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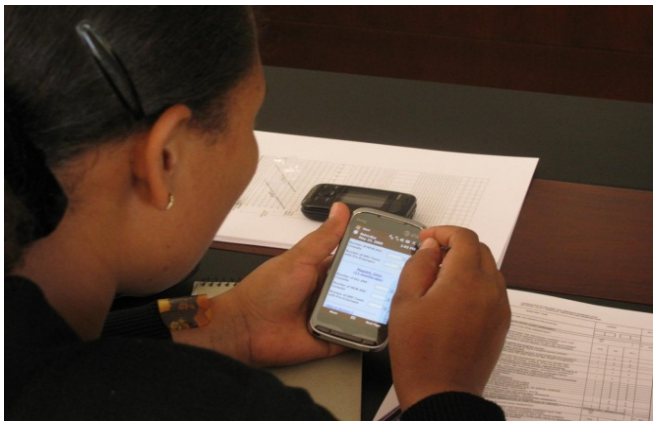
Quality of Care for Prevention and Management of Common Maternal and Newborn Complications: A Study of Ethiopia's Hospitals



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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

AMDD	Averting Maternal Death and Disability
AMTSL	Active management of the third stage of labor
ANC	Antenatal care
BP	Blood pressure
D5NS	Dextrose 5% in normal saline
EmONC	Emergency obstetric and neonatal care
FANC	Focused antenatal care
FMOH	Federal Ministry of Health
FIGO	International Federation of Gynecology and Obstetrics
HMIS	Health Management Information System
ICM	International Conference of Midwives
IM	Intramuscular
IMPAC	Integrated Management of Pregnancy and Childbirth
IV	Intravenous
L&D	Labor and delivery
M&E	Monitoring and evaluation
MCHIP	Maternal and Child Health Integrated Program
MDGs	Millennium Development Goals
MNH	Maternal and newborn health
NS	Normal saline
PE/E	Pre-eclampsia/eclampsia
POPPHI	Prevention of Postpartum Hemorrhage Initiative
PPH	Postpartum hemorrhage
QOC	Quality of care
SPA	Service Provision Assessment
USAID	United States Agency for International Development
WHO	World Health Organization

ACKNOWLEDGMENTS

The primary purpose of this study was to generate practical information to guide decision-making about improving the quality of facility-based maternal and newborn health services in Ethiopia. An undertaking such as this one requires the dedication and contributions of many people, and the authors would like to recognize those individuals who made this study possible.

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EXECUTIVE SUMMARY

BACKGROUND AND METHODS

International evidence suggests that improving the quality of obstetric care can directly reduce maternal and neonatal deaths. Accurate and reliable data are needed on the quality of services provided at health facilities in Ethiopia, especially for complicated deliveries involving postpartum hemorrhage, pre-eclampsia/eclampsia, and newborn asphyxia. With support from the United States Agency for International Development (USAID), the Maternal and Child Health Integrated Program (MCHIP) partnered with Ethiopia's Federal Ministry of Health and the Ethiopian Society of Obstetricians and Gynecologists to conduct a quality of care survey during March and April of 2010 to assess the care received by mothers and newborns during antenatal and delivery care.

The quality of care (QOC) survey was fielded in the 19 Ethiopian hospitals with the heaviest volume of deliveries in (at least five births per day on average). Five tools were used to gather data during health facility visits: (1) a facility inventory, which recorded the availability of critical drugs, supplies, equipment, and infrastructure; (2) a structured clinical observation checklist for antenatal care (ANC) consultations; (3) a structured clinical observation checklist for labor and delivery (L&D) and obstetric and newborn complications; (4) a structured health worker interview guide and knowledge tests on labor and delivery practices, including management of labor complications such as postpartum hemorrhage (PPH), pre-eclampsia/eclampsia (PE/E), obstructed labor, and essential newborn care and resuscitation; and (5) a national policy and drug review tool.

The primary objective of the survey was to determine the frequency and quality of interventions that address direct causes of maternal and neonatal deaths and to guide the need for and content of QOC improvement activities for maternal and newborn care at all hospital levels. The results of the survey will be used to inform and guide the national program and policies responsible for quality improvement in the ANC and labor and delivery, and immediate newborn care key interventions mentioned; they will also provide baseline estimates of the quality of these interventions in Ethiopia and other countries.

FINDINGS

The study involved interviews with 79 health workers and observations of 126 ANC consults and 192 deliveries. Findings are highlighted in the table below.

TYPE OF SERVICE OR COMPLICATION	FINDINGS
Postpartum hemorrhage	• About 29% of women received the full components of active management of the third stage of labor (AMTSL); this indicates that little has changed overall since the 2005 POPPHI/FMOH study. However, oxytocin use has improved markedly, reaching nearly 100%. • We found low knowledge of PPH management, which indicates a need for improved training.
Pre-eclampsia/eclampsia	• Blood pressure was commonly checked during clients' ANC visits and when they were admitted to the labor and delivery ward, but providers rarely asked about symptoms and signs of PE/E (in current or previous pregnancies) or counseled clients to return if they developed signs and symptoms. • Magnesium sulfate was rarely available in labor and delivery wards (only three of 19 facilities had it available). • Knowledge was low overall; scores for treatment were higher than those for examination and ongoing management.

TYPE OF SERVICE OR COMPLICATION	FINDINGS
Obstructed labor	• Partograph use was very low (despite available supplies), and in the few cases in which partographs were used, they were not always filled out correctly and completely. • Cesarean section appeared to be underused: seven out of 19 facilities reported performing no cesarean sections in the previous three months. • Knowledge of the signs of obstructed labor was low, but management knowledge was a bit higher.
Postpartum sepsis in mother and newborn	• With the exception of hand washing and use of protective clothing, infection prevention practice was generally good. • An unacceptable level of manual exploration of the uterus was found. • Knowledge of newborn sepsis was better than knowledge of postpartum sepsis.
Newborn care	• There is room for improvement in newborn care practices—especially skin-to-skin care. • Knowledge of routine care was found to be moderate, while diagnoses and management of asphyxia was low.

CONCLUSIONS AND RECOMMENDATIONS

Overall, the quality of care observed during the study was often below internationally accepted standards for ANC, labor and delivery practices, and essential newborn care. The study findings reveal a need to integrate evidence-based practices and quality assurance processes at all hospital levels. Further, a concerted countrywide drive to improve the quality of care is needed, and it should include implementing routine clinical and quality audits with attendant feedback mechanisms, retraining and supportive supervision, and making the FMOH's *Management Protocol on Selected Obstetrics Topics* widely available. Such an effort will increase the quality of key maternal and newborn health services by enhancing the capacity of health workers to provide the signal functions for basic and comprehensive emergency obstetric care, and consequently help to reduce maternal and newborn mortality and achieve Ethiopia's targets for Millennium Development Goals (MDGs) 4 and 5.

