Quality of Care of the Prevention and Management of Common Maternal and Newborn Complications in Health Facilities in Madagascar

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The Maternal and Child Health Integrated Program (MCHIP) is the U.S. Agency for International Development's Bureau for Global Health flagship maternal, neonatal and child health (MNCH) program. MCHIP supports programming in MNCH, immunization, family planning, malaria and HIV/AIDS, and strongly encourages opportunities for integration. Cross-cutting technical areas include water, sanitation, hygiene, urban health and health systems strengthening.

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ABBREVIATIONS AND ACRONYMS

ACCESS	Access to Clinical and Community Maternal, Neonatal and Women's Health Services
AMDD	Adverting Maternal Death and Disability
AMTSL	Active management of the third stage of labor
ANC	Antenatal care
BEmONC	Basic emergency obstetric and neonatal care
BP	Blood pressure
CEmONC	Comprehensive emergency obstetric and neonatal care
DSE	Drugs, supplies and equipment
EDL	Essential Drug List
EmOC	Emergency obstetric care
EmONC	Emergency obstetric and newborn care
ENC	Essential newborn care
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HMIS	Health Management Information System
IC	Interpersonal communication
IMPAC	Integrated Management of Pregnancy and Childbirth Toolkit
IP	Infection prevention
IPTp	Intermittent preventive treatment in pregnancy
ITN	Insecticide-treated bed net
L&D	Labor and delivery
MCHIP	Maternal and Child Health Integrated Program
MCPC	Managing complications in pregnancy and childbirth
MDG	Millennium Development Goal
MgSO4	Magnesium sulfate
MMR	Maternal mortality ratio
MNH	Maternal and neonatal health
MOH	Ministry of Health
NR	Newborn resuscitation
PE/E	Pre-eclampsia/eclampsia
PMTCT	Prevention of mother-to-child transmission [of HIV]
POPPHI	Prevention of Post-partum Hemorrhage Initiative Project
PPFP	Postpartum family planning
PPH	Postpartum hemorrhage
QoC	Quality of care
SP	Sulfadoxine-Pyrimethamine
SPA	Service Provision Assessment
STI	Sexually transmitted infection
TT	Tetanus Toxoid
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development
WHO	World Health Organization

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- Director of Maternal and Child Health Services
- Executive Office in charge of Health Centers
- Directors of Regional Health
- Medical Inspectors of the districts involved in the study

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EXECUTIVE SUMMARY

OVERVIEW/BACKGROUND

Improving the quality of facility-based health care to prevent and treat frequent maternal and newborn complications is important to reduce maternal and newborn deaths globally and assist countries in meeting their targets for Millennium Development Goals 4 and 5. Madagascar faces serious challenges to meeting the maternal and newborn health needs of its 19.5 million people. The maternal mortality ratio was reported as 498 deaths per 100,000 live births in the last Demographic and Health Survey (2008–2009). [i] Malagasy women have a one in 45 risk in their lifetimes of dying from maternal causes. These sobering statistics demonstrate a great need for improving access to emergency obstetric and newborn care (EmONC). The Government of Madagascar has taken important steps to improve EmONC, including approving specific national policies, adding necessary drugs to the Essential Drug List and authorizing midwives to administer lifesaving interventions. Although these steps show progress, significant gaps remain.

STUDY AIM AND OBJECTIVES

This Quality of Care (QoC) survey carried out by the Maternal and Child Health Integrated Program (MCHIP) in Madagascar, and funded by the U.S. Agency for International Development (USAID), was designed to complement and extend previous efforts at assessing quality and access to maternal and newborn care, with a particular focus on observations of providers during antenatal care (ANC) and labor and delivery (L&D) to assess the use of lifesaving interventions to prevent or manage common complications.

The multi-country study objectives were to:

- Guide program planning for improving quality of facility-based maternal and newborn care services in each country and at the global level
- Develop rapid and practical data collection tools and composite indicators
- Provide baseline estimates and, when repeated, endline estimates where the survey is part of an evaluation of program interventions

METHODS

The study design—approved by the Ministry of Health Ethical Committee in Madagascar and by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board—used a cross-sectional and descriptive national health facility survey. Methods included direct observations of actual services, inventories of the health facilities and oral interviews with providers.

Seven teams of data collectors evaluated the care observed in 36 health facilities for prevention and management of common complications at time of birth, spending an average of 3.5 days in each facility. The facilities included all hospitals and health centers with more than two births per day. The facilities were mainly public (81%), of which three-quarters were hospitals of different levels (district, regional and university) and one-quarter were Basic Health Center 2 facilities (see Appendix A for a detailed list of participating facilities). A hallmark of the assessment was the observation of actual deliveries (n=347) and ANC consultations (n=323). In addition to the observational data, the teams also conducted inventories of four types (general, ANC, maternity ward and pharmacy) and interviews, including knowledge tests, with 139 providers. The majority of providers observed and interviewed were midwives.

FINDINGS

From multiple forms of data collected and analyzed together, the QoC Assessment provides an overall description of maternal care at a point in time at all high birth volume facilities in Madagascar. The findings of this assessment indicate that, despite a number of areas of

strong performance, gaps remain at all stages of the care of pregnant women and newborns, representing opportunities for action by stakeholders in the maternal health arena.

Detailed findings are presented and discussed in the report for: ANC, infection prevention (IP), normal L&D, pre-eclampsia/eclampsia (PE/E), obstructed/prolonged labor, postpartum hemorrhage (PPH) and newborn resuscitation. Cross-cutting findings and discussion are also presented. Recommendations are made for policy, facility readiness and specific service components.

The survey's findings indicate that there is a foundation upon which to focus improvements addressing the gaps identified in this assessment, notably in facility readiness, provider knowledge and routine practice related to the quality of ANC, L&D and EmONC care. Below are some highlights of the gaps that were identified across technical components and data collection methods.

Regarding facility readiness, providers and facilities lacked protocols for most ANC, L&D and EmONC services. In addition, guidelines and visual aids were not widely posted and available. Even when some essential medicines or personnel were available, their utilization could be prevented by the absence of complementary supplies or equipment.

Gaps exist between the availability of supplies/medicines and the services provided with them. For example, of facilities surveyed, 77% had iron/folic acid tablets, but these were provided during only half of observed first ANC consultations. A gap also exists between the services reportedly offered or available routinely and the care observed. For example, family planning (FP) counseling was reported to be routinely offered at 71% of facilities; however, postpartum FP counseling was observed in just 20% of ANC consultations.

Across care components, even when certain procedures and interventions were performed, optimal practice was infrequently observed. For example, even among the 28% of L&D cases where partographs were completed, few were initiated at the correct time and almost none were completed at the correct intervals. While blood pressure was taken in the majority of ANC consultations, it was taken correctly in fewer than half.

Provider knowledge was notably weak in relation to complications that are the leading causes of maternal death in Madagascar, including PPH and PE/E. The mean score for knowledge regarding assessment, actions and interventions for heavy bleeding postpartum from atonic/uncontracted uterus was 39%, and the mean score for assessment, actions and interventions for retained placenta/products of conception was 36%. While the mean score for the assessment/diagnosis of PE/E was 70%, under one-third of providers knew to stabilize cases with magnesium sulfate and antihypertensives; the mean score was just 50% for actions to take for women experiencing convulsions. Knowledge related to maternal health care was higher than for newborn care. Overall, providers appeared to be more comfortable with, or accustomed to, providing information regarding medical interventions and less comfortable with counseling regarding health behaviors, care seeking or services outside the immediate medical context. As a result, ANC and L&D encounters present missed opportunities for the provision of or referral to essential services.

RECOMMENDATIONS

These survey findings inform a number of policy and program recommendations to strengthen the quality of maternal and neonatal care at health facilities in Madagascar. At the national level, key stakeholders across institutions and disciplines should come together to discuss and develop strategies to address findings in this report. Below are some of the specific recommendations.

National Policy Recommendations

National policy documents have been developed to facilitate the high-quality maternal and neonatal health (MNH) services, including the National Policy on Reproductive Health, the

National Hospital Policy, the Road Map for Reducing Maternal and Neonatal Mortality 2005–2015, and the norms/standards documents listed in Appendix 2. Even if these documents are shared with health providers, it is necessary to accompany this document sharing with training, supervision, and the supply of necessary equipment, materials, and medications to the facilities. A key recommendation is to develop an implementation plan to accompany and make operational the existing policy documents, such that facilities and providers are well-prepared to provide high-quality MNH services to every pregnant woman and newborn.

This assessment has shown that simple techniques such as labor management and surveillance using the partogram, the prevention of PPH using active management of third stage of labor (AMTSL), and the use of magnesium sulfate for the prevention and treatment of PE/E are not always common practices of providers. A second key recommendation is to develop a mechanism for systematic and regular technical updates and information sheets to be distributed to providers. These technical updates would reflect the latest evidence for the routine delivery of key MNH interventions.

Cross-Cutting Facility Readiness Recommendations

Below are some highlights of the specific recommendations made regarding facility readiness:

- Disseminate, explain and check the availability in health facilities of instruction manuals, protocols and visual aids for all essential ANC, IP, L&D and EmONC procedures and services.
- Ensure that essential infrastructure such as running water and electricity is standard in all health facilities.
- Ensure that all health facilities have the basic supplies, equipment and medicines needed to provide essential ANC, IP, L&D and EmONC interventions, and that training is provided in the use of all new equipment.
- Strengthen supervisory systems to promote routine service delivery and emergency case management in accordance with national policy and clinical guidelines.

Component-Specific Recommendations

Component-specific recommendations were made for ANC, IP, L&D, PE/E, obstructed/prolonged labor, PPH and newborn resuscitation. Some of these specific recommendations are touched upon here. For ANC, for example, providers should have readily available or clearly posted guidelines for necessary services including screening and management for sexually transmitted infections, as well as HIV counseling and testing, and prevention of mother-to-child transmission of HIV. IP could be improved by ensuring that providers have protective clothing for each client contact and encouraging systematic treatment of clothing in a 0.5% chlorine solution after use. L&D could be improved by providing training and ongoing support to improve interpersonal communication, including explanation of procedures during L&D, encouragement of questions from patients, and specific topics such as postpartum FP. Providing guidelines and job aids for PE/E counseling during ANC, as well as the detection of proteinuria, is critical for PE/E. In the cases of obstructed/prolonged labor, it is essential to provide guidelines, training, advocacy and supervision to ensure the regular use and proper completion of partographs as a labor management tool at the time of birth (i.e., with timely initiation and appropriate frequency). Similar recommendations are proposed to provide guidelines for PPH, to ensure the timely provision of all three components of AMTSL, and for newborn resuscitation, to ensure systematic care and monitoring of the newborn in optimally hygienic conditions.

It is a recommendation to roll out implementation of these actions in a manner that prioritizes facilities that provide clinical training, that have relatively high rates of maternal and neonatal mortality, and/or facilities located in remote areas where referral out is difficult.

1. INTRODUCTION AND BACKGROUND

Improving the quality of facility-based health care to prevent and treat frequent maternal and newborn complications is important to reduce maternal and newborn deaths globally and assist countries to meet their targets for Millennium Development Goals (MDGs) 4 and 5. Hemorrhage is the most frequent cause of maternal deaths in developing countries, accounting for 25% of maternal deaths. In Africa, hemorrhage accounts for 33.9% of maternal deaths (Khan et al. 2006).[2] Worldwide, other leading causes of maternal death include hypertensive disorders in pregnancy (primarily eclampsia at 12%), sepsis at 15% and obstructed labor at 8%. In developing countries, skilled health providers attend two-thirds of births (62%) and 31% in the least developed countries.[3] In facility-based births, effective interventions for prevention, detection and treatment of obstetric and newborn complications exist that can be delivered by skilled providers.

The quality of facility-based maternal and newborn care has been assessed in three major survey efforts in multiple countries. First, in the Prevention of Post-partum Hemorrhage Initiative (POPPHI), a survey was carried out on the performance of active management of the third stage of labor (AMTSL).[4,5] In the 10 countries where the survey was conducted, the results proved highly successful in efforts to change policy and programs to increase AMTSL and reduce postpartum hemorrhage (PPH). Second, the Averting Maternal Death and Disability (AMDD) Program, in partnership with the United Nations and University of North Carolina, developed an obstetric facility assessment that has been carried out in many countries.[6]

Third, ICF Macro developed the Service Provision Assessment (SPA) survey.[7] The latter two efforts both assess "facility readiness" to conduct maternal care, including number and type of health providers in facilities and availability of equipment and medical supplies.

The Maternal and Child Health Integrated Program (MCHIP), funded through the U.S. Agency for International Development (USAID), has developed a facility survey toolkit to complement and build upon these previous efforts. MCHIP and USAID first developed a health facility survey toolkit with the idea of focusing on pre-eclampsia/eclampsia (PE/E) screening and treatment, and then expanded the concept to include key normal labor and delivery practices and treatment of major maternal and newborn complications at the time of birth. This study, modeled after the POPPHI work, fills a gap in health facility surveys by including actual assessment of quality of care (QoC) through direct observation of services assessed against standard care checklists and provider knowledge tests in both antenatal care (ANC) and labor and delivery (L&D) care.

In Madagascar, serious challenges exist to meet the maternal and newborn health (MNH) needs of its 19.5 million people. Women have on average 4.8 births, and 40% use any contraception.[8] The majority of the population is rural, and 55% of women deliver without the assistance of a skilled birth attendant. The infant mortality rate of 48 deaths per 1,000 live births is high. The maternal mortality ratio (MMR) was reported as 498 deaths per 100,000 live births in the last Demographic and Health Survey (2008–2009),[9] and the World Health Organization (WHO) reported an adjusted MMR of 440.[10] Malagasy women have a one in 45 chance in their lifetimes of dying from maternal causes.

A great need for improving access to emergency obstetric and newborn care (EmONC) in Madagascar was evident in a recent assessment, funded by the United Nations Population Fund (UNFPA), of 303 health facilities nationwide.[11] Only 22 or 7% of the facilities conducting more than 20 deliveries per month could be classified as either basic or comprehensive EmONC facilities. Not one region in the country was found to have the recommended number of EmONC facilities (one comprehensive and four basic EmONC facilities per 500,000 population), and seven regions of the country did not have any EmONC facility at all. Based on the number of expected births and complications to be treated, the actual number of complications treated translated to a "met need" of 21%. Early perinatal mortality in the health facilities visited was 121 deaths out of 1,000 births. Direct causes contributed to 84% of maternal deaths reviewed in the UNFPA study, indirect causes, 8%,

and unknown causes, 8%. As found globally, the most prevalent direct cause was PPH/retained placenta. Other major direct causes were PE/E, obstructed labor and infection.

AMTSL at every birth is approved as national policy in Madagascar;[12] however, the steps for correctly performing AMTSL are not incorporated into service delivery guidelines. Oxytocin has been put on the Essential Drug List (EDL) and is generally available in facilities. Midwives are authorized to carry out AMTSL including oxytocin administration and controlled cord traction. While AMTSL is included in pre-service and in-service training, students are not assessed for competency of AMTSL as a clinical skill prior to graduation. There is not an AMTSL indicator in the Health Management Information System (HMIS).

Magnesium sulfate and diazepam have been approved as first-line anticonvulsants in Madagascar's national policy. Magnesium sulfate is on the EDL for severe PE/E. While hydralazine, nifedipine and methyldopa have been approved in national policy as first-line antihypertensives for severe PE/E, labetolol has not been approved. Hydralazine and methyldopa are on the EDL for severe PE/E, and nifedipine has been added. Midwives are authorized to diagnose PE/E and give the first dose of magnesium sulfate; however, it is not regularly available at facilities. Pre-service and in-service training curricula include PE/E management principles. There is not a severe PE/E management indicator in the HMIS.

The present study in Madagascar complemented and extended previous efforts at assessing quality and access to maternal and newborn care, with a particular focus on observations of L&D and ANC, and the lifesaving interventions to prevent or manage common complications.

2. STUDY AIM AND OBJECTIVES

The aim of the QoC survey carried out by MCHIP in Madagascar, with USAID support, was to provide information on the quality of key screening, prevention and management interventions in facility-based maternal and newborn care that address direct maternal complications in order to guide quality improvement activities. The study defined quality as the practices that were correctly carried out per globally accepted evidence-based guidelines. The ultimate aim of the QoC study is to contribute to the reduction of frequent, preventable maternal and newborn deaths through increased use and quality of known lifesaving interventions/tasks, described in Table 1.

Table 1. Interventions and Tasks Assessed and Complications Addressed in the Quality of Care Survey

INTERVENTIONS/TASKS ASSESSED	COMPLICATIONS ADDRESSED
Antenatal care	Routine ANC and actions to prevent and detect complications, including PE/E and infection
Routine obstetric care and essential newborn care	Normal deliveries and actions to prevent and detect complications, including infection
AMTSL and management of postpartum hemorrhage	Postpartum hemorrhage
Blood pressure and urinalyses screening, use of magnesium sulfate in PE/E cases	Pre-eclampsia/eclampsia
Correct partograph use and taking appropriate action	Prolonged/obstructed labor, stillbirth, newborn asphyxia and infection
Newborn resuscitation	Newborn asphyxia
Infection prevention practices	Sepsis—newborn and maternal

STUDY QUESTIONS

The QoC study was designed to answer the following program questions:

- Are national policies, standards and guidelines supportive of selected evidence-based elements of maternal and newborn care—PE/E and PPH management, partograph use, AMTSL, infection prevention (IP) and essential newborn care (ENC) and resuscitation?
- Are key MNH supplies, drugs, equipment and infrastructure available?
- Are pregnant women who come to ANC and women in L&D appropriately screened for PE/E, diagnosed and managed?
- Are the selected key interventions in L&D—PE/E management, partograph use, AMTSL, IP and ENC and resuscitation—being correctly implemented?
- What are the barriers to improve QoC?

