2. Emphasis must continue to be placed on health systems strengthening to ensure that drugs and commodities are available for implementation of best practices. But availability of the required supplies and equipment is not enough; this study documented instances where commodities were available yet appropriate care was not provided.
3. Services need to be organized in such a way that critical supplies and equipment are accessible and ready for use when they are needed during labor and birth, especially for emergency care since complications can arise at any time.
4. Supportive supervision should also be encouraged, and should include (a) direct supervision of practice, (b) review of how services are organized and what preparations are made in advance of labor and birth, (c) both positive reinforcement and suggestions for improvement [30, 31], and (d) review of recordkeeping forms (partographs, registers, client cards/charts) to ensure adequate monitoring of service provision for clinical decision-making, management, and reporting.

A future research agenda should include further qualitative investigation to better understand constraints that limit implementation of proven lifesaving interventions as well as facilitators that promote their effective delivery.

Furthermore, additional analyses of the relationship between “facility readiness” (in terms of supplies and equipment) and actual practice of evidence-based interventions are needed to better identify where there are substantial disparities in performance and where qualitative research can best be targeted to help explain those gaps.

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