1. BACKGROUND

Improving the quality of obstetric care at health facilities is a challenge that must be undertaken to reduce maternal deaths and enable developing countries to achieve their targets for MDGs 4 and 5 (Van den Broek and Graham 2009). The Maternal and Child Health Integrated Program's assessment of the quality of care for prevention and management of common causes of maternal and newborn complications in Ethiopia and other countries builds on the successful survey model developed by the POPPHI project to assess facility-based management of the third stage of labor (Prevention of Postpartum Hemorrhage Initiative, n.d.; Stanton et al. 2009). In the ten countries where the POPPHI survey was conducted, the results motivated efforts to change policies and programs that support the use of active management of the third stage of labor to help reduce the incidence of PPH.

Postpartum hemorrhage is the most frequent cause of maternal deaths globally and in developing countries, accounting for 27% of maternal deaths. It is followed by hypertensive disorders in pregnancy (12% of maternal deaths), sepsis (12%), and obstructed labor (6%) (World Health Organization 2008). In Ethiopia, pregnancy and childbirth complications are among the leading causes of mortality among women, with an estimated 590 maternal deaths per 100,000 live births and a neonatal mortality rate of 37 deaths per 1,000 live births (Hogan et al. 2010; Central Statistical Agency and ORC Macro 2006 and 2011). In an analysis of 2000 data, approximately half of all births in developing countries took place in facilities (Stanton, Blanc, Croft and Choi 2007). Effective interventions for screening, prevention, and treatment of life-threatening obstetric and newborn complications can be readily provided in facilities by skilled providers. Implementing these interventions in facilities will help reduce maternal and newborn deaths globally and assist countries with meeting their targets for MDGs 4 and 5.

Among the many efforts to assess health facilities and the quality of the maternal and neonatal care services they provide, two major multicountry efforts stand out: Columbia University's Averting Maternal Deaths and Disabilities (AMDD) program, in partnership with the United Nations and UNICEF, developed an emergency obstetric and newborn care facility assessment; and ICF Macro developed and applied the Service Provision Assessment (SPA) in various countries. Both surveys assess aspects of facility readiness, including the number and type of health providers in the facility and the availability of equipment and medical supplies. The Maternal Child Health Integrated Program (MCHIP) developed its QOC survey to assess pre-eclampsia/eclampsia treatment and then expanded the survey for the assessment of all labor and delivery practices. The survey expands on the AMDD and ICF Macro surveys by including an assessment of quality of care through direct observation and comparison with standard care checklists for both ANC and L&D care. The MCHIP survey is being conducted in multiple countries as either an independent survey or as part of other survey efforts, such as the ICF Macro SPA survey.

The overall purpose of the MCHIP QOC survey is to generate information that can be used to guide quality of care improvement activities for maternal and newborn care in hospitals at the district, regional and central referral levels. The goal is to document the appropriate use, quality of implementation, and barriers to performance of key preventive, screening, and treatment interventions during facility-based maternal and newborn care. "Quality" in the practices we are assessing is determined by how closely the practices adhere to globally accepted evidence-based guidelines. The ultimate aim is to contribute to the reduction of preventable maternal and newborn deaths through increased use and quality of known life-saving interventions.

2. STUDY OBJECTIVES

The primary objective of this assessment is to determine the quality of interventions that address common direct causes of maternal and newborn deaths in developing countries as compared to the globally accepted evidence-based guidelines outlined in the World Health Organization's *Managing Complications in Pregnancy and Childbirth* manual, which is part of the Integrated Management of Pregnancy and Childbirth (IMPAC) series (World Health Organization 2003). The survey focused on PE/E, PPH, prolonged/obstructed labor, and sepsis among women and on birth asphyxia and sepsis in newborns.

Secondary objectives included the following:

- Provide baseline estimates on compliance with globally accepted standards for clinical practice in ANC and L&D, including history taking, physical examination, laboratory examination and birth preparedness counseling during ANC; clinical examination, use of the partograph, infection prevention, and active management of the third stage of labor during labor and delivery; and essential newborn care immediately postpartum.
- Provide qualitative information on the quality of management of women with PE/E and PPH and management of newborns with asphyxia.
- Assess three sets of factors related to quality of care: health provider knowledge of evidence-based practices; facility readiness with respect to infrastructure, supplies, and medications; and the national policy environment.
- Develop indicators and data collection tools that can be used in multiple countries.
- The results of this assessment will be used to guide national programs and policies to improve the quality of antenatal, L&D and immediate newborn care, including the management of common complications. The results may also serve as a baseline for future evaluations of quality improvement activities.

3. METHODOLOGY

3.1 STUDY DESIGN

The QOC study in Ethiopia was a cross-sectional national facility survey that was part of a multi-country assessment of maternal and newborn care practices at health facilities.

3.2 DATA COLLECTION TOOLS

The following tools were developed for this assessment:

- Structured clinical observation checklists for ANC consultations and the care of women in labor. A set of checklists were developed for the observation of ANC and vaginal deliveries in the selected facilities The checklists were based on the World Health Organization's MCPC manual and covered screening for PE/E in ANC, management of cases of PE/E and PPH (and other interventions) in labor and delivery; routine and correct use of the partograph, routine and correct use of AMTSL, infection prevention behaviors, provider-client interaction/communication, correct essential newborn care, and newborn resuscitation. Background information collected included age, gravidity, and parity of the client; qualifications of the provider; and level of care provided by the health facility (tertiary care, hospital, health center, etc.). The forms were adapted from the Jhpiego/ACCESS Program's *Best Practices in Maternal and Newborn Care: Learning Resource Package for Essential and Basic Emergency Obstetric and Newborn Care* (Jhpiego/ACCESS 2008). The routine labor and delivery clinical observation checklist was adapted from POPPHI's international survey instrument for facility-based management of the third stage of labor (Prevention of Postpartum Hemorrhage Initiative, n.d.).

- Health care worker interview and knowledge tests. A sample of health workers involved in labor and delivery care completed the health worker interview. When possible, health workers who were observed were also interviewed, but when this was not possible, other providers of antenatal care and labor and delivery services were substituted. The interview tool has two parts: one is designed to collect information about constraints to and facilitators for the delivery of quality care, including providers' medical qualifications, training and experience in the provision of ANC, L&D, and newborn care services, and supervision. The second part of the tool consists of a series of multiple-choice questions, which test the health workers' knowledge of how to identify and manage common maternal and newborn health complications, plus two clinical case studies to assess their knowledge and clinical decision-making pertaining to management of severe PE/E and newborn resuscitation.
- Record review. Although the survey toolkit includes a record review, this tool was not applied in Ethiopia, because much of the information was already available from the AMDD assessment that had been conducted in 2008–2009. The tool captures the number of ANC consults, deliveries, births, deaths, and obstetric complications at each facility for the last year from facility registers. Up to 24 individual client charts from the past three months are also reviewed for partograph use, AMTSL, and essential newborn care.
- Facility inventory. The facility inventory collects information on infrastructure conditions and verifies the availability of and storage conditions for medications, supplies, and equipment. The inventory is conducted once per facility and in addition to observation may include interviews with different health workers for different sections of the tool to ensure the most accurate responses. In addition, the inventory includes an interview with the director of the facility, or his/her designee, to generate a list of all health workers who attend deliveries and/or conduct ANC consultations.
- Key informant interview on national level policy. To determine the status of maternal and newborn care policies and the availability of key drugs and supplies at the national supply depot, interviews were conducted with key informants, with knowledge of national policies and practice guidelines. The interview guide included standardized questions aimed at identifying the existence of relevant evidence-based practice guidelines in national policy; relevant medications on the national essential drug list or formulary; and evidence-based content about L&D care, including PE/E and PPH management, in pre-service and in-service medical curricula/syllabus from the year preceding the study.