The QoC study in Madagascar was part of a multi-country effort, with studies carried out in Ethiopia, Kenya, Tanzania and Rwanda in 2010. The multi-country study objectives were to:

- Guide program planning for improving quality of facility-based maternal and newborn care services in each country and at the global level
- Develop rapid and practical data collection tools and composite indicators that can be used in multiple countries
- Provide baseline estimates and, when repeated, endline estimates in multiple countries where the survey is part of an evaluation of program interventions

3. METHODS

3.1 STUDY DESIGN

The study design was a cross-sectional and descriptive national health facility survey.

Methods included direct observations of actual services, inventories of the health facilities and oral interviews with providers—all using structured (quantitative) checklists or questionnaires.

3.2 DATA COLLECTION TOOLS

Data collection tools included observation checklists of ANC and L&D, inventory of the facilities in four areas and a health provider's interview guide and knowledge test. These tools are described below.

QoC Survey Toolkit:

- Health worker listing
- Facility inventory (general, ANC, L&D, pharmacy)
- Record review
- ANC observation checklist
- L&D observation checklist, including essential maternal and newborn care, and prevention and treatment of PPH, PE/E and newborn resuscitation
- Health worker interview and knowledge test
- National policy and drug management interview guide
- Data collector field guide

ANC Observation Checklist

Clinical practice observations on ANC and vaginal deliveries in the selected facilities were collected using checklists based on international WHO protocols for PE/E screening in ANC and PE/E management (WHO IMPAC manual).[8]

L&D Observation Checklist

This checklist was based on WHO protocols (IMPAC/MCPC manuals[13,14]) for screening for PE/E in L&D, management of PE/E and PPH in L&D, routine and correct use of partograph, and routine and correct ENC and resuscitation. Background information collected included: age, gravidity and parity of the client; qualification of the provider; and level of care

provided by the health facility (tertiary care, hospital, health center, etc.). The checklist was adapted from the instrument used by Stanton et al. in their international survey on AMTSL as part of POPPHI,[2] as well as the Jhpiego/Access to Clinical and Community Maternal, Neonatal and Women's Health Services (ACCESS) Program's *Best Practices in Maternal and Newborn Care: A Learning Resource Package for Essential and Basic Emergency Maternal and Newborn Care.*

Facility Inventory

The facility inventory tool was used to record infrastructure conditions and to verify the availability of medications, supplies and equipment, as well as storage conditions for these items. The inventory was conducted once at each facility and included observations of supplies, infrastructure and equipment in general, as well as in the service delivery areas for ANC and L&D and the pharmacy.

Health Care Provider's Interview

A sample of health providers involved in ANC and L&D care completed the health provider's interview. Providers who were observed in ANC or L&D services were also interviewed, when possible, but when this was not possible, other providers in ANC and L&D care were substituted. The first part of this tool was designed to collect information about constraints and facilitators for the delivery of quality care. Information collected from health providers included medical qualifications, training and experience providing ANC, L&D and newborn care services, and information about supervision. The second half of the tool included a series of multiple choice questions to test the providers' knowledge about how to identify, manage and treat common MNH complications. In the knowledge interview, respondents were asked to list all possible responses to the questions. In addition, the interviewer probed for more responses. Each question had between six and 12 correct responses (items). A clinical case study was used to assess clinical decision-making related to the management of severe PE/E and newborn resuscitation, which involved observation of the provider using an anatomical model.

3.3 PLANNED SAMPLES

Health Facilities

All hospitals and health centers offering maternal and neonatal care services in the country were identified in a recent UNFPA/AMDD study,[7] which covered 147 hospitals and 147 health centers in 22 regions of Madagascar. The total number of deliveries in each facility in 2009 was obtained previously by UNFPA/AMDD from facility registers. In addition to being a hospital that offered maternal health services according to the UNFPA study, the inclusion criterion for a health facility in the QoC study was an average caseload of two or more deliveries per day. Overall, 33 health facilities, both hospitals and health centers, met this criteria. This QoC study, therefore, was a census of health facilities with more than two deliveries per day. Three additional facilities in MCHIP demonstration districts were added, for a total of 36 facilities in 15 regions of Madagascar (see Appendix A for a list of participating facilities).

Health Providers

In each facility, we sampled up to five L&D providers and up to five ANC providers. In facilities with fewer than five providers, all health providers were included. If more than five providers in L&D and five providers in ANC were present in a facility, data collectors were instructed to take a stratified sample. A line listing of all health workers attending deliveries and ANC was created by cadre (doctor, midwife, etc.). The sample of each provider cadre proportional to overall numbers was then selected randomly from the line listing.

L&D and ANC Consultations

We planned to observe up to 295 deliveries and 295 ANC consultations overall (the minimum number specified for other QoC country studies was 250). This figure was attained, as follows: The total number of deliveries in the original 33 health facilities in 24

hours was 126 based on their per-day caseload. The planned observation period was 16 hours per day in which 84 deliveries would occur in these 33 facilities.

Data collectors were instructed to observe as many deliveries as possible during 3.5 days spent in each facility to reach the planned number. The number of cases that we planned to observe in each facility was the estimated number of deliveries per day, multiplied by 2/3 (for 18 hours) and 3.5 days. Data collectors were instructed to observe the same number of ANC consultations as deliveries. It was expected that a small number of maternal and newborn complications would be observed.

3.4 DATA COLLECTION

Seven teams of data collectors—doctors, midwives and nurses—were trained and employed in the study (21 data collectors were trained and 19 were engaged in data collection). Each team consisted of one leader (a more senior clinician) and two additional data collectors.

An 11-day training for the data collectors included updating EmONC knowledge and competencies, reviewing and mastering the content of the data collection instruments, learning how to use smart phones to record observational data, and obtaining informed consent from participants. Training included several exercises to promote inter-rater reliability for clinical observations at a level of 80% agreement. Participants observed practices of key interventions on anatomic models using "flawed" clinical performances. Scores were then compared to the correct responses as determined by the trainers who designed and carried out the flawed performances. These exercises were followed by group discussions to ensure mutual understanding of how to record data. Following the training, two days of pre-testing occurred at the main university hospital and several health facilities in Antananarivo.

Data were collected using HTC Windows Mobile Smart Phones (hardware), the Windows Mobile 6.0 operating system and PocketPC Creations 6.0, a software platform for the data entry program. The data entry screens on the phones had logic, skip and consistency checks built into the forms. Each device had a secure digital card for backing up the data. Data from the phones were backed up each night. Upon returning from the field to the Jhpiego office weekly, the IT/Data Manager collected the mobile devices and uploaded the data into a central computer. A job aid was developed regarding use of the smart phones and distributed to data collectors.

Data collectors observed care and collected data over 3.5 days at each facility. Observations of ANC consultations generally occurred in the morning. Deliveries were observed during two consecutive eight-hour shifts (16 hours per day). Data were collected from the 36 health facilities in September and October 2010.

3.5 DATA MANAGEMENT AND ANALYSIS

At MCHIP, all files of each data collection instrument were combined into a single database. Data cleaning involved reviewing the number of facilities represented in each database and reviewing ranges for implausible values and means. Final datasets were uploaded to a Web site, with results presented in Web tables, using Cold Fusion software according to a tabulation plan created for all countries using the same instruments.

Data analysis involved creating composite mean "percentage achieved" variables for multiple, related items. For the L&D observational data, correction factor weights were applied to the data based on prior health facility caseloads of births. The weights were the ratio of the proportions of expected to observed deliveries per day (see Appendix 1). Results are presented for the whole sample of 36 health facilities.

3.6 ETHICAL APPROVAL

The study was approved by the Ministry of Health (MOH) Ethical Committee in Madagascar and by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board. Upon arriving at a health facility, the data collector team provided to the facility director a letter from the MOH describing the study and asking for his or her cooperation. Written informed consent was obtained from each health facility director. Oral informed consent was obtained from all providers interviewed and observed, women whose L&D or ANC visit was observed, and, in some cases, family members.

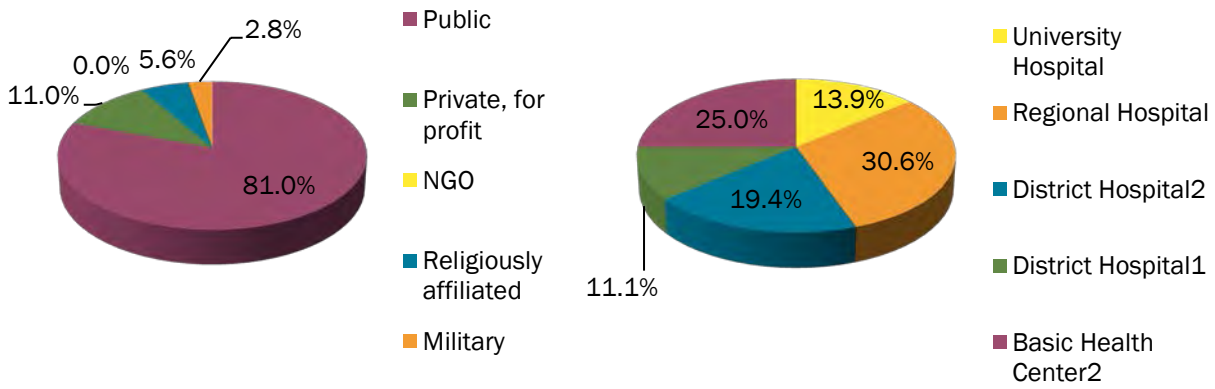
4. RESULTS

4.1 ACTUAL SAMPLES

Characteristics of Health Facilities Assessed

Among the 36 facilities visited, the majority were government/public (29 or 81%), four (11%) were private, for-profit, two (6%) were religiously affiliated and one (3%) was military (Figure 1.1). University facilities (5) made up 14% of the sample of facilities. Regional (11 or 31%) and district hospitals (10 or 30%) comprised a third of the sample each, and the basic health centers (CSB2) (9) comprised a quarter of facilities.

Figure 1.1. Type of Affiliation and Types of Health Facilities Assessed (n=36)



Overall, we observed 323 ANC consultations and 347 labors and deliveries, and interviewed 139 providers. In ANC observations, we observed 76 unique providers, and in L&D observations, 148.

The majority of observations and interviews were of midwives (between 64 to 70% among the three groups of samples) (Table 2). “Other physicians” made up a quarter of the sample (24%), while other physicians made up only 12% of L&D observations and 4% of ANC observations. Among ANC observations, “other non-physicians” made up 30%. Obstetricians and nurses participated infrequently (1.5 to 7% and 4 to 7%, respectively) across the samples.

Table 2. Provider and Facility Characteristics of Samples

CHARACTERISTIC	ANC OBSERVATION (N=323)	L&D OBSERVATION (N=347)	PROVIDER INTERVIEW (N=139)
Cadre			
Midwife	70.3%	68.9%	64.0%
Obstetrician	1.5%	6.6%	1.4%
Other physician	4.0%	12.1%	23.7%
Nurse	4.3%	3.7%	5.8%
Other	19.8%	8.1%	4.3%
Unique providers (N)	76	148	139
Affiliation			
Public	84.2%	81.3%	75.5%
Private, for profit	8.0%	11.8%	12.9%
NGO	0.0%	0.0%	0.0%
Religiously affiliated	7.7%	4.3%	7.2%
Military	0.0%	2.9%	5.0%
Type of Facility			
University Hospital	27.6%	35.2%	12.9%
Regional Hospital	27.6%	24.5%	33.1%
District Hospital 2	15.8%	14.7%	23.0%
District Hospital 1	9.3%	6.6%	10.1%
Basic Health Center 2	19.8%	19.3%	21.6%

Observations and interviews were mainly carried out in government facilities (76 to 84%) (Table 2). Private, for-profit facilities made up only 8 to 13% of the samples. Religiously affiliated facilities made up 4 to 7%, and a military site made up 3 to 5%. In terms of facility type, university hospitals made up 28% of ANC observations and 36% of L&D observations, but only 13% of interviews. Regional hospitals made up a third (33%) of observations in interviews but fewer in observational data (25% to 28%). District hospitals were also more common in provider interviews than in the observation datasets. Basic health centers made up about a fifth of each sample.

The majority of L&D observations (63%) were among facilities with fewer than 2,000 deliveries per year. Some (13%) were among facilities with 2,000 to 2,999 deliveries and a quarter (24%) was among facilities with 4,000 or more deliveries per year.

Characteristics of Providers Interviewed

Interviews were carried out with 139 providers. The respondents were mainly female (86.3%) and generally experienced and older. Over half had worked for 10 years or more since completing basic training (54%) and 59% were aged 40 years or older. Nearly all provided ANC (78%), delivery care (90%) and newborn care (86%). Half of the respondents reported attending more than 100 deliveries in the past six months (51%).

Supervision

Only 18% had received any technical support or supervision in the last three months. Two-fifths of providers (42%) had received no supervision at all.

Characteristics of the ANC Observations Sample

Overall, 323 ANC consultations were observed. A third of ANC consultations observed (38%) was among primigravidas and 62% among multigravidas. Also a third (34%) of ANC observations was first-time visits and 66% was follow-up visits. The mean time for first visits was 27 minutes, and for follow-up visits, 17 minutes. Corresponding to the bulk of visits being follow-up visits, most ANC consultations observed were for pregnancies in the 21st to 36th week of gestation (70%), a fifth were at 20 weeks or earlier (19%), and 11% were at advanced gestation of 37 weeks or more. Regarding the outcome of the ANC consultation, 12% of clients were admitted or referred within or out of the facility for further care.

Characteristics of the L&D Observations Sample

Data collectors observed between three and 18 deliveries at each facility. An exception was the main university hospital CHU Antananarivo, which had a high caseload and 64 deliveries were observed.

Overall, 347 L&D observations were observed. The number of each component observed varied. There were 268 observations of the initial client assessment, 255 observations of the first stage of labor, 288 of the second and third stages of labor, and 336 for immediate newborn and postpartum care. A total of 15 suspected cases of PPH management, 10 suspected cases of PE/E management, and 49 suspected newborn resuscitations were observed.

Among the deliveries observed, 12% were cesarean section and 4% were assisted deliveries. A third of deliveries were among primigravidas (31%). In terms of the outcome for the mother, in nearly all deliveries observed, the mother went to the recuperation ward (92%), 1% of women were referrals within the health facility, 4% of women went to surgery in the same facility, and 3% of women were referred to another facility. No maternal deaths occurred among the observed cases. In terms of the outcome for the newborn, three-quarters (77%) went to the ward with the mother, 12% went to the nursery, 4% were referred to a specialist in the same facility, 2% were referred out and 5% died (18 out of 339 cases with information on newborn outcome).

4.2 AVAILABILITY OF ESSENTIAL MEDICINE AND SUPPLIES

General Inventory and Facility Infrastructure

Most facilities had 25 beds or fewer (72%) and only 6% (n=2) had greater than 50 beds. More than two-thirds had 24-hour staff coverage of clients, in which a staff schedule or staff persons were observed on site (69%). Less than two-thirds had the ability to conduct surgery with general anesthesia (61%). All facilities had electric power, either through a grid or a functioning generator with fuel. A third had a safe water source (39%) but only 25% had a safe source within 500 meters of the facility. Half of facilities had communication equipment or emergency transport. Nearly all had a functioning toilet (97%) and 83% had a functional, improved type of toilet.

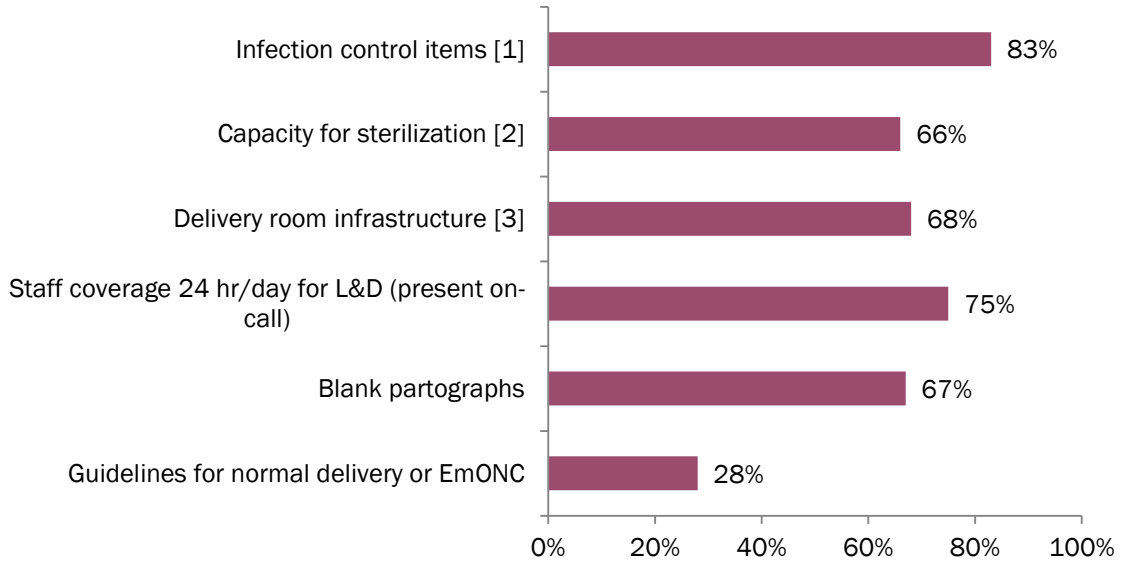
Availability of Items to Support Quality of Delivery

A high proportion of facilities had the necessary inventory for IP (83%) (Figure 2.1). For sterilization items, the mean score across facilities was 66%, and for delivery room infrastructure, 68%. Blank partographs were available in over two-thirds of facilities (67%). However, guidelines were often lacking. Only about a quarter of facilities (28%) had guidelines for normal delivery and 28% had guidelines for emergency obstetric care.