3.3 SAMPLE

Because the AMDD assessment that was completed in 2008–2009 in Ethiopia included a census of public and private health facilities across the entire country, there was no need to repeat an assessment with a large sample of facilities. Ethiopia was also the first country in which MCHIP conducted the QOC assessment independently, and beginning with a smaller sample size facilitated the process of finalizing the data collection tools and procedures. In consultation with the Ethiopia FMOH, and taking into account logistical requirements, MCHIP focused on facilities with medium and high volumes of deliveries facilities. The identified sampling frame was all facilities with at least five deliveries per day. In 2008, in preparation for their nationwide assessment, the AMDD team identified 19 facilities (all hospitals) that met this criterion. So a survey of these 19 hospitals was conducted. To generate a sample of women and their newborns for observation, 200–250 deliveries and 200–250 ANC consultations were required. Based on the reported number of births at each facility in the year preceding the study, two days of observation at each facility would be needed (see Appendix Table A). At each facility, observations were made of all ANC consults and all deliveries during the 48–hour period when the assessment team visited.

At some facilities with the highest volume (e.g., Gandhi Memorial Hospital), it was not feasible for the team to observe all deliveries, so they observed the maximum number that could be observed without compromising data quality. Furthermore, although the ideal period of

observation of a woman's care was from the time of admission to one hour postpartum, it was not possible to observe care for every client for this entire period because deliveries overlapped. A description of the samples of health facilities, health workers, ANC consults, and labors/deliveries is presented in Table 3.1.

Table 3.1 Summary of Study Samples

SAMPLE	PLANNED	ACTUAL SAMPLE	DESIGN EFFECT	SAMPLING ERRORS OF ESTIMATES (PERCENTAGE POINTS)
Health facilities	All health facilities with ≥ 5 deliveries/day	19	N/A	No sampling error
Health provider interviewees (knowledge and work conditions)	80–100 (4–5/health facility)	79	1.5	± 12 baseline ± 24 change
Labor and deliveries observed	200–250	192	2.0	± 10 baseline ± 20 change
ANC consults observed	200–250	126	2.0	± 12 baseline ± 24 change

Key characteristics of these facilities are summarized in Table 3.2. The majority (11 of 19) were regional hospitals. All but two were government-affiliated institutions, and most had a volume of deliveries that fell in the range of six to eight deliveries per day.

Table 3.2 Selected Characteristics of Sampled Facilities

ITEM	PERCENTAGE OF FACILITIES	NUMBER OF FACILITIES
Level of health system		
Central and specialized	16%	3
Regional	58%	11
Zonal/district	26%	5
Managing authority		
Governmental	89.5%	17
Nongovernmental	10.5%	2
Volume of deliveries		
5/day	16%	3
6–8/day	63%	12
≥ 9/day	21%	4
Number of beds		
< 200	47%	9
200–399	37%	7
> 399	16%	3

The observed number of cases for each component of labor and delivery is shown in Table 3.3.

Table 3.3 Components of Labors and Deliveries Observed

COMPONENTS OF L&D	NUMBER OF CASES OBSERVED
Initial client assessment	107
First stage of labor	139
Second and third stages of labor	117
Immediate newborn care	115

The distribution of the types of providers observed is presented in Table 3.4. Most of the ANC observations were done by nurses (40%) or doctors (33%). Residents or doctors in training were categorized as doctors, and the majority of physician ANC consults were provided by residents. This is not surprising, given that many of the health facilities assessed were teaching institutions for medical personnel. On the other hand, a majority of the observed labors and deliveries (55%) were attended by midwives. Eight percent of deliveries have been handled by other staff.

Table 3.4 ANC Consults and Deliveries Observed and Health Workers Interviewed, by Cadre of Health Worker

HEALTH WORKER QUALIFICATION	PERCENTAGE OF ANC CONSULTS (N=126)	PERCENTAGE OF DELIVERIES (N=192*)	PERCENTAGE OF HEALTH WORKERS INTERVIEWED (N=79)
Doctor	33% (21% by residents)	20% (12% by residents)	8%
Health officer	9%	5%	5%
Midwife	10%	55%	49%
Nurse	40%	12%	24%
Others (students, others, data missing, etc.)	8%	8%	14%

*Performed by 102 different health workers; number of cases observed varied for each section of L&D checklist.

Characteristics of ANC clients observed are provided in the Appendix Tables B.

Finally, the characteristics of the health workers interviewed are shown in Table 3.5. Most (67%) were female, under 30 years of age (63%), and most had fewer than five years of experience (68%). The mix of health workers interviewed for the study matches quite closely the mix of observed deliveries by cadre of health workers.

Table 3.5 Selected Characteristics of Health Workers Tested

CHARACTERISTICS	PERCENTAGE OF HEALTH WORKERS (N=79)
Years Since Completion of Basic Training	
0–4	68%
5–9	18%
10–20	11%
> 20	3%
Age	
< 25	28%
25–29	34%
30–39	26%
40–49	8%
≥ 50	4%
Sex	
Male	33%
Female	67%

If a woman or newborn experienced a complication (PE/E, PPH, or newborn asphyxia) while the team was observing L&D, the assigned observer was to follow the case either until it was resolved (discharge, transfer to another department or another facility, or death) or as long as the team remained in facility. A total of 38 complications were observed (see Table 3.6).

Table 3.6 Types of Complications Observed

COMPLICATIONS	NUMBER
Postpartum hemorrhage	11
Pre-eclampsia/eclampsia	9
Neonatal asphyxia	18
Total	38

3.4 DATA COLLECTION PROCEDURES

A group of nine skilled providers (six midwives who were basic emergency obstetric and newborn care clinical trainers and three practicing obstetrician/gynecologists) were trained over an eight-day period to be data collectors for the survey in Addis Ababa, Ethiopia. The training included a thorough review of each data collection tool, role plays, and clinical simulations using anatomic models to standardize their clinical observation skills. An inter-rater reliability exercise was conducted for one key observation checklist (observation of the classroom simulation of newborn resuscitation). All observers achieved scores of more than 80% consistency with the senior trainer who served as a "gold standard observer."