Among IP items, soap and water for handwashing, a sharps container and decontaminating solution were highly available in the facilities visited (86 to 100%). However, piped water, or bucket with tap, was available in only half of facilities (53%) and clean or sterile gloves were available in two-thirds of facilities (64%). Among sterilization items, functioning electric or non-electric equipment were available in most facilities (83%), and a functioning automatic timer or TST indicator strip was available in two-thirds of facilities (64%). However, written

protocols or guidelines for sterilization were available in only half (50%) of the facilities. Among delivery room infrastructure, all facilities had a table or bed for delivery (100%) and two-thirds had a functioning light for pelvic examination (63%). A room with no privacy was found in a third of facilities (33%). A private room with visual and auditory privacy was available in 36% of facilities; a shared room in 22%; and a room with visual privacy only in 9% (not shown in table).

Figure 2.1. Availability of Items to Support Quality of Delivery



Note: N=36.

[1] Mean percentage for soap for handwashing, water for handwashing, piped water or bucket with tap, sharps container, decontaminating solution and clean (or sterile) gloves
[2] Mean percentage for functioning electric or non-electric equipment for sterilization (electric autoclave, or electric dry heat sterilizer, or electric boiler or steamer, or non-electric pot with cover and heat source), functioning automatic timer or TST indicator strips, written protocols or guidelines for sterilization or disinfection
[3] Mean percentage for private room with visual and auditory privacy, functioning spotlight for pelvic exam (or flashlight/torch or exam light), table or bed for delivery

Essential Supplies for Normal and Complicated Delivery

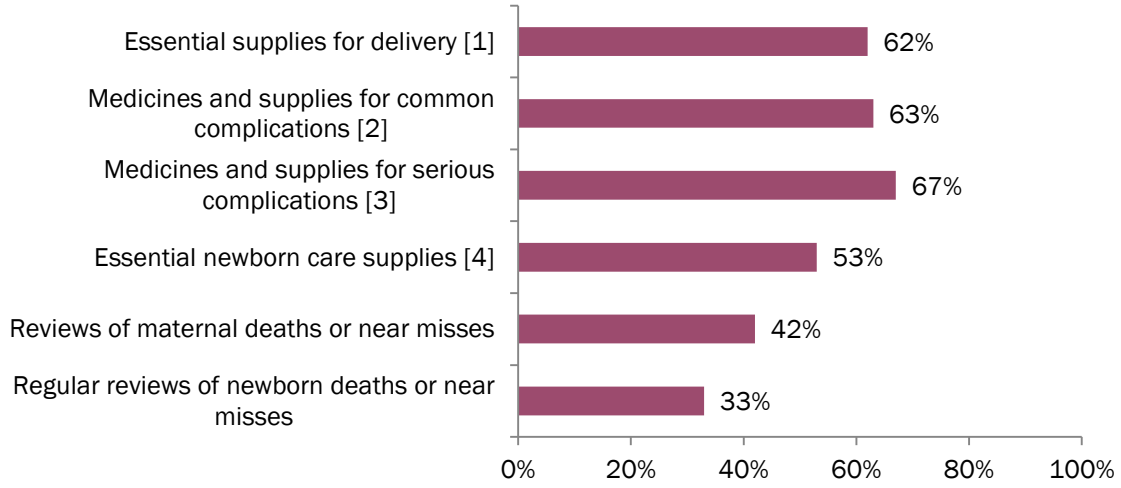
Essential supplies for normal and complicated delivery (from SPA, with modification), common complications and serious complications were available in two-thirds of facilities (63 to 67% each). (Figure 2.2). Essential supplies for newborn care were slightly less available, in half of facilities (53%).

Among essential supplies for normal and complicated delivery, sterile scissors or blade and suction apparatus for use with catheter were fairly available (66 to 81%), while disposable cord ties or clamps and skin antiseptic were available in about half of facilities (43 to 58%). Among medicines and supplies for common complications, an injectable uterotonic (oxytocin or ergometrine) and needle holders were fairly available (78 to 81%). Somewhat less available were syringes and needles (61.1%), IV infusion set (56 %) and suture material with needle (42%). Among medicines and supplies for serious complications, an injectable anticonvulsant (magnesium sulfate or diazepam) was available in nearly three-fourths of facilities (72%). Injectable antibiotics (ampicillin or gentamicin) were available in 61.1%.

Some ENC items were lacking in about half of facilities: disposable cord ties or clamps (available in 42.9%), a towel or blanket to wrap baby (35%) and functioning incubator or other heat source (57%). However, less than half of facilities (42%) carried out reviews of maternal deaths or near misses, and only a third of facilities carried out reviews of newborn

deaths or near misses (33%). For newborn sepsis management, over half had stocks of ampicillin (58%) and gentamycin (56%) (not shown).

Figure 2.2. Essential Supplies for Normal and Complicated Delivery and Essential Newborn Care



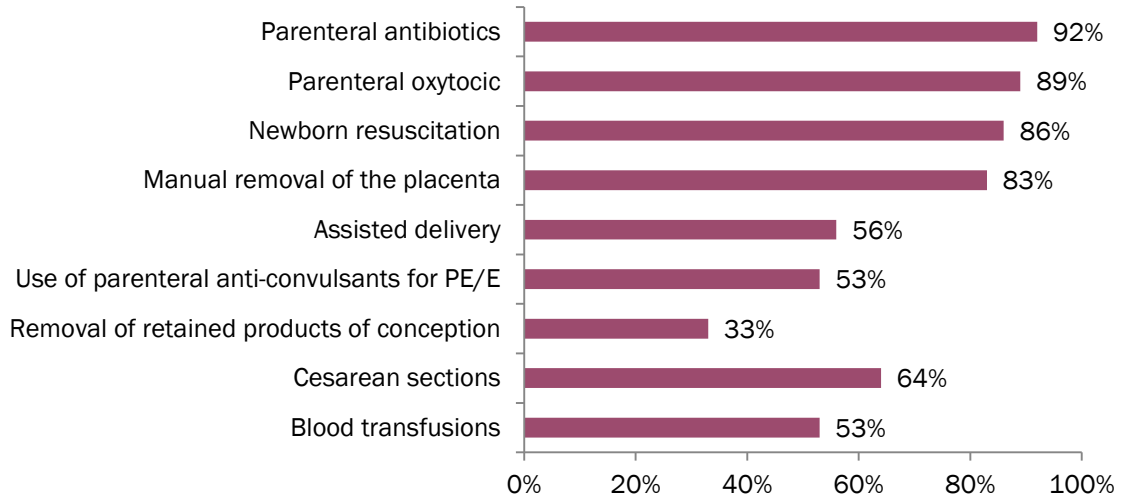
Note: N=36.

[1] Mean percentage for sterile scissors or blade, disposable cord ties or clamps, suction apparatus for use with catheter, skin antiseptic, antibiotic eye ointment for newborn
[2] Mean percentage for syringes and needles, injectable oxytocic (oxytocin or ergometrine), IV infusion set, suture material with needle, needle holder, oral antibiotic (cotrimozazole or amoxicillin)
[3] Mean percentage for injectable anticonvulsant (magnesium sulfate or diazepam), injectable antibiotic (ampicillin or gentamicin)
[4] Mean percentage for disposable cord ties or clamps, towel or blanket to wrap baby, sterile scissors or blade

Comprehensive EmONC Signal Functions Performed in Last Three Months

A high proportion of the facilities reported offering four signal functions in the last three months: parental antibiotics for pregnancy-related infections (92%), parenteral oxytocic (89%), newborn resuscitation (86%) and manual removal of the placenta (83%) (Figure 2.3). However, other signal functions were less available. Slightly more than half of facilities offered assisted delivery (56%) or use of parenteral anti-convulsants for PE/E (53%). Only a third of facilities had performed removal of retained products of conception (33%). For comprehensive EmONC, cesarean sections were performed at two-thirds of facilities (64%) and blood transfusions at half (53%).

Figure 2.3. Proportion of Facilities that Reported to Offer Signal Functions in Past Three Months



Note: N=36.

Between 60 and 68% of facilities had the drugs, supplies and equipment (DSE) to support the signal functions for removal of retained placenta, parenteral antibiotics, parenteral oxytocics, parenteral anti-convulsants, manual removal of the placenta and newborn resuscitation (mean percentage scores shown in Figure 2.4). Among the 23 facilities that offered cesarean section, the mean percentage score for DSE and staffing for cesarean section was higher at 81%.

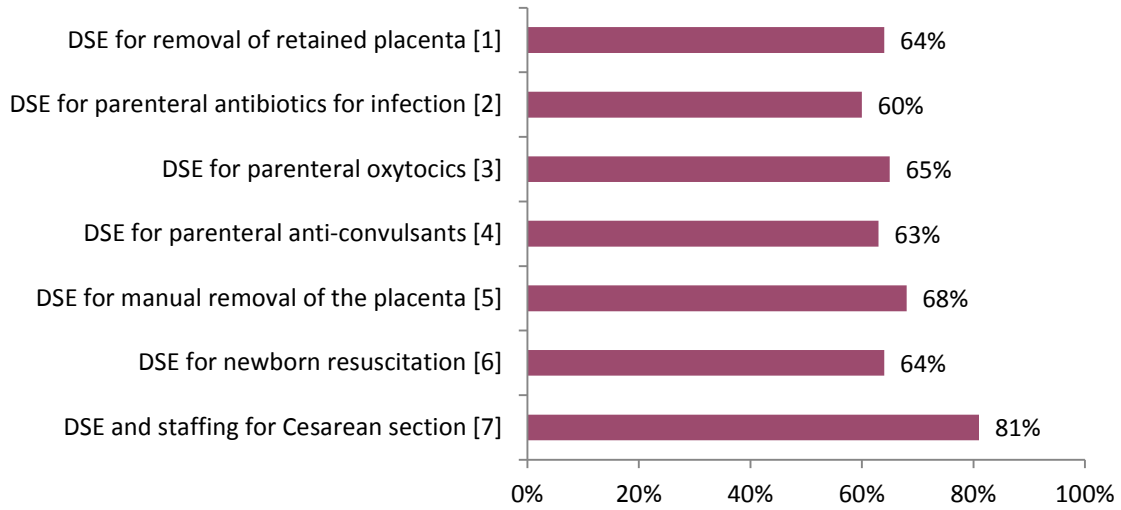
A retained placenta is removed manually or with curettage. Retained placental fragments, or retained products of conception after incomplete abortion, can be removed with either manual vacuum aspiration or curettage. In DSE for removal of retained placenta, a manual vacuum aspirator or dilatation or curettage kit was available in good condition in half of facilities (50%). Considered separately, manual vacuum aspiration was available in 38% of facilities; a dilatation and curettage kit was available in 36% of facilities.

In DSE for parenteral antibiotics for infection, injectable ampicillin or gentamycin and syringes and needles were each available in nearly two-thirds of facilities (61%) and Ringer's lactate, D5NS or NS infusion in over half. In DSE for use of parenteral anti-convulsants, injectable magnesium sulfate, diazepam or phenytoin was available in nearly three-quarters of facilities (72%). The first-line treatment, magnesium sulfate, was available in 47% of facilities in the labor and delivery ward.

In DSE for manual removal of the placenta, injectable oxytocin or ergometrine was available in 78% and injectable ampicillin in over half (58%). In DSE for newborn resuscitation, suction bulb was very common (85%), suction apparatus for use with catheter and the tube and mask (infant size) was common (63% each), and bag and mask (the inventory instrument asked about size 00, 01) was available in only half of facilities (50%).

Among 23 facilities offering cesareans, the following items were highly available: operating table, light, scrub area adjacent to or in the operating room and sterilized instruments ready for use (each 96%). In half to over two-thirds of facilities, the following were available: halothane (64%), ketamine (57%) and health provider and anesthetist to perform cesarean sections 24 hours per day (70% each).

Figure 2.4. Drugs, Supplies and Equipment for Signal Functions



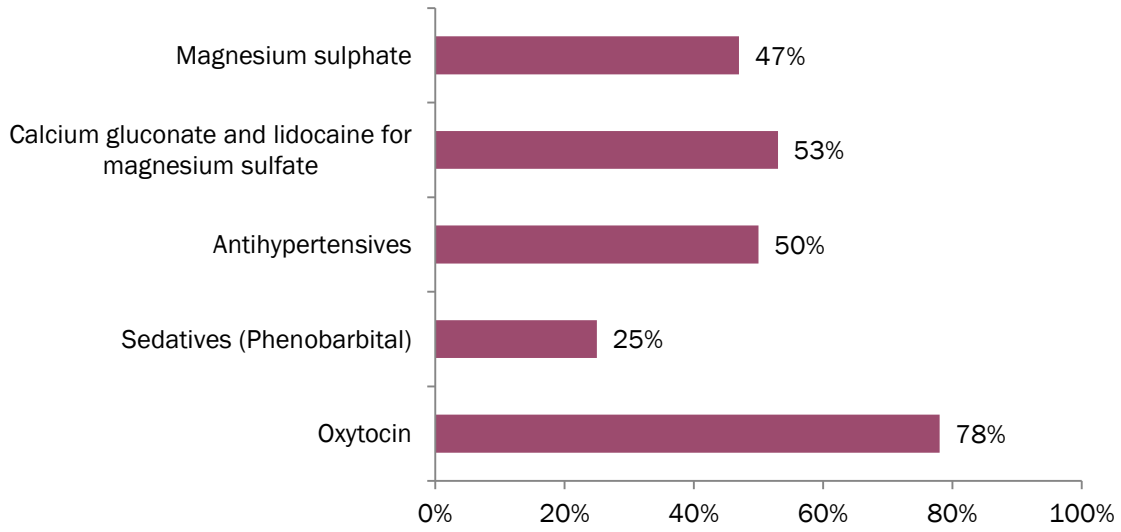
Notes: N=36, except N=23 for cesareans.

[1] Mean percentage for manual vacuum aspirator or dilation and curettage kit, injectable oxytocin or ergometrine
[2] Mean percentage for injectable ampicillin or gentamicin, syringes and needles, Ringer's lactate, D5NS or NS infusion
[3] Mean percentage for Injectable oxytocin or ergometrine, syringes and needles, Ringer's lactate, D5NS or NS infusion

[4] Mean percentage for injectable magnesium sulfate, diazepam or phenytoin, syringes and needles, Ringer's lactate, D5NS or NS infusion
[5] Mean percentage for injectable ampicillin, injectable oxytocin or ergometrine
[6] Mean percentage for bag and mask (infant size), tube and mask (infant size), suction bulb, suction apparatus for use with catheter, resuscitation table for newborn
[7] Mean percentage for operating table, operating light, anesthesia giving set, scrub area adjacent to or in the operating room, tray, drum, or package with sterilized instruments ready to use, halothane, ketamine, health worker who can perform cesarean section present or on call 24hr/day (schedule observed), anesthetist present or on call 24hr/day (schedule observed)

Regarding specific drugs, oxytocin was available in three-quarters of facilities (78%). Magnesium sulfate was available in less than half of facilities (47%). The items needed to support magnesium sulfate administration, calcium gluconate and lidocaine, were available at half of facilities (53% and 51%, respectively) (Figure 2.5). Antihypertensives were available in half of facilities (50%). However, sedatives (phenobarbital) were available in only a quarter of facilities (25%). Per guidelines, sedatives should not be used.

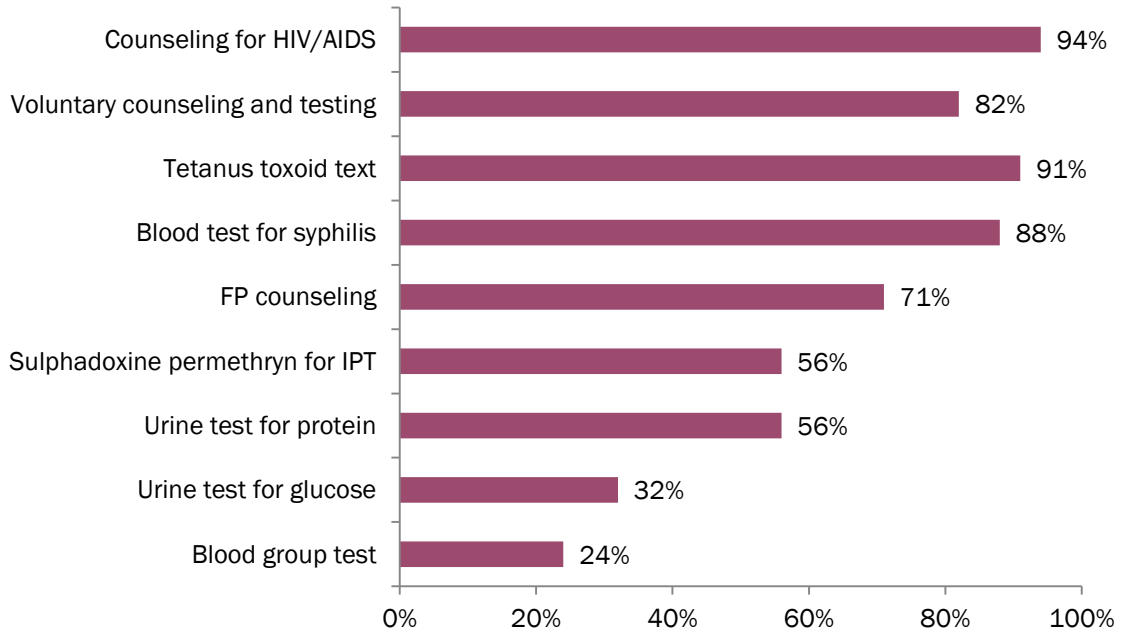
Figure 2.5. Availability of Additional Items for Signal Functions



Note: N=36.