The tools were pretested in two facilities in Addis Ababa as part of the data collector training. Fieldwork was conducted over a three-week period from March 29 to April 16, 2010. Data collectors worked in three teams, each with three members. One of the members of the team (the obstetrician supervisor) collected facility inventory information. The other two members

(nurse-midwives) performed the observations and health worker interviews. One observer was expected to observe six ANC consultations—the first three consults of the day and another three consecutive cases later the same morning. This observer then assisted the second observer with labor and delivery observations. The two observers took shifts on the L&D ward so that observations were made there from 8:30 a.m. until 8:00 p.m. Labor and delivery observations were continued for a second day, also from 8:30 a.m. until 11:00 p.m., for a total of about 24 hours of observation in each facility.

Data collectors recorded survey data on smart phones using customized data entry programs developed with a package called PocketPC Creations running on the Microsoft Windows mobile platform. Skip logic and completeness checks were built in to the programs. Data collectors were trained to review records for missing or inconsistent answers before submission. Depending on local capabilities, the data from each smart phone were either uploaded directly to a central database at the end of each day or backed up to a secure digital card to be uploaded upon returning from the field. At the end of the data collection period, all of the data files from all three teams were linked and merged into a central database. After data cleaning, the MCHIP team in Washington, DC, generated a standard set of online tables and graphs using custom-designed Cold Fusion backend.

3.5 DATA ANALYSIS

Descriptive statistics, including means and percentage distributions, were calculated. Facility weights were observation period at a given facility differed from the expected caseload. When the number of cases at a given health facility fell below that estimate, the results were adjusted upward. If a larger number of deliveries were observed than were expected for a facility, the results were adjusted down. Observations of maternal and newborn complications (PE/E, PPH, newborn asphyxia) were not weighted because data were only used qualitatively. Data for ANC observations were not weighted because there was no information on ANC volume by facility. Other data presented here are unweighted unless otherwise noted. Because there was a large amount of data collected by this survey, some analyses are included in tables in the Appendix at the end of this report.

3.6 ETHICAL CONSIDERATIONS

The study protocol was submitted to and approved by the ethical review board of the Ethiopian Public Health Association (EPHA) and the institutional review board of the Johns Hopkins Bloomberg School of Public Health. The institutional review board ruled the protocol exempt from review under 45 *CFR* 46.101(b)(5). Informed oral consent was obtained from all participating health providers and clients, and written consent was obtained from facility directors. The client consent form was translated into and administered in Amharic, and the other consent forms were administered in English. The study team realized that women presenting at the facility with obstetric complications might be either too ill or unconscious and unable to give informed consent. Because these cases were deemed to be crucial to the assessment of quality of care, the team asked for approval from the institutional review board to obtain consent from the next of kin under these circumstances. During the data collector training workshop, all data collectors were trained in how to obtain informed consent using the approved consent forms.

3.7 LIMITATIONS

Although this study was observational, it was intended to be relatively rapid and not an in-depth examination of all aspects of maternal and newborn care. It was considered a pilot study because it was the first time the assessment was carried out as an independent survey rather than as part of a larger assessment (as was the case in Kenya, where the QOC study was integrated into the Kenya Service Provision Assessment). This was also the first time the

assessment was conducted using mobile phones. Both of these new aspects of implementation may have had some effect on data quality.

The study has several important limitations. First, although the study sample was national in scope, the universe of health facilities included were those that had an average of five or more births per day (all hospitals), based on delivery caseload service statistics collected during the 2008 AMDD/United Nations/UNICEF assessment of emergency obstetric and newborn care (EmONC). Thus, study findings can only be generalized to that group of facilities, not all hospitals in Ethiopia or lower-level facilities that provide delivery care services. Second, although the study achieved a total sample size of 192 births observed, observations were not made of every stage of labor and birth in every case. The sample of cases by labor stage was smaller than the total number of cases observed. This means that we did not achieve the desired statistical power for the indicators associated with the observed care of normal birth. In addition, the data collectors reported some difficulties in using the time function button in the smart phone applications, so the reliability of some of the observed clinical care indicators calculated based on time of performance is not as high as desired. Finally, the data collected on the performance of signal functions at each facility in the previous three months is based on health care worker/supervisor verbal reports and is subject to recall bias. This information was not verified using the facility records because performance of some signal functions (e.g., manual removal of placenta, provision of parenteral anticonvulsants, etc.) is recorded only in the maternity clients' charts. Because these treatments are provided only rarely, it would be necessary to do an extensive chart review to verify that these services were provided in the previous three-month period. Such a review was beyond the scope of the current study protocol.

4. FACILITY READINESS

4.1 PREVALENCE AND CONTENT OF POLICIES AND GUIDELINES

Antenatal care guidelines were observed in the ANC service area in 58% and of health facilities, while PE/E guidelines were found in 21% of facilities. In the labor and delivery service area, 21% of facilities were observed to have guidelines for normal birth guidelines, 16% had emergency obstetric guidelines, and 11% had sterilization/disinfection guidelines. However, because content reviews were not performed on all of the documents, it was not clear whether the observed guidelines were officially recognized by the Federal Ministry of Health or whether the guidelines agreed with internationally accepted standards.

The team was able to review the national guidelines document, *Management Protocol on Selected Obstetrics Topics*, which was released by the FMOH at the time of the survey. These guidelines cover many maternal and newborn health (MNH) areas, but our review of the document was focused only on content areas relevant to our survey. We also reviewed documents published by the Drug Administration and Control Authority (the national drug formulary, essential drug list, and national drug list) and the national paper as well as electronic ANC and L&D cards. The findings from our review are summarized in Table 4.1.

Table 4.1 Maternal and Newborn Care Practices Recommended in *Management Protocol on Selected Obstetrics Topics*

CONTENT AREA	FINDINGS
Postpartum hemorrhage	The national guidelines recommend using AMTSL for all vaginal deliveries AMTSL components included: • Within one minute of the delivery of the baby, palpate the abdomen to rule out the presence of an additional fetus(s) and give oxytocin 10 units IM. • Use controlled cord traction. • Immediately massage the fundus of the uterus until the uterus is well contracted. Palpate for a contracted uterus every 15 minutes and repeat uterine massage as needed during the first 2 hours postpartum. Oxytocin is the preferred drug for AMTSL and the first-line drug for PPH caused by uterine atony. Oxytocin, ergometrine, and misoprostol are registered for use in prevention and treatment of PPH and are also included in national and essential drug lists. Steps for treatment of PPH included in the guideline are in line with World Health Organization (WHO) guidelines. National health management information system (HMIS) and monitoring and evaluation (M&E) system: • AMTSL is included in monitoring cards for labor and delivery.
Severe pre-eclampsia/eclampsia	Guidelines for screening for PE/E during ANC include the following: • Check blood pressure at all ANC visits. • Test for proteinuria in all women during first ANC visit and repeat in subsequent visits if the woman is nulliparous or if she has had hypertension, pre-eclampsia, or eclampsia in a previous pregnancy. • Note and/or ask about abnormal changes in body features (e.g., peripheral swelling). • Check for generalized edema. Steps in management of severe PE/E: • Provide supportive measures (ABC: airway, breathing, circulation). • Prevent convulsion with magnesium sulfate or valium. • Control hypertension. • Deliver as soon as possible. Magnesium sulfate is the drug of choice for preventing and treating convulsions in severe pre-eclampsia and eclampsia. Magnesium sulfate loading and maintenance doses are consistent with WHO guidelines. Magnesium sulfate is included in the national and essential drug lists. HMIS and M&E: • National cards for pregnant women (both paper and computer based) contain checklists for blood pressure, urine analysis, and edema. • Computer-based ANC cards make sure that health workers perform according to standards (e.g., inform health workers about missed tasks).

CONTENT AREA	FINDINGS
Partograph	The national guidelines recommend the use of partograph for all laboring women. HMIS and M&E: • A WHO-type partograph is included in labor and delivery client cards. • ''Proportion of labors followed with partograph'' is included in health facility's list of routinely reported indicators.
Immediate and essential newborn care	Dry baby's body with dry towel. Remove the wet towel and wrap the baby with dry towel; wrap preterm babies with double towels. Place the baby in skin-to-skin contact and on the breast to initiate breastfeeding.

Overall, the national guidelines reflect internationally accepted evidence-based practices, with the following important exceptions:

- They should include guidance on practical implementation of guidelines.
- Guidance on which cadres of providers are eligible to use specific tasks/interventions (e.g., who can administer magnesium sulfate) should also be added.

The FMOH's commitment to monitoring the performance of key interventions is evident in (1) the inclusion of "proportion of labors followed with partograph" as an essential indicator of intrapartum care quality, (2) the inclusion of key MNH tasks (blood pressure, urine analysis, partograph, and AMTSL) in pregnant women's record cards, and (3) the introduction of computer based client cards.

4.2 PRESENCE OF SKILLED PERSONNEL

The composition of the workforce involved in the hospitals' labor and delivery services is shown in Table 4.2. The facilities had sufficient skilled personnel to cover the volume of deliveries performed (see Table 4.2 and Appendix Table C). The ratio of deliveries to skilled personnel exceeded 20 deliveries per month per skilled provider only in Gandhi Memorial Hospital and Felege Hiwot Referral Hospital. In general, the ratio varied between 10 and 20 deliveries/month (i.e., less than one per day. Overall, the proportion of deliveries observed by each type of provider matched the proportion of personnel overall. More than half the health workers providing deliveries were midwives, and midwives performed the majority of deliveries observed (55%, as shown in Table 3.5). Doctors and nurses performed most of the remainder.

Table 4.2 Types of Health Workers Providing L&D Services in Sampled Facilities

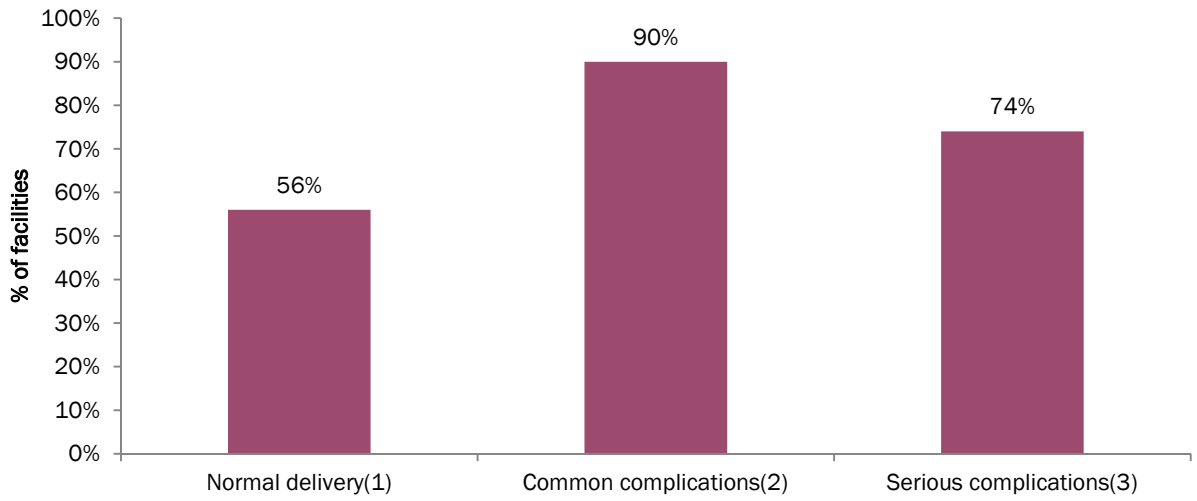
L&D PERSONNEL	DOCTORS	NURSES	MIDWIVES	HEALTH OFFICERS	OTHER (MAINLY STUDENTS)	TOTAL
Number of personnel	91	52	176	11	4	334
Percentage of personnel	27%*	16%	53%	3%	1%	100%
% deliveries observed	20%*	11%	55%	5%	8%	

*12% of health workers providing L&D services were residents; and 12% of deliveries observed were by residents.

4.3 AVAILABILITY OF MEDICINES AND SUPPLIES

Figure 4.1 shows the availability of essential medicines and supplies in the labor and delivery service area. To facilitate comparison with other countries, we grouped supplies and medicines into the three main categories used in ICF Macro's SPA surveys.* The categories correspond closely to the supplies needed for newborn resuscitation, prevention and initial management of PPH, and management of eclampsia and/or sepsis. All three categories of medicines and supplies were available in more than 80% of facilities on the day of the assessment. Of the 19 facilities assessed, 10 facilities had all the medicines and supplies needed for normal delivery (data were missing from one facility); 17 facilities had everything needed for common complications; and 14 facilities had everything needed for serious complications. On the day of the assessment one facility lacked all of the medicines and supplies needed for serious complications.

Figure 4.1 Percentages of Facilities with Essential Medicines and Supplies



[1] Sterile scissors or blade, disposable cord ties or clamps, suction apparatus for use with catheter, skin antiseptic
[2] Syringes and needles, injectable oxytocic (oxytocin or ergometrine), IV infusion set, suture material with needle, needle holder
[3] Injectable anticonvulsant (magnesium sulfate or diazepam), injectable antibiotic (ampicillin or gentamicin)

Notably, although 84% of the facilities visited had injectable oxytocin, only 16% had magnesium sulfate.