The study assessed the availability of ANC tests and services routinely offered. Counseling for HIV/AIDS was reported to be routinely offered at 94% of facilities, while voluntary counseling and testing was available at 82% of facilities (Figure 2.6). Tetanus toxoid (TT) tests were also available on day of visit at 91% of facilities. Blood tests for syphilis were available at 88% of facilities and counseling for family planning at 71% of facilities. However, sulphadoxine-pyrimethamine (SP) for intermittent preventive treatment during pregnancy (IPT) was routinely offered at just over half (56%) of facilities, as was the urine test for protein. Urine tests for glucose were reported as routinely offered at 32% of facilities, and blood group tests at 24%.

Figure 2.6. Elements of ANC Routinely Offered



Note: N=34.

Basic essential items to support ANC were available in 82% of facilities (mean percentage score over five items, not shown). Nearly all facilities had a fetal stethoscope (97%) and TT vaccine (94%). A functioning blood pressure (BP) apparatus was available at 82% of facilities and iron or folic acid tablets were available at 77%, while SP for IPT was available at 62%. However, as noted earlier, guidelines were often lacking at the facilities. Guidelines or protocols for ANC and sexually transmitted infections (STIs) were available at only 38% of facilities, while guidelines for management of PE/E were rarely available (at 15%). Urine test strips or ability to do boiled urine tests were also lacking (at 29%).

The items to support quality ANC counseling were available in 54% of facilities (mean percentage score of two items). Guidelines or protocols for ANC were generally lacking (38%); however, visual aids for client education on subjects related to pregnancy or ANC were more available (71%).

The items for IP were fairly highly available, at 82% (mean percentage score across five items). All facilities had a sharps container and 94% had soap for handwashing. Water for handwashing was available at 79% and clean latex gloves were available at 71%. Already mixed decontaminating solution was available at 65%.

The items to support physical examinations were available at two-thirds of facilities (67% across three items). While nearly all had a table or bed for delivery (94%), two-thirds had a private room for visual and auditory privacy (65%) and 41% had a functioning spotlight for pelvic exam.

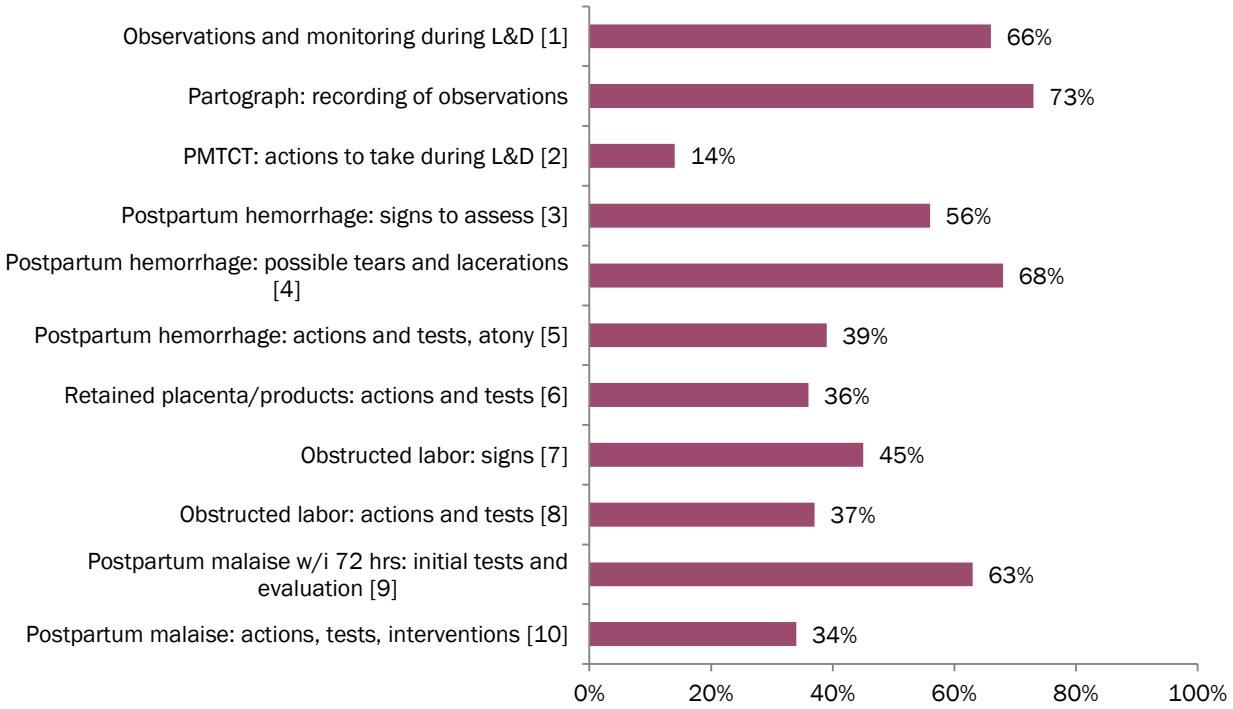
4.3 HEALTH PROVIDERS KNOWLEDGE AND SKILLS

Knowledge of Maternal and Newborn health

Providers scored between 34% and 68% on 10 multi-item MNH areas. Higher scores were achieved for observations and monitoring needed during routine L&D (66%), likely location of tears and lacerations (68%), and initial tests and evaluations for a woman presenting with postpartum malaise within 72 hours (63%) (see Figure 3.1). A question asking where to record activities and observations was answered correctly by most providers (73%, “partograph”). Providers had lower scores for signs to assess PPH (56%). Few providers knew about actions and tests for atonic uterus (39%). Scores were also low for signs for obstructed labor (45%), actions and tests for obstructed labor (37%), and actions and tests,

and interventions for a woman presenting with postpartum malaise within 72 hours (34%), although initial tests and evaluations for a woman with postpartum malaise had a higher score, as noted above. The lowest knowledge score was for prevention of mother-to-child transmission of HIV (PMTCT) (14%). Overall, the average knowledge score across the 10 MNH areas, excluding PMTCT, was 52%.

Figure 3.1. Mean Scores for Health Providers' Knowledge



Note: N=138.

[1] Mean percentage for the following steps: monitor fetal heart rate, assess degree of moulding, assess cervical dilation, assess descent of head, monitor uterine contractions, monitor maternal BP, monitor maternal pulse, monitor maternal temperature, check urine, check for amniotic fluid for meconium
[2] Mean percentage for the following steps: PMTCT counseling; provide ARV prophylaxis in early labor; wipe nose, mouth, eyes of newborn with gauze, avoiding suction; no routine episiotomy; minimize instrument delivery; Hibitane vaginal cleaning; minimize vaginal exam; minimize artificial rupture of membranes; avoid milking cord/immediately clamp cord; appropriate use of partograph; AMTSL; provide ARV phophylaxis to newborn
[3] Mean percentage for uncontracted/ atonic uterus, rapid pulse, faint/weak pulse, amount of external bleeding, retained products of conception/placenta, genital tract injuries, pallor, checking if bladder is full
[4] Mean percentage for peri-urethral (anterior), vaginal, cervix, perineum
[5] Mean percentage for the following steps: reassure woman, massage the fundus, empty urinary bladder, give uterotonics IM or IV, perform bimanual compression of uterus, perform abdominal compression of aorta, start IV fluids, take blood for Hb, group and x-match, refer to doctor or hospital, raise foot of bed
[6] Mean percentage for the following steps: reassure woman, empty urinary bladder, repeat uternotonic, manually remove placenta/ products of conception, give IV fluids, monitor vital signs for shock, check contraction of uterus, massage fundus after removal, give antibiotics, take blood for Hb, group and x-match, prepare for theatre if bleeding does not stop, refer to doctor or hospital
[7] Mean percentage for no descent of presenting part, no change in cervical dilation, Bandl's ring, severe moulding, first stage > 12 hours, second stage > two hours
[8] Mean percentage for the following steps: reassure woman, start IV fluids, continuous bladder drainage by catheter, prepare for cesarean section, call doctor or refer, give parenteral antibiotics, take blood for Hb, group and x-match, monitor vital signs
[9] Mean percentage for the following steps: assess for vaginal bleeding, check for rapid/ faint pulse, check for high fever, check for low BP, check for lower abdominal pain and tenderness, check for foul-smelling vaginal discharge, check for anemia/do rapid test for malaria

[10] Mean percentage for the following steps: start IV fluids, give parenteral antibiotics, give analgesics/ antipyretics, take endometrial swabs, do ultrasound, start malaria treatment if rapid test is positive, perform manual vacuum aspiration, refer to doctor or hospital

One question was asked about several non-recommended practices and whether each one should be practiced routinely during labor (not shown). The correct answer ("false") was given by 99% of interviewees for episiotomies, 95% for artificial rupture of membranes, 90% for enema and 76% for pubic shaving, but only 47% for suctioning nose and mouth of the newborn. This means that half of providers believe suctioning nose and mouth of the newborn is a routine practice.

Case Scenario on Pre-Eclampsia/Eclampsia

A case scenario with information about a presenting woman was read aloud. The respondent was given a paper copy of the case study to follow along. The mean score for the first section, physical examination elements, was 66%. Nearly all respondents identified the correct working diagnosis of severe pre-eclampsia (96%). Taken together, the mean score for examination and diagnosis was 70%. However, only a third of respondents mentioned the management steps for stabilizing the mother with magnesium sulfate and hypertensives (33%). Respondents received a mean score of 47% on the initial steps in management of a woman with severe pre-eclampsia, and respondents received a mean score of 50% on the correct management of convulsions. Similarly, half the respondents knew the essential equipment and supplies that must be available at the referral facility (56%). Only a third of respondents (30%) knew the actions to take one hour later. The overall case study score across respondents was 51%.

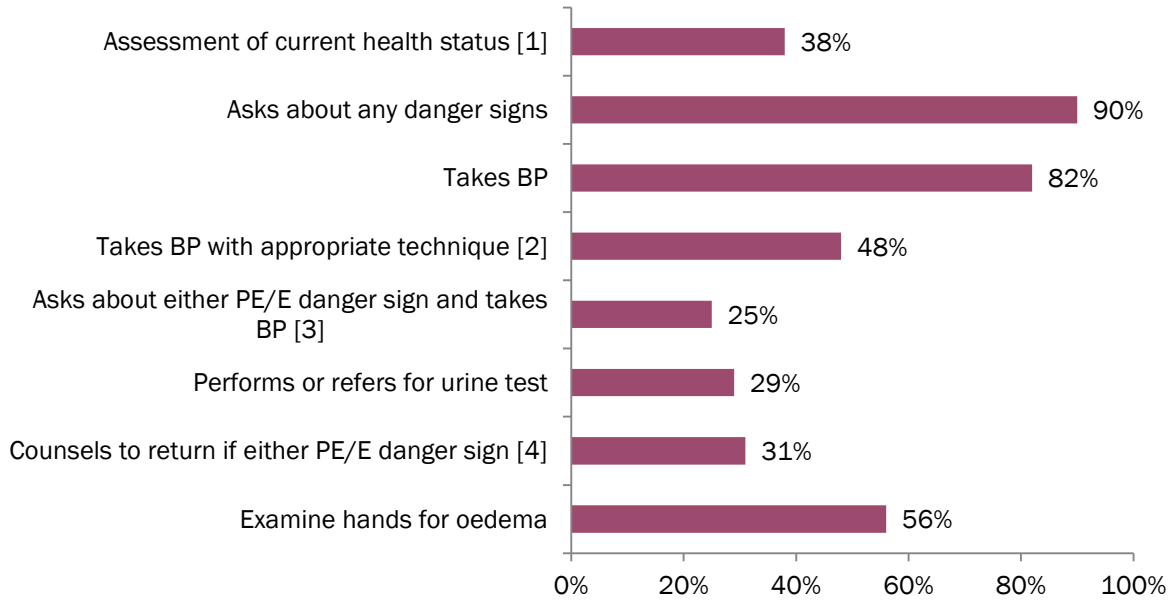
Newborn Resuscitation Simulation

The provider was asked to perform a three-part newborn resuscitation simulation using an anatomic model brought by the interviewer. For stimulation of the newborn, over half (57%) of providers demonstrated all steps correctly: dry newborn, place on warm surface, keep head in slightly extended position, perform suction with bulb or catheter in mouth or nose. For ventilation, a third (34%) of providers demonstrated all items (place correct size mask covering chin, mouth or nose; squeeze bag with two fingers or hand appropriately, and ventilate at 40 breaths/minute). Two-thirds (66%) demonstrated any adjustment (check neck position, check seal, repeat suction and/or squeeze harder). The overall newborn resuscitation simulation score was 52%.

4.4 OBSERVATIONS OF ANTENATAL CARE

Nearly all clients were asked about any danger signs (90%). However, for assessment of current health status in ANC across 11 items, the mean score was only 38% (Figure 4.1). Half of the time or more, providers asked about vaginal bleeding, any problems clients were concerned about, foul-smelling discharge and whether client had felt the baby move (50 to 77% each). They asked less often about persistent cough for two or more weeks, whether client knows her HIV status, convulsions or loss of consciousness, severe difficulty breathing, swollen hands or face, and headache or blurred vision or fever (4 to 40% each). BP was taken for 82% of clients, but only at 48% using the correct technique. For pre-eclampsia screening, asking about either danger signs and taking BP correctly occurred among only a quarter (25%) of observations. Similarly, only 29% of women had a urine test performed or were referred for one. Counseling the woman about returning to the clinic if she experienced either danger signs (headache or blurred vision, or swollen hands or face) occurred among 31% of ANC observations. In over half of the observations, women's hands were examined for edema (56%).

Figure 4.1. Current Health Status and Screening for PE/E



Note: N=323.

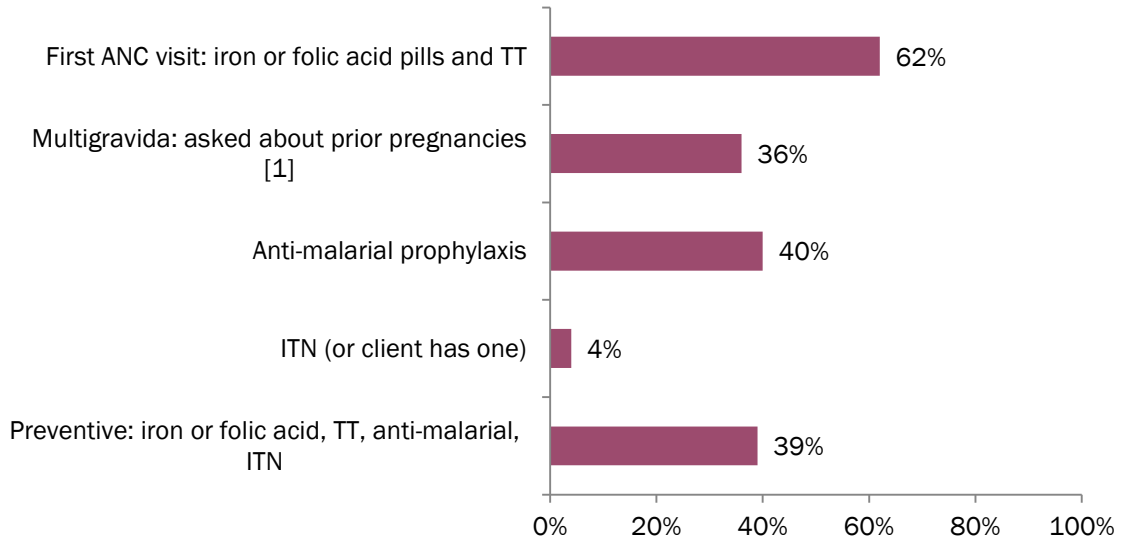
[1] Mean percentage for vaginal bleeding, fever, headache or blurred vision, swollen face or hands, severe difficulty breathing, convulsions or loss of consciousness, foul-smelling discharge, whether client has felt the baby move, persistent cough for two weeks or longer, whether client knows her HIV status, if there are any other problems client is concerned about
[2] Takes blood pressure while sitting or positioned on the left lateral side, and takes pressure at the level of the heart
[3] Both PE/E screening elements: Asks about a danger sign and takes blood pressure with appropriate technique
[4] Counsels to return if headache or blurred vision, or counsels to return if swollen hands or face

In observations of first ANC consultations, nearly three-fourths of women (70%) received TT injections and half (53%) received iron or folic acid pills (54%). The mean score for these two items was 62% in Figure 4.2.

The mean percentage score for history taking about previous pregnancies during first ANC visits for multigravida clients was 36%. Providers routinely asked about prior stillbirths, abortions and cesareans (71 to 80%). Providers asked about neonatal deaths in half of the observations (57%). They rarely asked about anemia, previous pregnancy with convulsions, previous assisted deliveries, previous pregnancy-induced hypertension, previous prolonged labor, previous multiple pregnancies or prior heavy bleeding after delivery (1 to 26% each). In nearly all ANC observations of first client visits, the provider asked the client's age, last menstrual period and number of previous pregnancies (94 to 99% each) (not shown).

Anti-malarial prophylaxis (SP) was given in 40% of observations, and ITNs rarely at only 4%. The mean score for preventive treatments (iron or folic acid pills at first visit, TT injection, anti-malarial prophylaxis or ITN) occurred in 39% of ANC observations.

Figure 4.2. First ANC Visit and Preventive Treatments

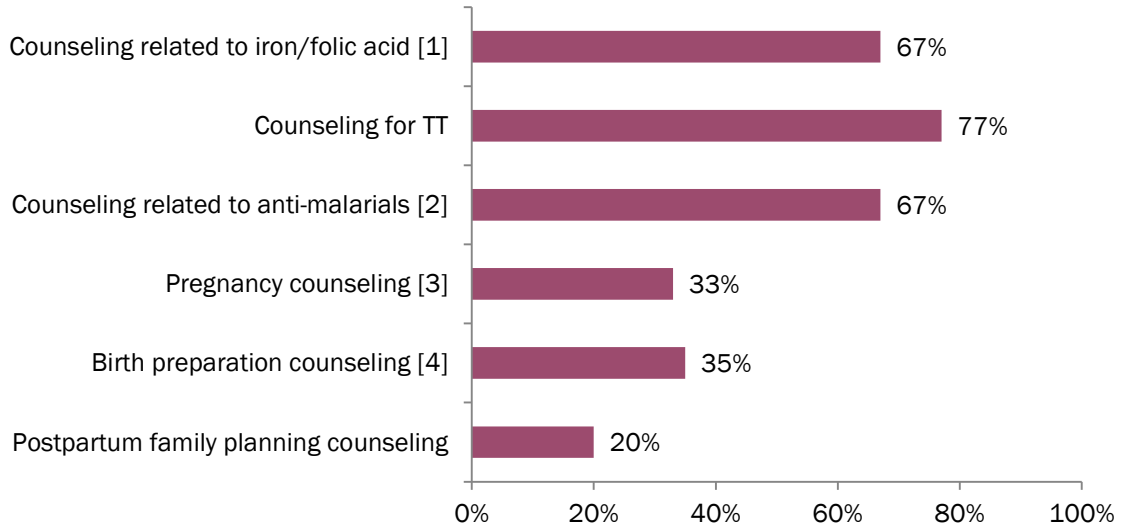


Notes: N=108 among all clients at first ANC visit, and N=60 among multigravida at first visit. TT, anti-malarials and ITN were observed among N=322.

[1] Mean percentage for prior stillbirth; heavy bleeding, during or after delivery; pervious cesarean section; previous abortions; previous multiple pregnancies; previous prolonged labor; previous pregnancy-induced hypertension; previous pregnancy-related convulsions; previous assisted deliveries (forceps, ventouse); anemia; prior neonatal deaths

Counseling related to iron/folic acid pills, anti-malarials and TT occurred in over two-thirds of cases (67 to 77% each) (Figure 4.3). However, the score was much lower for pregnancy-related counseling and birth preparation counseling (33 to 35% each). Postpartum family planning counseling was also low (20%).

Figure 4.3. ANC Clients Counseled



Note: N=322.

[1] Mean percentage for the following steps: explain the purpose of the treatment, explain how to take, explain side effects
[2] Mean percentage for the following steps: explain the purpose of the treatment, explain how to take, explain side effects
[3] Mean percentage for the following steps: inform client of progress of pregnancy, tell client to return if vaginal bleeding, tell client to return if swollen hands and face, tell client to return if severe headache or blurred vision, tell client to return if persistent cough, tell client to return if severe abdominal pain

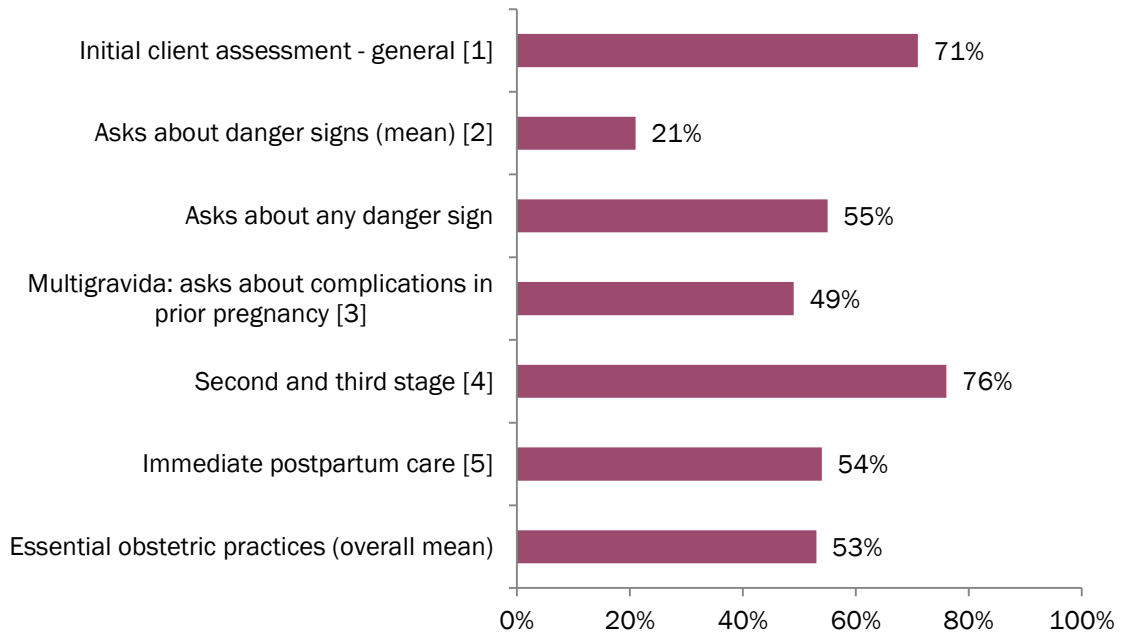
[4] Mean percentage for the following steps: ask client where she will deliver, advise client to prepare for delivery (e.g., set aside money, arrange for emergency transport), advise client to use skilled health worker during delivery, discuss with client what items to have on hand at home for emergencies (e.g., sterile blade)

4.5 OBSERVATIONS OF LABOR AND DELIVERY

In observations of L&Ds, initial client assessment was performed fairly regularly, with a 71% score across L&D observations, which was similar to the score for the component of the second and third stages of labor practices (76%) (Figure 5.1). About half of the women were asked about *any* danger signs in their current pregnancy (55%). However, the mean score across all seven danger signs was 21%. Among multigravidas, the score for asking about danger signs in prior pregnancies was 55%. Half of all the women also received postpartum care practices (54%). The overall score for essential practices in L&D observations was 53%.

Among initial client assessment items, the items that scored high included: asking the client about her age, pregnancy and parity; performing an abdominal examination with measuring tape; checking fetal presentation and fetal heart rate; and performing vaginal examination (89 to 93% each). Taking the client's temperature or pulse occurred among half of women (46 to 48% each), while in only 10% of observations was urine output noted or discussed. Asking about each danger sign ranged from 10% to 34%. In the second and third stages, supporting the baby's head gently, assessing completeness of placenta and membranes and assessing for lacerations occurred fairly often (62 to 86% each).

Figure 5.1. Essential Practices in Labor and Delivery



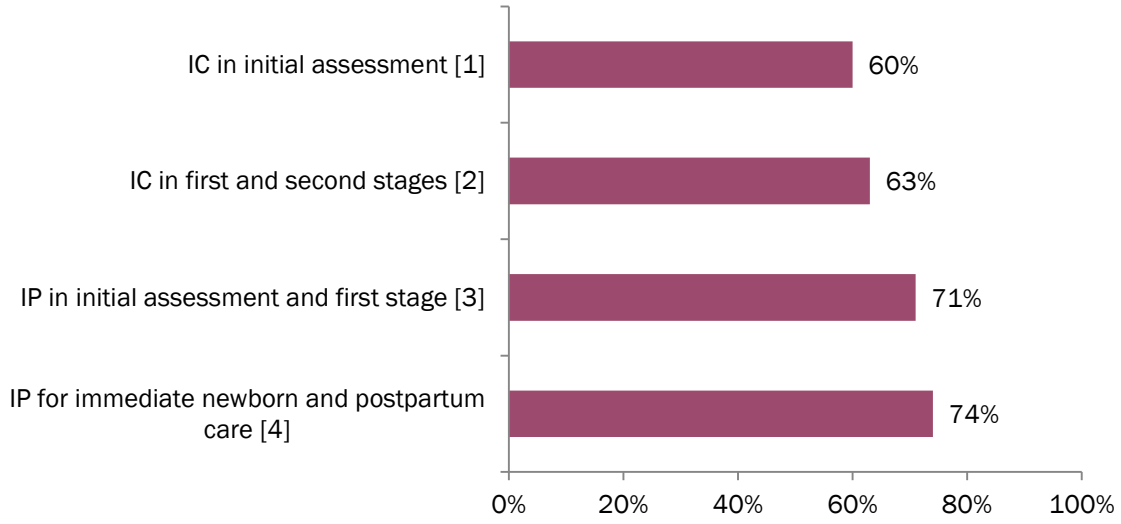
Notes: N=272 for all except N=168 for multigravida and N=336 for postpartum care.

[1] Mean percentage for the following steps: check client's card or asks client her age, length of pregnancy and parity; take temperature; take pulse; ask/note amount of urine output; perform general examination (e.g., for anemia, edema); perform abdominal examination: checks fundal height with measuring tape; perform abdominal examination: check fetal presentation by palpation of abdomen; perform abdominal examination: check fetal heart rate with fetoscope/ultrasound; perform vaginal examination (cervical dilation, fetal descent, position, membranes, meconium)
[2] Mean percentage for fever, foul-smelling discharge, headaches or blurred vision, swollen face or hands, convulsions or loss of consciousness, shortness of breath, vaginal bleeding
[3] Mean percentage for high BP, convulsions, heavy bleeding during or after delivery/hemorrhage, previous cesarean section, prior stillbirth, prolonged labor, prior neonatal death, abortion, prior assisted delivery

[4] Mean percentage for the following steps: support perineum as baby's head is delivered, assess completeness of the placenta and membranes, assess for perineal and vaginal lacerations, assess for perineal and vaginal lacerations
[5] Mean percentage for the following steps: take mother's vital signs 15 minutes after birth, palpate uterus 15 minutes after delivery of placenta

In the interpersonal communication (IC) section, high scores were found in the following: giving respectful greetings, encouraging the woman to have a support person throughout labor and birth, informing the pregnant woman of findings, providing friendly treatment and draping the woman (65 to 88% each). Moderate scores were found for explaining procedures to the woman or support person and encouraging ambulation or different positions during the first stage of labor (35 to 49% each) (Figure 5.2). Asking the woman or support person if she had any questions was fairly rare (28%). As noted, the overall IP mean score was high (74%) over nine items. Two items scored lower. In over half of observations (60%), the provider put on clean protective clothing to cover the face, hands and body in preparation for the birth. In a quarter of observations (26%), the provider removed the apron and wiped with 0.5% chlorine solution.

Figure 5.2. Interpersonal Communication and Infection Prevention in Labor and Delivery



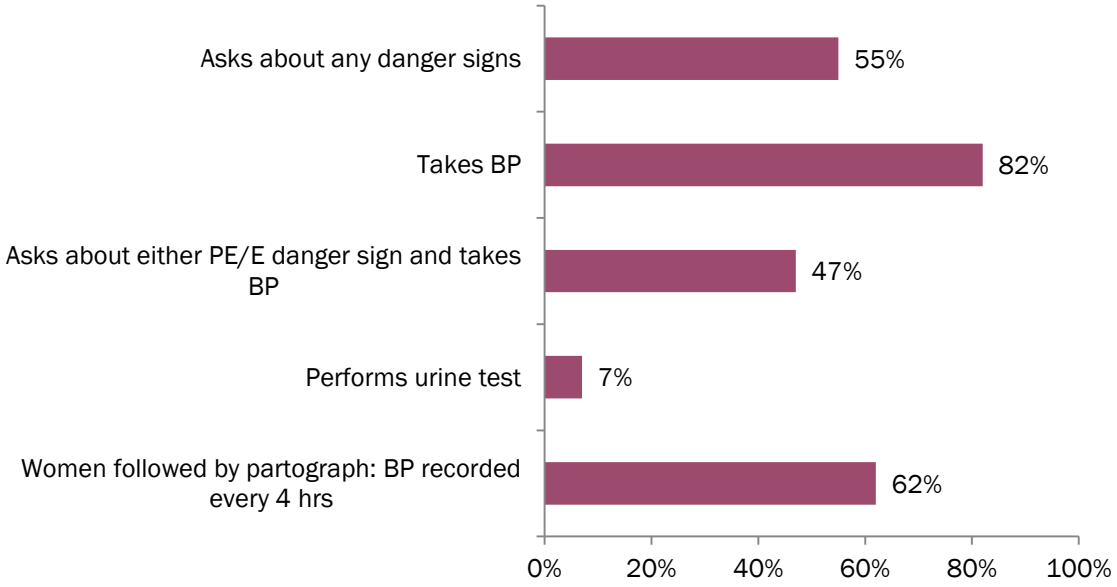
Notes: N=275 for IC in initial assessment, N=262 for first and second stages of labor, N=263 for IP in first stage of labor, and N=339 for IP in newborn and postpartum care.

[1] Mean percentage for the following steps: respectively greet pregnant woman, encourage the woman to have a support person present throughout labor and birth, ask woman (and support person if present) if she has any questions, explain procedures to woman (support person) before proceeding, inform the pregnant woman of findings
[2] Mean percentage for the following steps: at least once, explain what will happen in labor to pregnant woman and her support person; at least once, encourage woman to consume fluids/food throughout labor; at least once, encourage/assist woman to ambulate and assume different positions during labor; support the woman during labor in a friendly way, drape woman
[3] Mean percentage for the following steps: wash his/her hands before any examination, wash his/her hands before any examination, wear high-level disinfected or sterile gloves for vaginal examination, put on clean protective clothing in preparation for birth that protects face, hands and body from contact with bodily fluids
[4] Mean percentage for the following steps: dispose of all sharps in puncture-proof container immediately after use, decontaminate all reusable instruments in 0.5% chlorine solution, dispose of all contaminated waste in leakproof containers, remove apron and wipes with 0.5% chlorine solution, wash hands thoroughly with soap and water and dry them

In screening for PE/E, BP was taken almost always (88%) (Figure 5.3). Danger signs were discussed in over half of observations (55%). The score for these two items was 47%. Urine testing for protein as rarely performed (7%). On the few patients whose L&Ds were plotted

on a partograph (n=89 or 28% of L&D observations), nearly two-thirds (60%) had the BP recorded at least every four hours.

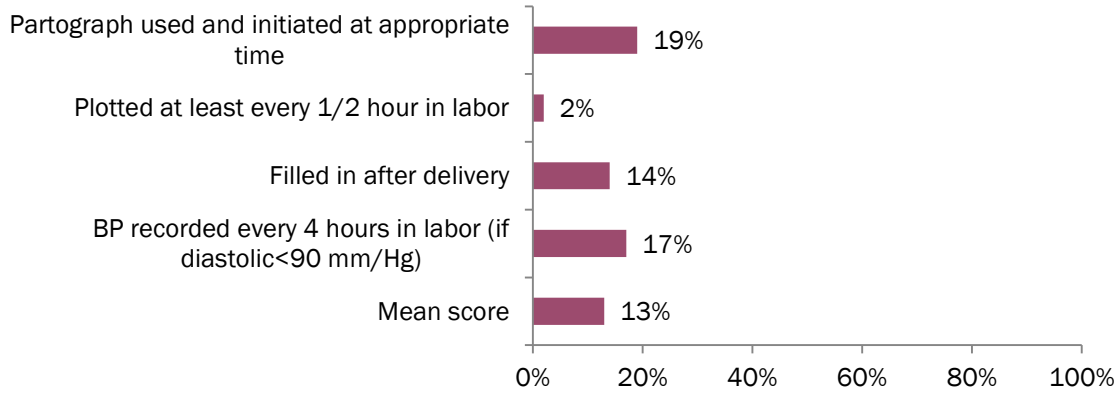
Figure 5.3. Pre-Eclampsia/Eclampsia Screening in Labor and Delivery



Notes: N=273 for all except N=89 for partograph item.

A partograph was used in a quarter of L&D observations (28% of 342 births). As indicated in Figure 5.4, across all births, a partograph was initiated at the appropriate time in only 19% of cases. In 14% of observations, the partograph was filled in with post-delivery information, such as birth time and delivery type. Evaluating those births in which a partograph was used (see Table 3), providers initiated partograph use at the correct time in the majority of cases, ranging from two-thirds to three-fourths of the time, depending on the type of partograph used. Providers recorded BP every four hours in two-thirds of cases (63%). However, other partograph components were filled in less consistently, ranging as low as 5.5% for completion of maternal pulse at least every 30 minutes. Among observations in which the action line was reached, a follow-up action was undertaken in all cases. However, a specialist was not consulted in any of the observations in which the action line was reached.

Figure 5.4. Full Partograph Use (All Births)



Note: N=347.

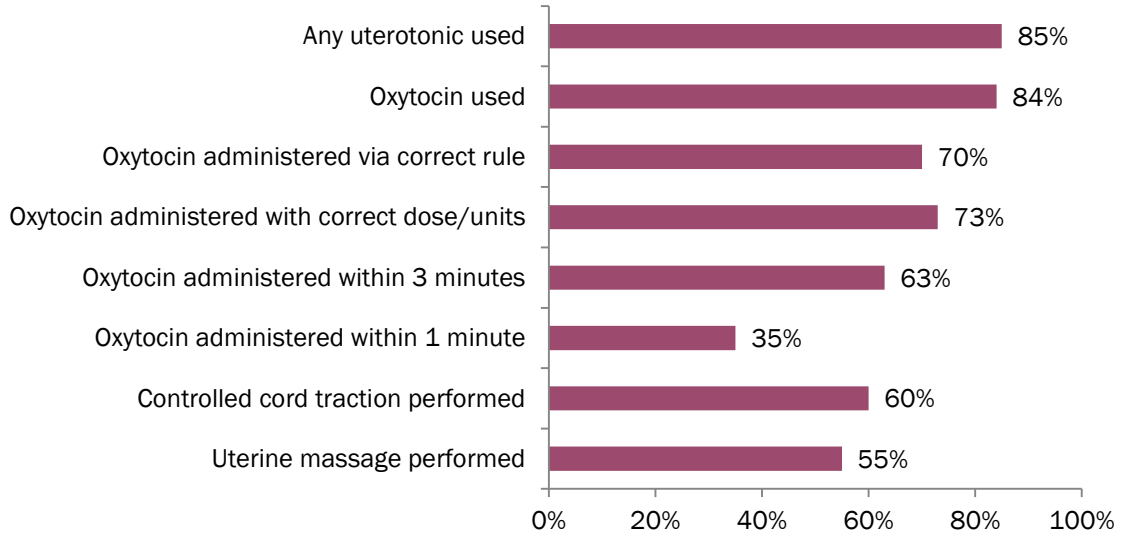
Table 3. Characteristics of Partograph Use

INITIATES PARTOGRAPH AT THE CORRECT TIME, BY TYPE OF PARTOGRAPH USED:	PERCENT
3 cm (old WHO) partograph	67.3
4 cm (new WHO) partograph	79.6
Other partograph	77.0
Partograph components filled in least every 30 minutes during labor with:	
Frequency/duration of contractions	47.6
Fetal heart tones	34.0
Maternal pulse	5.5
Partograph filled in with BP every four hours during labor	63.0
Partograph filled in after delivery with:	
Birth time	72.0
Delivery method	58.5
Appropriate action taken at action line (among those partographs in which the action line reached) (n=28):	
Consult with specialist	0.0
Refer to facility for specialized care	2.2
Prepare for assisted delivery	40.8
Prepare for cesarean section	30.1
Other	21.3

Notes: Data are among 89 cases of L&D observations in which a partograph was used. Percentages add up to more than 100% because weighted values are provided.