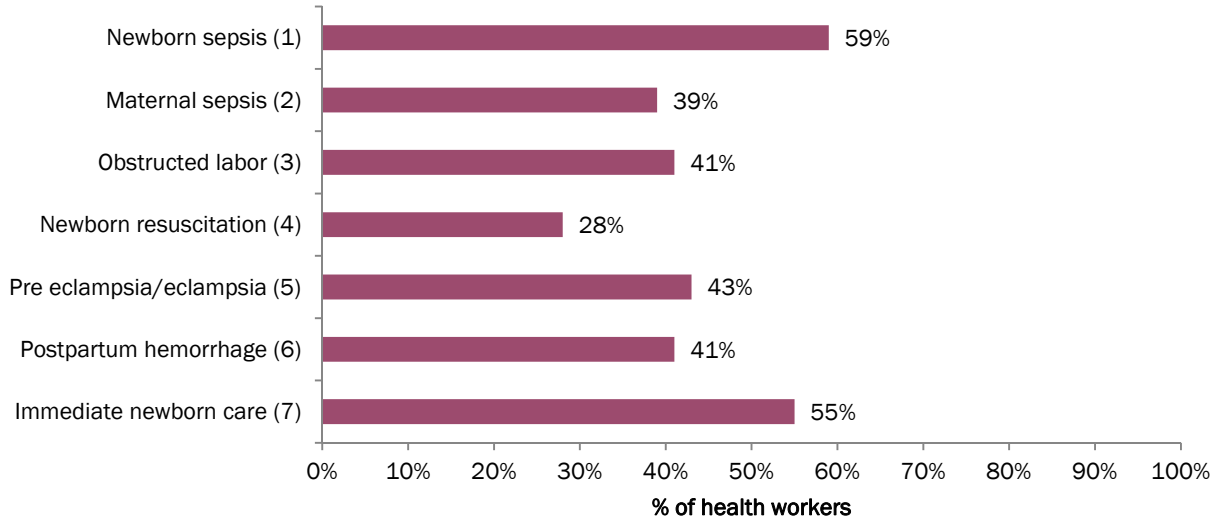
4.4 HEALTH WORKER KNOWLEDGE OF MANAGEMENT OF OBSTETRIC AND NEWBORN COMPLICATIONS

This study assessed health provider knowledge using multiple-choice questions and two clinical decision-making case study questionnaires related to PE/E and newborn resuscitation. It is usually assumed, but not always correctly, that health worker knowledge is strongly associated with or predictive of correct performance of clinical skills (Harvey et al. 2007).

Figure 4.2 below presents the percentage of health workers correctly answering questions related to maternal and newborn complications and immediate newborn care.

*See, for instance, the 2004 Kenya SPA, Table 6.8 (http://www.measuredhs.com/pubs/pdf/SPA8/06Chapter6.pdf)

Figure 4.2 Health Workers' Knowledge of Prevention, Identification, and Management of Complications

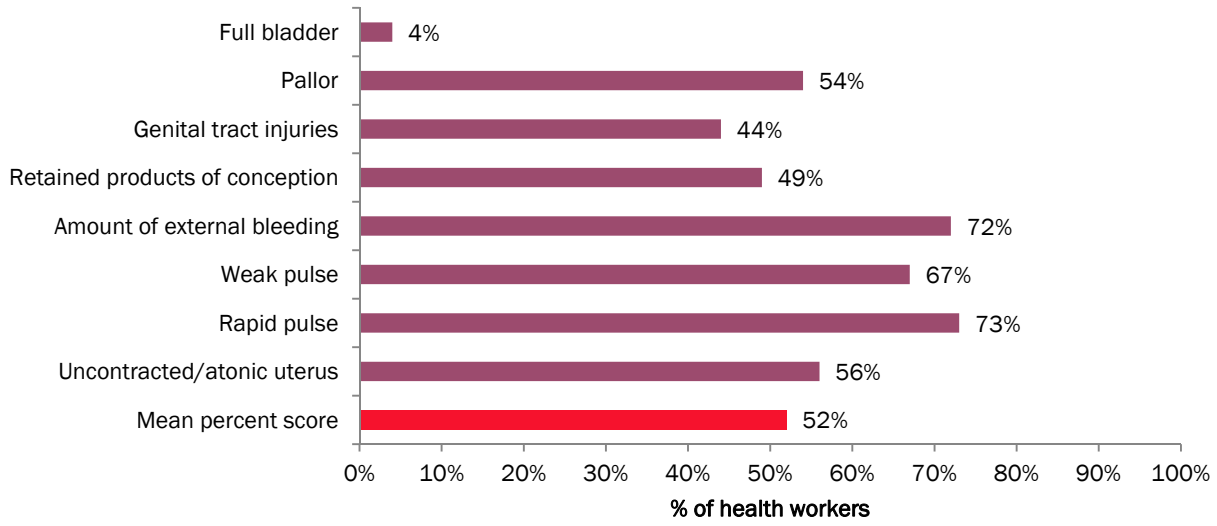


[1] Mean score for signs of sepsis in newborn (Figure 4.8)
[2] Mean of scores for (1) evaluation and (2) actions for woman who presents 72 hours after delivery with general malaise (Figures 4.10 and 4.11)
[3] Mean of scores for (1) signs of obstructed labor (Figure 4.6) and (2) actions to identify/treat obstructed labor (Figure 4.7)
[4] Mean score for newborn resuscitation case study averaging scores for "stimulation actions" and "ventilation actions" (see Appendix Table J)
[5] See Appendix Table I
[6] Mean of scores for (1) signs to assess in woman with heavy postpartum bleeding (Figure 4.3), (2) actions for woman with PPH due to atonic uterus (Figure 4.4), and (3) actions for retained placenta and/or products of conception (Figure 4.5)
[7] Mean score for immediate newborn care (Figure 4.9)

In general, knowledge of how to prevent, identify, and manage maternal complications was poor, with only about 40% of the providers giving correct responses. Knowledge of newborn sepsis and immediate newborn care was better, with about 60% of the providers answering these questions correctly.