In AMTSL, a uterotonic (oxytocin) was given during the third stage of labor in most cases (85%). Figure 5.5 depicts the frequency of each element of AMTSL.

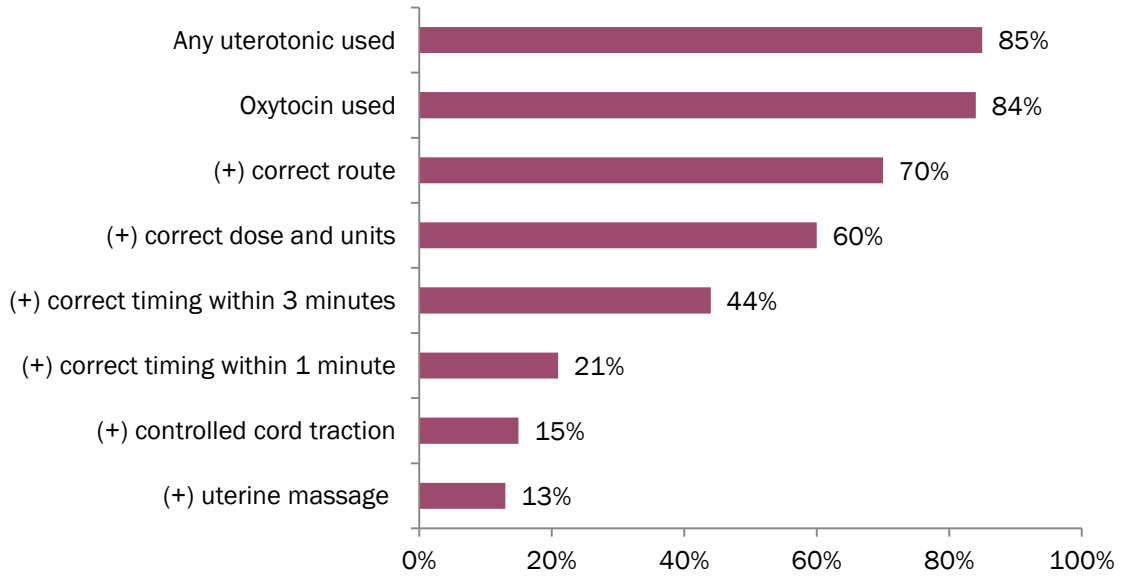
Figure 5.5. Performance of Individual AMTSL Steps in Observations of Deliveries



Note: N=288.

Compliance with all elements of the correct steps of AMTSL is shown in Figure 5.6. When considering whether oxytocin was given in the correct route and doses, this occurred in 60% of observations. When measuring whether oxytocin was given within one minute, this figure dropped to 21%. When adding controlled cord traction and uterine massage, only 13% of observations were in compliance with all correct steps and elements of AMTSL.

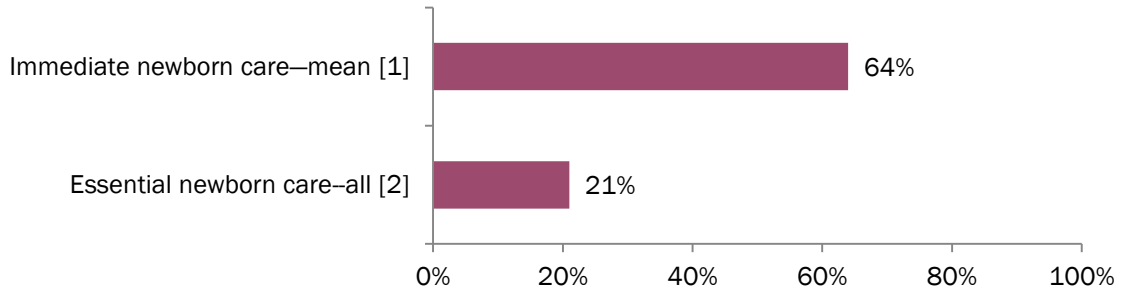
Figure 5.6. Compliance with All Correct AMTSL Steps in Observations of Deliveries



Note: N=288.

Immediate newborn care encompasses six items, and the mean percentage score was 63% (Figure 5.6). Elements that were performed often included immediately drying the newborn with a towel, discarding the wet towel and covering the newborn with a dry towel, cutting the cord with a clean blade and using delayed cord clamping (71 to 95% each). Assisting the mother with breastfeeding in the first hour was performed more rarely, in a third of cases (37%), and placing the newborn on the mother for skin-to-skin contact was performed in only a quarter of cases (27%). ENC encompasses four of these elements (drying, covering with dry towel, cutting cord with clean blade and assisting with breastfeeding in first hour). All four items occurred in only a fifth of observations (21%).

Figure 5.7. Newborn Care



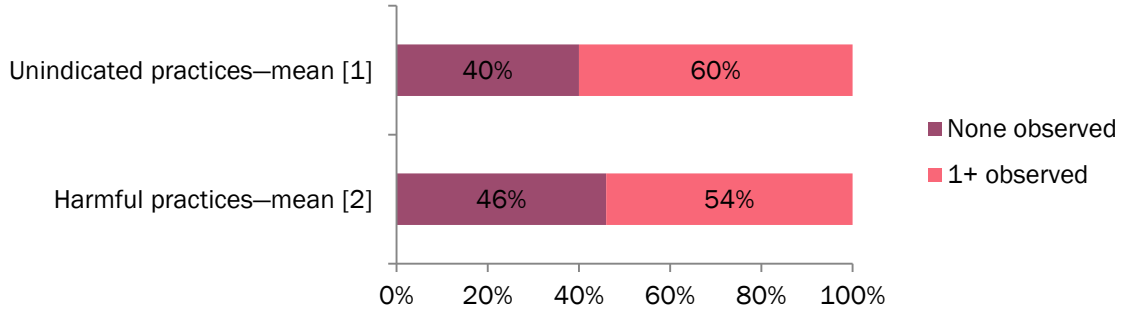
Note: N=336.

[1] Mean percentage for the following steps: place newborn on the mother's abdomen "skin to skin," immediately dry baby with towel, discard wet towel and cover with dry towel, cut cord with clean blade, assist the mother to initiate breastfeeding within the first hour, tie/clamp cord when pulsations stop, or by 2–3 minutes after birth (not immediately after birth)
[2] Mean percentage for the following steps: immediately dry baby with towel, discard wet towel and cover with dry towel, cut cord with clean blade, assist the mother to initiate breastfeeding within the first hour

At least one harmful or non-indicated practice was observed in the majority of observations (54 to 60% each) (Figure 5.8). Among harmful practices, stretching of the perineum was common (70%) and holding the newborn upside down was also seen (30%). Other harmful practices were rare (use of enema, pubic shaving, applying fundal pressure, lavage of uterus or slapping newborn) (1 to 17% each). Among non-indicated practices, manual exploration of the uterus after delivery occurred among half of cases (49%). Use of episiotomy, aspiration of

newborn's mouth and nose at birth, restricting food and fluids in labor and other occurred more rarely (4% to 22%).

Figure 5.8: Harmful and Non-Indicated Practices: Mean Frequency of Items Observed



Note: N=339.

[1] Mean percentage for the following steps: manual exploration of the uterus after delivery, use of episiotomy, aspiration of newborn mouth and nose at birth, restrict food and fluids in labor, other
[2] Mean percentage for the following steps: use of enema, pubic shaving, applying fundal pressure, lavage of the uterus after delivery, slap newborn, hold newborn upside down, milking the newborn's chest, stretching of the perineum

4.6 OBSERVATIONS OF COMPLICATIONS OBSERVED

The observers followed and recorded observational data for 10 cases of PE/E, 15 cases of PPH and 49 cases of newborn resuscitation.

Summary of Case Management of Suspected Pre-Eclampsia/Eclampsia Cases Observed in Madagascar (n=10)

Number of cases and facilities

The observer suspected PE/E and followed the cases using the PE/E observation module for nine cases of pre-eclampsia and one case of eclampsia. These PE/E cases occurred at seven of the facilities assessed; three cases occurred at the university hospital. The newborn died in one of the pre-eclampsia cases, although the cause of death was not available. The summary below reviews the availability of drugs in these facilities, the routine provision of relevant PE/E care during ANC in these facilities, management of the 10 cases observed and assumptions in the analysis.

Availability of Drugs

Magnesium sulfate was found to be available in the pharmacy inventory in three of seven facilities where cases of PE/E were observed. It was also available in the maternity ward inventory in four of these seven facilities. Magnesium sulfate was available in both the pharmacy and maternity inventories at only two facilities. Magnesium sulfate was not available in either inventory in two of the seven facilities, including a public regional hospital where the two suspected pre-eclampsia cases occurred. Diazepam was available in three of the seven facilities where cases of PE/E were observed; two of these facilities also had magnesium sulfate (observed in the pharmacy, maternity or both). One of the four facilities without diazepam was also the regional hospital that lacked magnesium sulfate. Phenobarbital was available in only two of the seven facilities, while phenytoin was available in none.

Calcium gluconate was available in three of the seven facilities; two of these had magnesium sulfate in at least one inventory. Lidocaine was available in two of the seven facilities; one of these also had magnesium sulfate in both its maternity and pharmacy inventories. Antihypertensives were available in two of the seven facilities where PE/E cases were observed; however, in one of these facilities, the only available antihypertensive was

methyldopa. All four antihypertensives assessed were available in only one facility; this was the same facility that had magnesium sulfate available in both the pharmacy and maternity.

Routine Provision of Relevant Care during ANC

Information on equipment and routine practices during ANC was available for six facilities, which accounted for nine of the suspected PE/E cases. In four of these facilities, taking BP was observed as routine during ANC. However, urine testing was observed to be routine in only one facility, a private hospital (although one other facility reported conducting this analysis, it was not observed). A working BP machine was observed in four of the facilities. Only one facility had urine tests in the exam room, which was the same facility where urine tests for proteinuria were routinely observed during ANC. This was also the only facility to have guidelines or protocols for the management of PE/E.

Case Management

Magnesium sulfate was not administered as standard procedure in PE/E cases even when available, and antihypertensives were not consistently administered when appropriate and available. This finding accords with the findings of provider interview case scenarios, in which scores for pre-eclampsia case management were low.

Magnesium sulfate was not administered in any of the PE/E cases, including in facilities that had it in stock. Diazepam was administered in five cases. Antihypertensives were administered in at least two cases; in at least one case, antihypertensives were not administered to a woman who was a candidate for them even though they were in the facility. Magnesium sulfate was not administered to a patient with convulsions even though it was available in the hospital. This patient was also not turned on her side to avoid aspiration and to ensure good fetal/placental circulation. In one pre-eclampsia case, the patient was transferred to another facility, although the original facility (a public district hospital) should have been able to manage pre-eclampsia, and perform a vacuum/forceps delivery, if necessary. Partographs were initiated in only two of these cases. In no case was the partogram correctly completed, including the plotting of BP.

Overall, magnesium sulfate was not administered as per global guidelines even when it was available and/or would have been indicated, as suggested by the observed administration of diazepam and antihypertensives. Additionally, antihypertensives were not consistently administered when appropriate and available. This finding accords with the scores of provider interview case scenarios in which, although most providers are able to define and diagnose PE/E, only one-third are able to correctly describe appropriate management.

Table 4. Summary of Suspected PE/E Case Management

OBSERVATION	NUMBER OF CASES (TOTAL N=10)
Convulsing or unconscious	1
Magnesium sulfate administered	0
Diazepam administered	5
Antihypertensive administered	2
Maternal deaths	0
Newborn deaths	1

Assumptions and Caveats

This analysis was based on 10 observed cases, and most of these cases had missing responses among the 70 or more items in the observation checklist. If a response was not recorded (i.e., left blank), it was assumed that the item was not done or administered. This analysis also considered drugs as unavailable if they were recorded as not seen on site, even if they were reported by providers to be available. Four possible variables denoted diazepam

administration; if any were positive, it was assumed diazepam was given. In one case, diazepam was stated as having been administered, even though it was not observed to be available in the inventory.

Summary of Case Management of Suspected Postpartum Hemorrhage Cases Observed in Madagascar (n=15)

Number of cases and facilities

The observer suspected PPH and followed cases using the PPH observation module for 15 women. These PPH cases occurred in nine of the 36 facilities assessed; five cases occurred at the university hospital alone. In three of the PPH cases, the newborn died and one case was a stillbirth. The summary below reviews: the availability of relevant drugs, equipment and other capacity in these facilities; the provision and completeness of AMSTL in these cases; management of the 15 cases observed; and assumptions utilized in the analysis. It is important to note that delivery appears to have occurred at home or en route to the facility in five of these cases, and that two of the cases were spontaneous abortions at mid-term. Not all standard L&D interventions would have been possible or appropriate to provide in these seven cases.

Caveats and assumptions

This analysis was based on 15 observed cases, most of which had numerous missing responses among the items in the PPH management observation checklist. This made it difficult to assess many aspects of the QoC. It is not possible to be sure that the interventions were not performed in cases with missing data. In addition, some interventions should not or could not have been performed in cases of abortion or delivery outside the facility. Both because of these gaps and because the PPH cases involved a variety of clinical situations, statements below about the number of cases in which correct interventions were performed should not be interpreted as percentages.

Availability of drugs

All facilities except one had oxytocin and ergometrine available in the pharmacy inventory. Oxytocin was available in the maternity ward inventory in seven of the nine facilities, and ergometrine was available in the maternity inventory in three of the nine facilities. Misoprostol was available in just two of the nine pharmacy inventories, as well as in two of the nine maternity inventories.

Availability of guidelines, equipment and capacity

Guidelines for normal L&D were found in only two of the nine facilities where PPH occurred. Guidelines for emergency obstetric care were observed in four facilities. Maternity wards in five of the nine facilities lacked either IV capacity or one or more of the relevant supplies assessed (e.g., syringes, sutures). Five of the nine facilities had the capacity to provide blood transfusions, had a blood bank and had performed a transfusion within the past three months. An additional two facilities had transfusion capacity but no blood bank.

Case management

Partograph

Among the eight women who labored and gave birth in the facility, a partograph was observed as initiated in only one case, and only with information about delivery and birth outcomes.

AMTSL and additional post-delivery interventions

Despite the widespread availability of oxytocin, it appears that a uterotonic was administered after delivery in just four of the eight cases in which women labored and gave birth in the facility (excluding cases of spontaneous abortion). Oxytocin was used in all four of these cases. Oxytocin was administered within three minutes of delivery in three cases, and within one minute of delivery in one case. Oxytocin was administered via intramuscular

injection in three cases and by IV in one case. Controlled cord traction was performed in three cases, and uterine massage was performed in three cases. All three elements of AMTSL were performed in just two cases. Assessment of the complete expulsion of the placenta and membranes was performed in three cases; assessment of lacerations of the vagina and perineum was performed in four cases.

Among the two cases of spontaneous abortion at mid-term, oxytocin was also administered in one of the two cases, upon the delivery of the anterior shoulder. Assessment of the complete placental expulsion and membranes was also performed in one of these two cases.

Management of PPH

In nine of the 15 PPH cases, the woman was informed about what was happening and she and those accompanying her were reassured. In another five cases, just one of these actions was taken. In only one case was there no communication with the woman or those accompanying her.

A uterotonic was administered for treatment in just four of the 15 PPH cases; oxytocin was used in all of these cases. Manual removal of the placenta appears to have been attempted in five cases; in at least four of these cases, it was not performed according to guidelines and/or at least one important step was omitted (e.g., IP). In two cases, women who had delivered outside the facility and were referred to the facility appeared to need manual removal of placenta, but apparently it was not attempted/performed.

> It was necessary to perform manual removal of the placenta in five of 15 cases, but it was not done according to guidelines in any of these cases.

Missing data makes it difficult to comment with confidence on additional aspects of the quality of PPH case management (e.g., suturing of lacerations, performance of bimanual compression). However, it appears that preparation to give blood was done in just one case, although no transfusion occurred (despite facility capacity to do so). In four cases, the woman was reportedly prepped for surgery in the same facility. Of these, one woman was referred to another health agent at the same facility, rather than undergoing surgery; it is not clear why. According to available data, three women underwent surgery in the same facility; however, only one of these was also recorded as having been prepped for surgery in the same facility. It is not clear if additional women underwent surgery after prepping; this information is missing.

Summary

Overall, it appears that providers need more support and supervision to ensure the complete provision of AMTSL interventions. For example, a uterotonic was only administered for treatment in half of the cases where a woman delivered at the facility, despite the availability of oxytocin in the maternity inventory in all four cases where it was not administered (three of these occurred within the same facility). Additionally, uterine massage and controlled cord traction were not performed in most cases, even though they do not require special equipment or supplies.