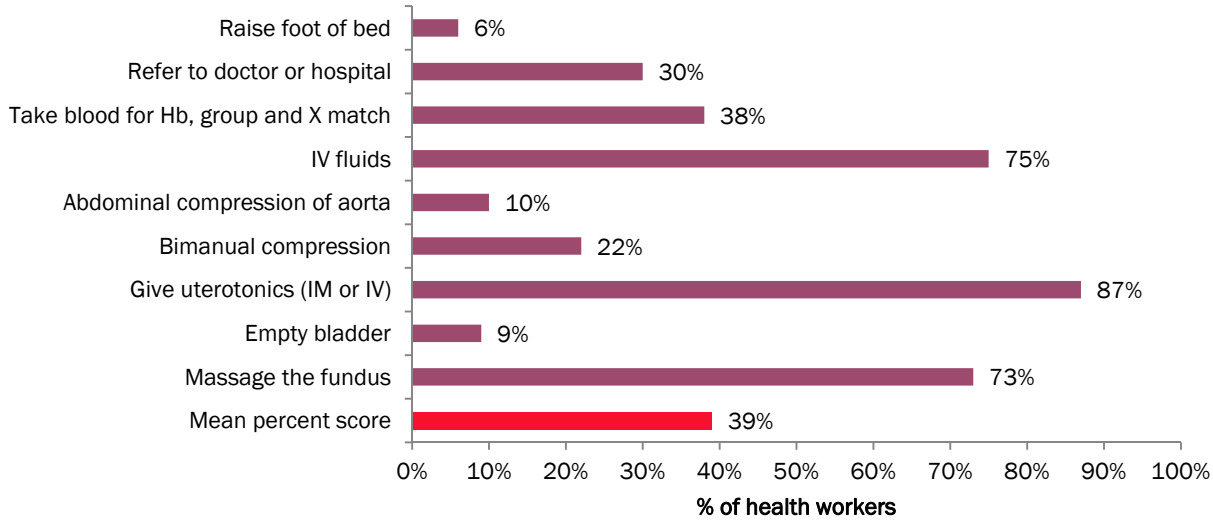
Figures 4.3 through 4.11 show the scores on individual questions related to maternal and newborn complications. Figures 4.3, 4.4, and 4.5 show the scores on questions related to postpartum hemorrhage.

Figure 4.3 Knowledge of Signs to Assess in a Woman with Postpartum Hemorrhage



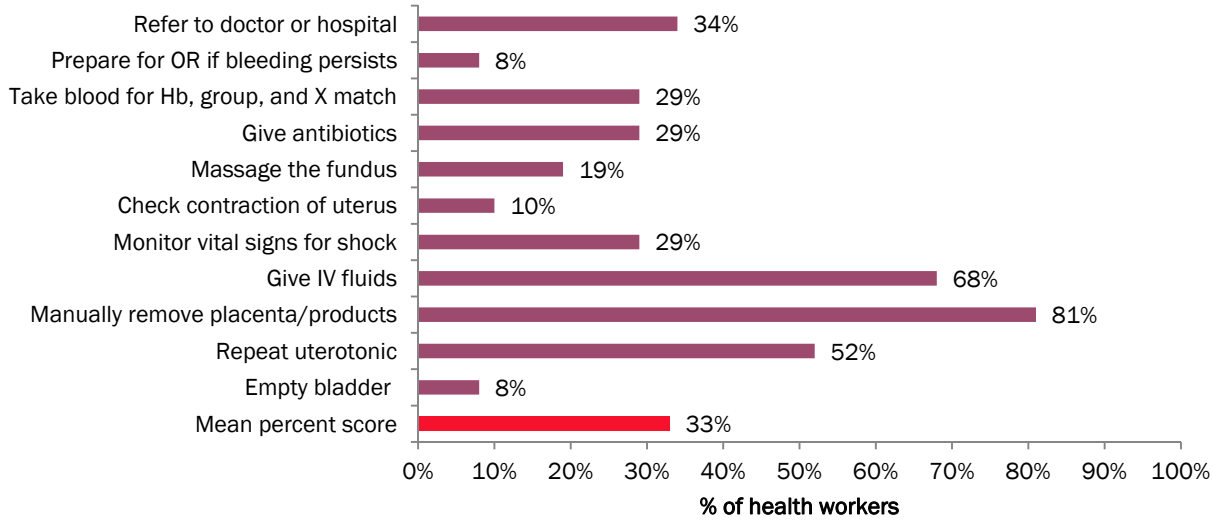
The mean percentage score for knowledge of signs to assess in a woman with heavy postpartum bleeding was just over 50%. Providers scored lowest on checking the bladder and highest on checking the amount of external bleeding and pulse rate.

Figure 4.4 Knowledge of Actions to Take for a Woman with Postpartum Hemorrhage from Atonic Uterus



The mean percentage score for knowledge of actions for a woman with heavy bleeding from an atonic uterus was 39% of health workers. Providers scored poorly on raising the foot of the bed, abdominal compression, and emptying the bladder, but most scored well on giving uterotonics and intravenous (IV) fluids and massaging the fundus.

Figure 4.5 Knowledge of Actions to Take for a Woman with Retained Placenta/Products of Conception



Scores for individual actions ranged widely. Providers were knowledgeable about manual removal of placenta as a treatment for retained placenta/products of conception, but they scored poorly on other important steps for a retained placenta, including massaging the fundus after removal and checking for contraction of the uterus.

Providers' knowledge of signs of and actions to take for obstructed labor are shown in Figures 4.6 and 4.7.

Figure 4.6 Knowledge of Signs of Obstructed Labor

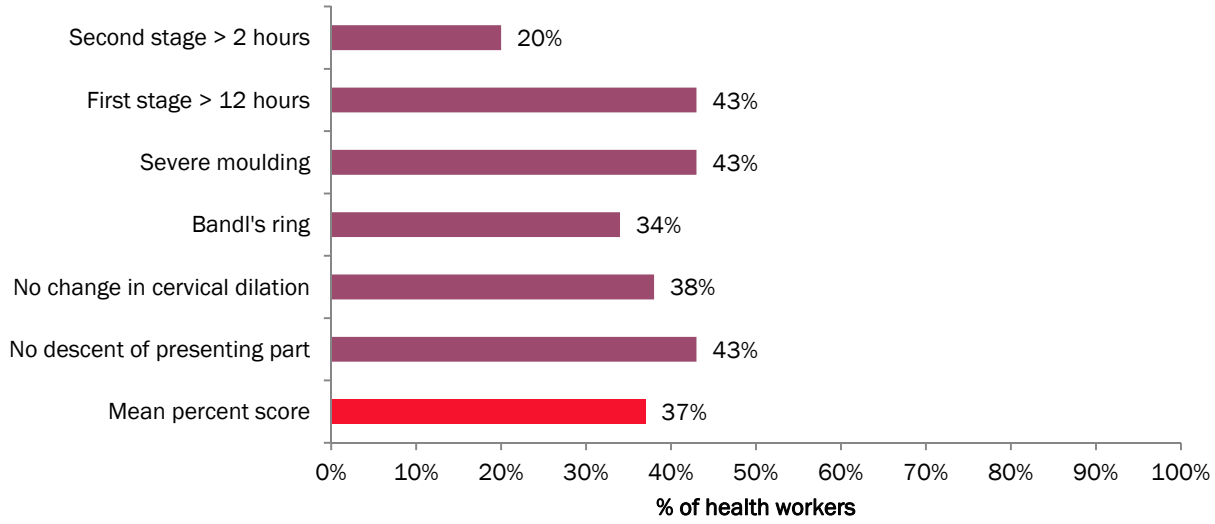
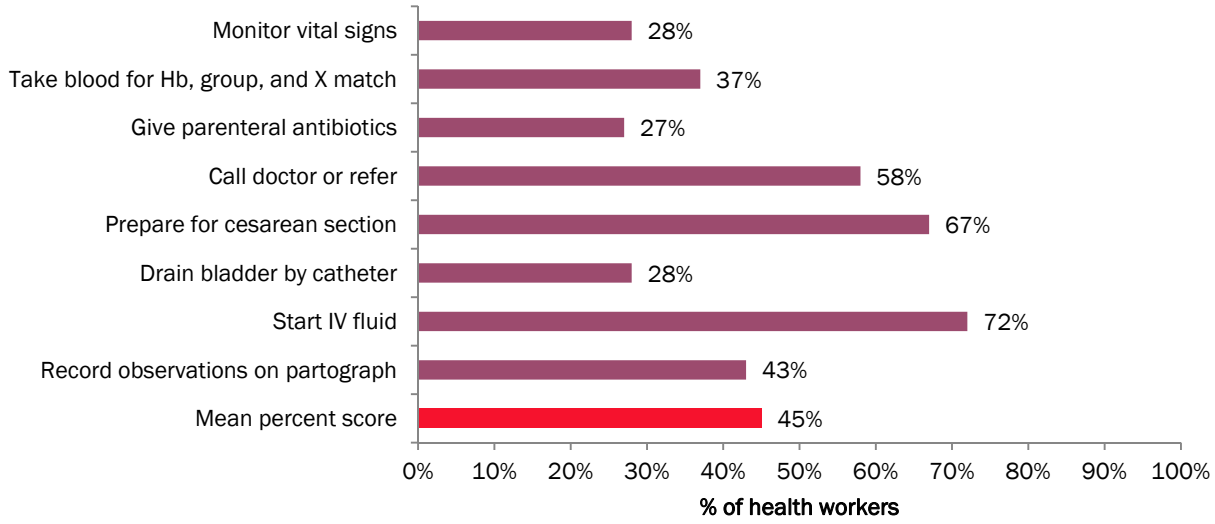