Table 5. Summary of Suspected PPH Case Management

OBSERVATION	NUMBER OF CASES (TOTAL N=15)
AMTSL Interventions Performed*	
Administration of a uterotonic	4
Controlled cord traction	3
Uterine massage	3
All AMTSL interventions	2

OBSERVATION	NUMBER OF CASES (TOTAL N=15)
Type of Treatment Provided	
Administration of a uterotonic	4
Massage the fundus	5
Repair of lacerations	2
Manual removal of placenta	5
Bimanual compression	--
Blood transfusion	0
Outcomes	
Surgery	3
Maternal deaths	0
Perinatal deaths	4**

* Among eight cases where the woman labored and delivered at the facility (excludes spontaneous abortions)
** One of these was a stillbirth, while three were neonatal deaths
-- Bimanual compression cannot be reported due to missing data

5. CONCLUSIONS

5.1 SUMMARY OF FINDINGS

The MCHIP QoC Assessment in Madagascar evaluated care observed in 36 health facilities for prevention and management of common complications at time of birth. The facilities included all hospitals and health centers with more than two births per day. The facilities were mainly public (81%), of which three-quarters were hospitals of different levels (district, regional and university) and one quarter were Basic Health Center 2 facilities. A hallmark of the assessment was the observation of actual deliveries (n=347) and ANC consultations (n=323). Observational data were complemented by inventories of four types (general, ANC, maternity ward, pharmacy) and interviews including knowledge tests with 139 providers. The majority of providers observed and interviewed were midwives. From these multiple forms of data collected and analyzed together, the QoC Assessment provides an overall description of maternal care at one point in time at all high-volume facilities in Madagascar. The findings of the QoC Assessment indicate that, despite a number of areas of strong performance, gaps remain at all stages of the care of pregnant women and of newborns, representing opportunities for action by stakeholders in the maternal health arena.

The main findings are presented and discussed below, with results summarized from the several forms of data collected for: ANC, IP, normal L&D, PE/E, obstructed/prolonged labor, PPH and newborn resuscitation. Cross-cutting findings and discussion are also presented. Recommendations are made for policy, facility readiness and specific service components.

Antenatal Care

Inventory and Facility Readiness Related to ANC

Nearly all health facilities had basic equipment, such as a fetal stethoscope (97%) and most had a functioning BP machine (82%). However, supplies of medicines varied, e.g., while over 94% of facilities had TT vaccines, only 62% had SP for IPTp. Guidelines or protocols for ANC were seen rarely (38% each) in the health facilities. Supporting materials for ANC counseling were available in half of facilities. Routine components of ANC services varied widely, with 88% of facilities routinely offering syphilis blood tests and 70% of facilities routinely offering FP, but only 56% routinely offering SP for IPTp. Blood group typing was offered at under a quarter of facilities (24%).

ANC Observations

Nearly all clients were asked about at least one danger sign during ANC (90%). However, certain signs were discussed less frequently, with less than half of women being asked about their HIV status (40%) and just 3% of women being asked whether they had experienced a persistent cough. BP was taken routinely (82%), but correctly in only 48% of observations. Although nearly three-fourths of women received TT injections during a first ANC consultation, only half received iron or folic acid, and 40% received SP. While providers often asked women about previous pregnancy outcomes (e.g., miscarriage), they rarely asked about complications in previous pregnancies and births. Less than a quarter asked about heavy bleeding during or after previous pregnancy and delivery, and less than a fifth asked about previous pregnancy-induced hypertension. And, although providers frequently provided counseling regarding preventive medical interventions (e.g., SP, iron/folic acid and TT) (67–77%), counseling on birth preparation (35%) or on postpartum family planning (PPFP) (20%) was conducted more rarely.

Infection Prevention

Inventory and Facility Readiness Related to IP

Supplies needed for IP were available in 83% of health facilities, with highly available items including: sharps containers, soap and water for handwashing, and decontamination solution. However, clean or sterile gloves were only available in two-thirds of facilities. While there was relatively good availability of sterilization equipment (83%), half of facilities lacked written guidelines or protocols for sterilization.

IP–Observations of L&Ds

Protective clothing was worn to prepare for birth in 60% of observations, but treatment of clothing with a 0.5% chlorine solution after use was only observed in a quarter of observations.

Normal Labor and Delivery

Inventory and Facility Readiness Related to Normal L&D

More than two-thirds of health facilities surveyed had 24-hour staff coverage. While all facilities had electric power and nearly all had functional toilets, only half had communication equipment or emergency transport, and just 25% had a nearby safe water source. Delivery tables were present in all health facilities, but functioning exam lights for procedures were less common (63%). One-third of facilities were not able to ensure patients' visual and auditory privacy (whether in shared or private rooms). Blank partographs were in stock at two-thirds of health facilities. Only about 28% of facilities had guidelines or instructions for normal delivery, a similar proportion for EmOC. While essential supplies for normal and complicated delivery were available in two-thirds of facilities, essential supplies for newborn care were available in only about half of facilities. Less than half of facilities reviewed maternal deaths or near misses, and just one-third reviewed neonatal deaths or near misses.

Provider Knowledge

Providers demonstrated moderately high knowledge regarding observations and monitoring during L&D (mean score of 66%), and nearly three-quarters correctly identified the partograph as the place to record observations. However, few providers correctly identified actions to take for PMTCT during L&D (mean score 14%). Virtually all providers correctly identified that episiotomy and artificial rupture of membranes should not be routinely performed; however, nearly half believed that suctioning the newborn's nose and mouth should be routine practice.

Observations

Despite availability at most facilities, partographs were only used in approximately a quarter (28%) of L&Ds observed. Partographs were almost never plotted at least every hour

during labor (2%). While some initial client assessment steps were routinely performed (e.g., asking about age and parity, checking fetal heart rate and performing vaginal examination), other actions occurred less frequently. Pulse or temperature was only checked in half of cases, and urine output was noted in only 10% of cases. Patients were rarely asked about danger signs (10–34% across seven different signs).

Assisting the mother to initiate breastfeeding within the first hour after birth was not commonly performed (37%) in the observations. This is much lower than was found in the DHS national household survey in which 72% of women reported initiating breastfeeding within the first hour after birth. In the QoC survey, performance was poorer (35–40%) with respect to explaining procedures to laboring women, encouraging walking or changing positions during labor. Providers rarely asked laboring women or those accompanying them if they had questions (28%). However, providers frequently greeted and gave patients friendly treatment (65–88%).

Observations—Harmful or Non-Indicated Practices

At least one harmful or non-indicated practice was recorded in the majority of L&D observations. The most common were: stretching of the perineum (68%) and holding the infant upside down (30%). Among observed, non-indicated practices were manual exploration of the uterus (50%) and, more rarely, episiotomy, aspiration of the newborn's mouth and nose, and fluid restriction during labor.

Pre-Eclampsia/Eclampsia

Inventory and Facility Readiness Related to PE/E

Injectable anticonvulsants were available in nearly three-fourths of facilities (magnesium sulfate in 47%). Just over half of facilities had the other drugs needed for magnesium sulfate administration (lidocaine and calcium gluconate). Antihypertensive drugs were available in 50% of facilities and sedatives (phenobarbital) in 25%. ANC evaluation indicated that urine tests for protein were offered in over half of facilities (56%). However, less than a third of facilities had urine test strips in stock or the ability to do boiled urine tests. Guidelines for management of PE/E were available in few facilities (15%).

Provider Knowledge

Nearly all providers identified the correct working diagnosis of the case scenario presented to be severe pre-eclampsia (96%). However, only a third correctly identified the actions to take to stabilize a patient, and only half knew what to do if a patient presented with convulsions. Across all questions asked about PE/E, the overall mean score was 51%.

ANC Observations Related to PE/E

BP was taken for 82% of pregnant women, but less often with the correct technique (48%). Only 29% of women were given a urine test or referred for one. Less than a third of women were counseled to return to the clinic in case of PE/E-related danger signs (e.g., headache or blurred vision, swollen hands or feet).

L&D Observations Related to PE/E

BP was routinely taken (88%), but danger signs were only evaluated or discussed in half of observations. Of patients for whom a partograph was completed, 60% recorded BP at least every four hours. Urine tests to detect proteinuria were rarely performed (7%).

Observations of Suspected PE/E Cases

Ten suspected PE/E cases were observed. Of the seven facilities in which these PE/E cases occurred, magnesium sulfate was observed in the maternity or pharmacy inventory at five facilities. Diazepam was observed to be available in five facilities. Antihypertensives were available in two of the seven facilities where PE/E cases were observed. Among the facilities where PE/E cases were observed, the regional hospital lacked both magnesium sulfate and

diazepam. Magnesium sulfate was not administered in any of the suspected PE/E cases, including facilities that had it in stock. Diazepam was administered in five cases. Antihypertensives were administered in at least two cases; however, they were not administered in at least one case where they were observed to be available. In the case where the patient was convulsing, magnesium sulfate was not administered, even though it was available. Other best practices were also not followed. Overall, it appears that management with magnesium sulfate is not standard procedure even when it is available, and that antihypertensives are not consistently administered when appropriate and available. The findings from suspected PE/E cases are consistent with those from the provider interviews, which indicated that, although most providers are able to define and diagnose PE/E, only one-third are able to correctly describe appropriate management.

Obstructed/Prolonged Labor

Inventory and Facility Readiness Related to Prolonged/Obstructed Labor

Cesarean sections were reported to be performed at 64% of facilities, but blood transfusions were only provided at about half (53%). Among facilities that offered cesarean section, 70% had the relevant providers (including anesthetists) available 24 hours a day, but only 64% had halothane available, and just over half had ketamine (57%).

Provider Knowledge

Providers demonstrated relatively low knowledge regarding signs of obstructed labor (mean score 45%) as well as actions and tests for obstructed labor (mean score 37%).

L&D Observation Related to Obstructed/Prolonged Labor

As noted above, partographs were infrequently used at all; when they were used, the time of initiation was rarely correct (19%) and few were completed with the correct frequency and thoroughness (2%).

Postpartum Hemorrhage

Inventory and Facility Readiness Related to PPH and AMTSL

Injectable uterotonics were available in over three-quarters of facilities, but syringes and needles were less available (61%). Half of facilities had the items needed for removal of retained placenta.

Provider Knowledge

Providers had relatively low knowledge of signs to assess for PPH (mean score 56%) and few knew about actions to assess for atonic uterus (mean score 39%). Similarly, only 36% of providers knew the steps to take to manage retained placenta.

L&D Observations—AMTSL

A uterotonic (oxytocin) was given during the third stage of labor in 85% of cases; however, it was only given within one minute of delivery in the correct dose and route in 21% of cases. Only 13% of observations were compliant with all procedures of AMTSL, including correct dose, route, administration within one minute of oxytocin, controlled cord traction and uterine massage.

Observation of PPH Cases

Providers need more support and supervision to ensure the complete provision of AMTSL interventions. For example, a uterotonic was only administered during AMTSL in four of eight cases where a woman with PPH delivered at the facility, although oxytocin was observed to be available in the maternity inventory in all four cases where it was not administered. Additionally, uterine massage and controlled cord traction were not performed in most cases, even though they do not require special equipment or supplies. A uterotonic was only administered for treatment in four of 15 suspected PPH cases. Manual removal of the placenta appears to have been attempted in five cases; however, it was not performed

according to guidelines. In two cases, women who had delivered outside the facility and were referred to the facility appeared to need manual removal of placenta, but apparently it was not attempted/performed.

Newborn Resuscitation

Inventory and Facility Readiness

Nearly all (86%) of facilities had performed newborn resuscitation in the past three months. Most facilities had a suction bulb for resuscitation, two-thirds had suction apparatus for use with catheter and a tube and mask device. However, just half had the newborn size bag and mask device (size 00,01).

Simulated Resuscitation of the Newborn

Over half (57%) of providers demonstrated all items correctly for stimulating a newborn, but only a third (34%) demonstrated all correct actions for ventilation.

5.2 CROSS-CUTTING FINDINGS AND DISCUSSION

These findings indicate that there is a foundation upon which to focus improvements addressing the gaps identified in this Assessment, notably in facility readiness, provider knowledge and routine practice related to the quality of ANC, L&D and EmONC care. Some gaps that were identified across technical components and data collection methods:

Readiness

- Providers and facilities lack protocols for most ANC, L&D and EmONC services. Guidelines and visual aids are not widely posted and available.
- Even when some essential medicines or personnel are available, their utilization may be prevented by the absence of complementary supplies or equipment.
- While 78% of facilities had supplies of an injectable uterotonic, related materials were less available (e.g., 61% had syringes, 56% had IV infusion sets and 42% had suture material).
- ENC supplies were less available (53%) than essential supplies for delivery (62%) and serious complications (67%).
- Reviews of newborn death and near miss were less frequently performed (33%) than maternal death/near miss reviews (42%).

Gaps between Readiness and Services Provided

There is a gap between the availability of supplies/medicines and the services provided:

- Of facilities surveyed, 77% had iron/folic acid tablets, but these were provided during only half of observed first ANC consultations.
- Blank partographs were available in 67% of facilities, but used in only 28% of L&D cases observed.

A discrepancy became evident between the services reportedly routinely offered and the care observed or supplies inventoried:

- FP counseling was reportedly routinely offered at 71% of facilities; however, PPFP counseling was observed in just 20% of ANC consultations.
- Urine tests for protein were reportedly routinely offered at 56% of facilities, but urine test strips or the ability to do boiled urine tests were only found during inventory at 29% of facilities.
- In at least one suspected PE/E case, the patient was referred out, even though the original facility was a district hospital that should have been able to treat pre-eclampsia and perform potentially indicated procedures such as vacuum-assisted delivery.

Interventions that do not require special equipment or supplies were also often not provided:

- In observation of AMTSL among PPH cases, controlled cord traction had only been conducted in three of the eight cases in which a woman labored and delivered in the facility. Similarly, uterine massage had also only been conducted in three of eight eligible cases.

Service Delivery

Across care components, even when certain procedures and interventions were performed, **optimal practice was not observed:**

- Even among the 28% of L&D cases where partographs were completed, few were initiated at the correct time and almost none were completed with the correct frequency.
- While BP was taken in the majority of ANC consultations, it was taken correctly in less than half.
- Although an injectable uterotonic was provided in most L&D cases, it was given within one minute of delivery in correct dose/route in under one-fifth of cases, and just 13% of cases received all elements of AMTSL.
- While 77% of ANC observations included counseling about TT vaccination, only one-third included counseling about birth preparation and just 20% included counseling about PPFP.
- When interventions to manage complications such as PPH were performed, they were often not conducted according to guidelines. For example, aspects of appropriate practice (e.g., IP) were omitted in all cases of manual removal of placenta observed.

Knowledge

- Knowledge and practices regarding **newborn care lagged** behind relative to other L&D indicators.
- While over 95% of providers had the correct knowledge about dangerous or non-indicated maternal practices such as episiotomy and artificial rupture of membranes, under half knew that suction of the mouth and nose of the newborn was not routine practice.
- Provider **knowledge was notably weak in relation to complications** that are the leading causes of maternal death in Madagascar, including PPH and PE/E.
- The mean score for knowledge regarding assessment, actions and interventions for abnormal bleeding postpartum due to uterine atony was just 39%, and the mean score for assessment, actions and interventions for retained placenta/products of conception was just 36%.
- While the mean score for the assessment/diagnosis of PE/E was 70%, under one-third of providers knew to stabilize cases with magnesium sulfate and antihypertensives; the mean score was just 50% for actions to take for women experiencing convulsions.
- Providers appeared to be more comfortable or accustomed to providing information regarding medical interventions and **less comfortable with counseling** regarding health behaviors, care seeking or services outside the immediate medical context. As a result, ANC and L&D encounters present missed opportunities for the provision of or referral to essential services.
- **Knowledge and practices regarding HIV counseling, testing and PMTCT were poor** despite widespread availability of relevant services. Although HIV counseling and testing was available at 82% of facilities surveyed, under half of ANC consultations asked whether the pregnant woman knew her HIV status. Additionally, providers' mean score on questions related to PMTCT was 14%, the worst of all areas for which knowledge was evaluated.

5.3 LIMITATIONS

This study was cross-sectional and presents a snapshot of the situation at one point in time. Additionally, the providers that were observed delivering ANC and L&D care were not always the same providers who were interviewed regarding routine practices and clinical knowledge.

Due to the Hawthorne effect of observation, providers may have offered better quality of care during observation to the ANC clients and maternity patients than they would have normally. Results would therefore present the better than normal scenario. However, since the data collectors were present for 3.5 days in each health facility, providers may have resumed their normal practices.

Understanding the extent to which the data were correctly observed and entered into the smart phones entails further study. The tools together had several hundred questions, and required observers to work intensively over multiple days at each facility. It is possible that there may be fatigue or quality issues for questions toward the end of the tools, or for observations conducted later in a facility visit. Additionally, in L&D observation, several interventions may have been going on simultaneously (e.g., essential newborn care and AMTSL). Thus, there remains a possibility that observers may have missed aspects of the care provided. However, these concerns should be mitigated by the fact that observers were trained in standardized and consistent use of the survey tools, and they were given opportunities to practice using the tools in ANC and L&D simulations, with inter-observer reliability evaluated.

Missing data regarding complications prevented extensive qualitative analysis of the management of some complications. Additionally, not all L&D items could be completed for all observations, partly due to the stages at which women arrived at the health facility (e.g., during the second stage of labor, or having delivered en route). Overall, it is not always possible to know when missing data is attributable to one of the issues noted above (e.g., simultaneous intervention, delayed arrival at facility), is a mistake, or is genuinely a blank response (e.g., an intervention was not begun, so later questions related to its administration should be blank).

Overall, the assessment utilized questions with clear, exclusive, non-overlapping responses, and allowed binary (yes/no) responses whenever possible. However, in the case of facility inventory, most inventory questions had four options: available, reported but not seen, not available, don't know. Because there was no additional information regarding the "reported but not seen" responses, they essentially became equivalent to "not available" and were aggregated with these for analysis. The questions did not always allow assessment of whether observed stock-outs were a temporary or recurring phenomenon.

5.4 COMPARISON OF FINDINGS TO MADAGASCAR DEMOGRAPHIC AND HEALTH SURVEY (2008–2009)

Antenatal Care

To paint a clearer picture of maternal health services received by women, it is useful to compare the findings of the 2008–2009 Madagsacar MDHS[15] to those of the QoC Assessment. The QoC Assessment evaluated the quality of care received by women who sought care in health facilities, while the MDHS solicited information from a nationally representative sample of women at the community level. Only a few indicators can be compared between the two surveys, primarily regarding ANC. These are identified and summarized here.

The MDHS found that a high proportion of women in Madagascar received ANC from trained personnel (86.3%), with 59.8% receiving care from a nurse, midwife or medical assistant; and 26.5% receiving care from a physician. In comparing MDHS ANC findings to those of the QoC Assessment, it is important to note that the MDHS asks about whether certain interventions were received during the most recent birth or in a birth within the five

years preceding the survey. The timing and frequency of most interventions (with the exception of TT vaccination) were not assessed.

Regarding quality of ANC, the MDHS found that 48.7% of women who received ANC for the most recent birth were informed about signs of pregnancy complications. In contrast, in the QoC Assessment, the most comparable indicator found that the mean percentage score for pregnancy counseling regarding signs of risk was 33.1%. Counseling regarding specific pregnancy complications (e.g., vaginal bleeding) ranged from 6.2% to 36.6%. Among women who received ANC for the most recent birth, the MDHS found that 80.6% had their BP measured. This is very simliar to the QoC Assessment finding that BP was taken in 82% of ANC observations; however, the QoC Assessment found that only 48.4% of women had their BP taken using the appropriate technique. The MDHS found that 29.5% of women had urine collected during ANC for their most recent birth. In the most comparable indicator from the QoC Assessment, it was similarly found that a urine test was performed (or referred for) in 28.9% of ANC observations.

The MDHS found that, among women with a birth in the five years preceding the survey, 59% reported taking iron tablets or syrup. While any comparison must be very rough due to the difference in indicator, it is interesting to note that the QoC Assessment found that 53.7% of women were prescribed or given iron pills or folic acid or both at their first ANC visit. The MDHS found that 47.4% of women received at least two TT injections during their last pregnancy, while the QoC Assessment found that a TT injection was given during 57.8% of ANC observations.

Related to malaria, the MDHS found that, of women who had given birth during the last two years, 48.4% reported taking an anti-malarial medicine during pregnancy. However, only 11% reported receiving Fansidar (SP) during ANC, and only 6.4% reporting receiving two or more doses of Fansidar during ANC. The QoC Assessment found that anti-malarial prophylaxis was given during 40.1% of ANC observations.

Delivery Care and Breastfeeding

In contrast to the high use of ANC from trained health providers, the MDHS found that only a third (35%) of births nationally during the five years preceding the survey took place in health institutions. Therefore, findings regarding delivery care are less comparable between the MDHS and the QoC Assessment. However, it is interesting to note that the MDHS found that 1.5% of births within the past three years had been performed by cesarean section. In contrast, the QoC Assessment found that 11.5% of births were performed by cesarean section, reflecting the facility-based sample.

A notable divergence of findings between MDHS and the QoC Assessment occurred in the breastfeeding indicator. The MDHS found that most women initiated breastfeeding soon after birth—72.4% within one hour after birth and 92.2% within 24 hours after birth. In contrast, the QoC Assessment found that the mother was assisted to initiate breastfeeding within an hour after birth in only slightly more than a third (37%) of observations. This contrast may reflect that mothers may initiate breastfeeding on their own, without provider assistance, or may indicate undefined differences between the QoC Assessment sample and the MDHS sample. However, the MDHS also found that women who were attended by a health professional were more likely to initiate breastfeeding in the first hour after birth compared to those delivered by a traditional midwife (76% vs. 70%). Similarly, those who delivered at a health facility were more likely to initiate breastfeeding early relative to those who delivered at home (77% vs. 70%). The low rate of initiation of breastfeeding found in the QoC Assessment may be worth exploring further.

6. RECOMMENDATIONS

These findings inform a number of policy and program recommendations to strengthen the quality of maternal and neonatal care at health facilities in Madagascar. At the national level, key stakeholders across institutions and disciplines should come together to discuss and develop strategies to address findings in this report.

6.1 NATIONAL POLICY RECOMMENDATIONS

National policy documents have been developed to facilitate the high-quality MNH services, including the National Policy on Reproductive Health, the National Hospital Policy, the Road Map for Reducing Maternal and Neonatal Mortality 2005–2015, and the norms/standards documents listed in Appendix 2. Even if these documents are shared with health providers, it is also necessary to provide training, supervision and supply of necessary equipment, materials and medications to the facilities. A key recommendation is to develop an implementation plan to accompany and make operational the existing policy documents, such that facilities and providers are well-prepared to provide high-quality MNH services to every pregnant woman and newborn.

This assessment has shown that simple techniques such as labor management and surveillance using the partogram, the prevention of PPH using AMTSL and the use of magnesium sulfate for the prevention and treatment of PE/E are not always common practices of providers.

A second key recommendation is to develop a mechanism for systematic and regular **technical updates** and information sheets to be distributed to providers. These technical updates would reflect the latest evidence for the routine delivery of key MNH interventions.

Stakeholders and donors have the opportunity to come together to address the gaps and shortcomings found in the QoC study. Additional recommendations include:

- Discuss the responsibilities of institutions at all levels of the health system in regard to maternal and neonatal care, including the minimum number of providers in each type of health facility, the minimum package of activities expected and the minimum package of resources required.
- Revisit the classification of facilities as BEmONC or CEmONC based on the resources actually available at each institution as well the updating of facility classifications based on regular monitoring of resources available and QoC.
- Advocate to ensure that all effective drugs for prevention and management of common maternal and newborn complications are on the Madagascar EDL.
- Ensure that all health facilities have clearly visible **guidelines** for the complete, correct and systematic performance of essential interventions such as ANC screenings, AMTSL, ENC and newborn resuscitation.
- Evaluate all existing documents (i.e., curricula, job aids, guidelines, protocols) relating to ANC, L&D and EmONC and, if necessary, update them.
- Upgrade pre-service and in-service training of staff to ensure that maternal and neonatal services reflect best practices and universally recognized evidence.
- Stress adherence to national guidelines for the practice of ANC, L&D and EmONC, as well as for appropriate PMTCT, PE/E detection, AMTSL, and the elimination of harmful and non-indicated practices during labor and childbirth.
- Identify innovative approaches to engage existing trainers, including those at universities, to ensure all trainers have updated knowledge and skills base.
- Support training schemes to evolve from one-off workshops to serial training modules that allow two-way feedback and follow-up/monitoring of the adoption and retention of new skills.

- Integrate into clinical supervisory practice observation and inventory checklists.
- Integrate appropriate indicators for PPH and PE/E are included into the HMIS.

6.2 CROSS-CUTTING FACILITY READINESS RECOMMENDATIONS

- Disseminate, demonstrate and routinely check the availability in health facilities of instruction manuals, protocols and visual aids for all essential ANC, IP, L&D and EmONC procedures and services.
- Ensure that essential infrastructure such as running water and electricity is standard in all health facilities.
- Ensure that all health facilities have the basic supplies, equipment and medicines needed to provide essential ANC, IP, L&D and EmONC interventions (e.g., syringes, urine strips, cord clamps/ties).
- Post lists of the minimum package of material resources (in accordance with national norms and standards documents, noted in Appendix 3) in all ANC, L&D and EmONC care rooms to remind providers and supervisors of the minimum standards and support them in the advocacy needed to have these minimum resources available at their facilities.
- Ensure respectful care of women and their families.
- Ensure visual and auditory privacy in consulting and work rooms.
- Ensure that training to providers is combined with having in stock the necessary equipment or supplies; conversely, ensure that all new equipment is accompanied by training in its use.
- Strengthen supervisory systems to promote routine service delivery and emergency case management in accordance with national policy and clinical guidelines.

An implementation report on the QoC data collection in Madagascar[16] suggested that implementation of recommended actions, as well as component-specific recommendations be carried out in a manner that prioritizes facilities. Priority would be placed on facilities that provide clinical training, in areas that have relatively high rates of maternal and neonatal mortality, and/or facilities located in remote areas where referral out is difficult.

This report also noted inefficiencies in the organization of health facilities and recommended several cross-cutting, facility-based actions to address these, including:

- Simpler and faster administrative procedures in hospitals, including on how to identify and manage patients most in need.
- Improved security for patient care at night.
- Improved collaboration between health providers and paramedics.
- Processes that enable regular, systematic and complete handover of case information and records between successive shifts or teams of health workers.
- Individual records for each patient that can be accessed by all health workers caring for that individual.
- Security and tracking systems to ensure the appropriate use and retention of equipment and supplies at the health facilities for which they were procured.

6.3 COMPONENT-SPECIFIC RECOMMENDATIONS

ANC

- Ensure that providers have guidelines for ANC services including STI screening and management, as well as HIV counseling, testing and PMTCT.
- Ensure that providers have visual aids or other supports for comprehensive counseling regarding all essential interventions during ANC, as well as discussion of birth planning/complication readiness/danger signs, PPFP and exclusive breastfeeding.
- Ensure that providers have functioning equipment (e.g., BP cuff, stethoscope) for ANC services, as well as training on proper usage.
- Strengthen ANC training and supervision to ensure that ANC services are provided in compliance with guidelines (e.g., taking BP under ideal conditions, taking temperature and pulse, and provision of SP to prevent malaria).

Infection Prevention

- Improve waste management by systematically using sharps containers and providing all facilities with working incinerators that are non-polluting and sustainable.
- Ensure that providers have protective clothing for each client contact and encourage systematic treatment of clothing with 0.5% chlorine solution after use.

Labor and Delivery

- Provide training and ongoing support to improve interpersonal communication, including explanation of procedures during L&D, encouragement of questions from patients and specific topics such as PPFP.

Pre-Eclampsia/Eclampsia

- Provide guidelines and job aids for PE/E counseling during ANC, as well as the detection of proteinuria.
- Provide guidelines, sustained training, advocacy and supervision to ensure the identification and management of PE/E (including the use of magnesium sulfate and antihypertensives and proteinuria detection). This may involve identifying barriers that prevent the use of magnesium sulfate even when it is available or prevent the provision of emergency care appropriate to facility levels, problems documented in the suspected PE/E cases observed during this assessment.
- Facilitate the availability of magnesium sulfate (as well as lidocaine and calcium carbonate) in the proper packaging in every health facility so that when needed, the recommended dose of magnesium sulfate can be delivered.
- As indicated by the Madagascar findings of the 2011 global status update on PPH and PE/E programming, ensure that all effective antihypertensives are on the EDL for PE/E.

Obstructed/Prolonged Labor

- Provide guidelines, sustained training, advocacy and supervision to ensure the regular use and proper completion of partographs as a labor management tool at the time of birth (i.e., with timely initiation and appropriate frequency).

Postpartum Hemorrhage

- Provide guidelines, sustained training, advocacy and supervision to ensure complete, correct and timely provision of all three components of AMTSL. As indicated in the 2011 global program status report on PPH and PE/E, AMTSL is included in pre-service and in-service training, but not in service delivery guidelines.

- Provide guidelines, refresher training and equipment/drugs to effectively treat PPH, including supervision to ensure that interventions such as manual removal of placenta are conducted according to guidelines.

Newborn Resuscitation

- Provide guidelines, sustained initial and on-the-job training, advocacy and supervision to ensure systematic care and monitoring of the newborn in optimally hygienic conditions.

6.4 DISSEMINATION AND NEXT STEPS

A preliminary stakeholders meeting was held in February 2011 on results of the L&D observations; a final dissemination covering this report is planned for January 2012. Stakeholders' input is crucial for addressing the findings of this report and for developing a concrete implementation plan, to improve MNH care in Madagascar and meet MDGs 4 and 5.

7. APPENDICES

7.1 APPENDIX 1. LIST OF PARTICIPATING FACILITIES

Appendix 1: Health Facilities Participating in Quality of Care Study and Expected and Observed Deliveries Per Day in Each Facility

Fac ID	Facility Type and Name	Région	Expected Number Per Day	Observed Number Per Day	Expected Proportion	Observed Proportion	Correction Factor Weight (Exp. Prop./Obs. Prop.)
0207	CHRR AMBOSITRA	AMORON'I MANIA	2.4	2.6	0.019	0.027	0.71
0211	CHU FIANARANTSOA	HAUTE_MATSIATRA	5.1	1.7	0.039	0.018	2.22
0305	CSB2 ANKIRIHIRY	ATSINANANA	3.4	2.3	0.026	0.024	1.11
0309	CHU TOAMASINA	ATSINANANA	6.7	4.6	0.051	0.047	1.09
0504	CHRR MORONDAVA	MENABE	2.3	2.3	0.018	0.024	0.76
0607	MATERNITE "AVE MARIA" ANTSIRABE	VAKINANKARATRA	3.1	1.7	0.024	0.018	1.33
0610	HOPITAL LUTERIEN ANDRANOMADIO	VAKINANKARATRA	2.8	2.6	0.022	0.027	0.81
0611	CHRR ANTSIRABE	VAKINANKARATRA	5.8	4.6	0.044	0.047	0.94
0707	CSB2 AMBOHIBARY	VAKINANKARATRA	2.2	0.9	0.017	0.009	1.94
0801	CHRR TSIROANOMANDIDY	BONGOLAVA	2.0	2.3	0.015	0.024	0.64
0912	CSB2 IMERINTSIATOSIKA	ITASY	2.1	0.9	0.016	0.009	1.85
0915	CHD1 ARIVONIMAMO	ITASY	2.3	2.0	0.018	0.021	0.85
1008	CSB2 AMBOHIMANGAKELY	ANALAMANGA	2.6	2.0	0.020	0.021	0.97
1009	CSB2 FIDY ANJANAHARY	ANALAMANGA	3.8	3.1	0.030	0.032	0.91
1010	CSB2 MITIA	ANALAMANGA	5.7	3.7	0.043	0.038	1.13
1011	CLINIQUE NOA	ANALAMANGA	2.2	1.7	0.017	0.018	0.97
1019	PAVILLON SAINTE FLEUR	ANALAMANGA	5.4	2.4	0.041	0.025	1.64
1107	CSB2 TALATAMATY	ANALAMANGA	2.4	2.6	0.018	0.027	0.68
1111	CHD2 ITAOSY	ANALAMANGA	4.1	2.5	0.031	0.026	1.22
1113	CHD1 AMBOHIDROA	ANALAMANGA	2.1	2.6	0.016	0.027	0.61
1117	HOPITAL MILITAIRE SOAVINANDRIANA	ANALAMANGA	2.5	2.9	0.019	0.030	0.65
1202	CSB2 ANDOHARANOFOTSY	ANALAMANGA	3.8	2.9	0.029	0.030	0.98
1216	CHU ANTANANARIVO (SGOB)	ANALAMANGA	24.2	18.6	0.186	0.192	0.97
1401	CHRR AMBATONDRAZAKA	ALAOTRA MANGORO	3.8	2.6	0.029	0.027	1.09
1412	CHD2 MORAMANGA	ALAOTRA MANGORO	2.1	1.1	0.016	0.012	1.39
1501	CHU MAHAJANGA	BOENY	3.3	2.6	0.026	0.027	0.96
1603	CSB2 TANAMBAO	DIANA	2.3	1.4	0.018	0.015	1.21
1606	CHD1 AMBILOBE	DIANA	2.2	1.4	0.017	0.015	1.13
1611	CHD2 NOSY BE	DIANA	2.1	1.7	0.016	0.018	0.90
1802	CHRR ANTSOHIHY	SOFIA	2.2	2.3	0.017	0.024	0.69
1901	CHRR SAMBAVA	SAVA	2.7	2.0	0.021	0.021	1.02
2109	CHRR MONJA JAONA	ANDROY	3.4	1.4	0.026	0.015	1.76
2310	CHRR TULEAR	ATSIMO ANDREFANA	3.2	3.7	0.024	0.038	0.64
2000	CHRR FENERIVE EST	ANALANJIROFO	1.6	1.1	0.012	0.012	1.05
3000	CHD1 AMPARAFARAVOLA	ALAOTRA MANGORO	0.6	1.0	0.005	0.010	0.44
4000	CHRR TOLAGNARO	ANOSY	1.8	1.1	0.014	0.012	1.16
	TOTAL		**130.3**	**96.8**	**1.000**	**1.000**	

7.2 APPENDIX 2. LIST OF NORMS & STANDARDS FOR MADAGASCAR FACILITIES PROVIDING MATERNAL HEALTH SERVICES AND FAMILY PLANNING

- Norms and standards in reproductive health, 2nd revision 2005 *(Normes et standards en sante de la reproduction, 2ème edition 2005)*
- Norms on human resources and medical imaging centers (Normes en ressources humaines des centres d'imagerie medicale)
- Norms and human resources of laboratories of medical analysis *(Normes en ressources humaines des laboratoires d'analyses medicales)*
- Materials list for medical imaging *(Materiels necessaires pour l'imagerie medicale)*
- Consumable materials and reagents needed for CHD2 *(Materiels consommables et reactifs indispensables pour CHD2)*
- Norms and standards of laboratories (analyses, materials, reagents *(Normes et standards des laboratoires: analyses - materiels- reactifs)*
- Materials, reagents, and consumables in the laboratory *(Materiels, reactifs et consommables de laboratoire)*
- Materials, reagents, and consumables necessary for medical imaging *(Materiels et consommables necessaires pour l'imagerie medicale)*
- Norms on floor space of University, Regional and District Hospitals *(Normes sur les surfaces utiles CHU, CHRR, CHD)*

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