Figure 4.7 Knowledge of Actions for Identifying and Treating Obstructed Labor



Knowledge of both the signs of obstructed labor and the actions for treating obstructing labor was poor, each with a mean percentage score of about 40% of health workers. Unlike scores for most other knowledge areas, scores for signs of obstructed labor were uniformly poor (scores on all signs were below 50%). Providers exhibited greater knowledge of how to identify and treat obstructed labor; about 70% of providers knew that preparing for a cesarean section and starting IV fluids were important actions to take. Only 43% mentioned one of the most basic ways to identify obstructed labor: use of a partograph.

Figures 4.8 and 4.9 show providers' scores on questions about newborn care. The mean percentage score for questions about immediate newborn care was about 60%. The mean percentage score for questions about newborn sepsis was slightly lower.

Figure 4.8 Knowledge of Signs of Newborn Sepsis

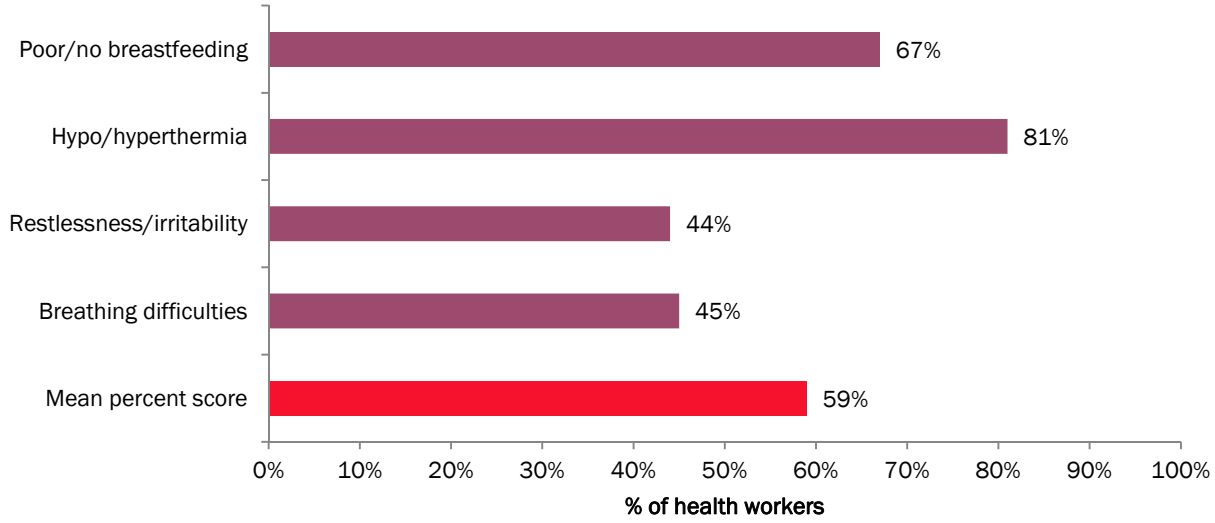
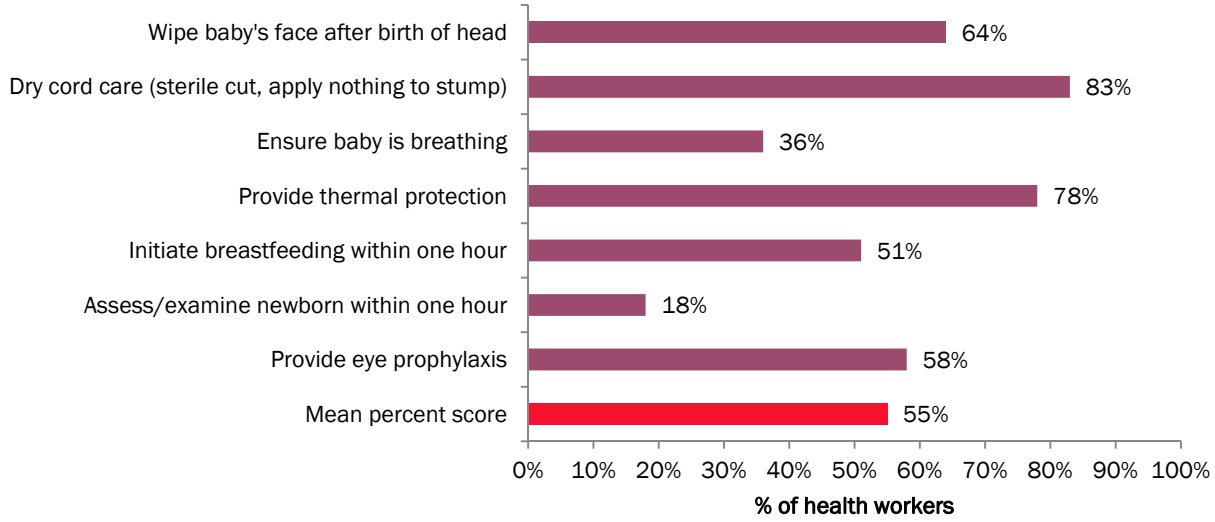
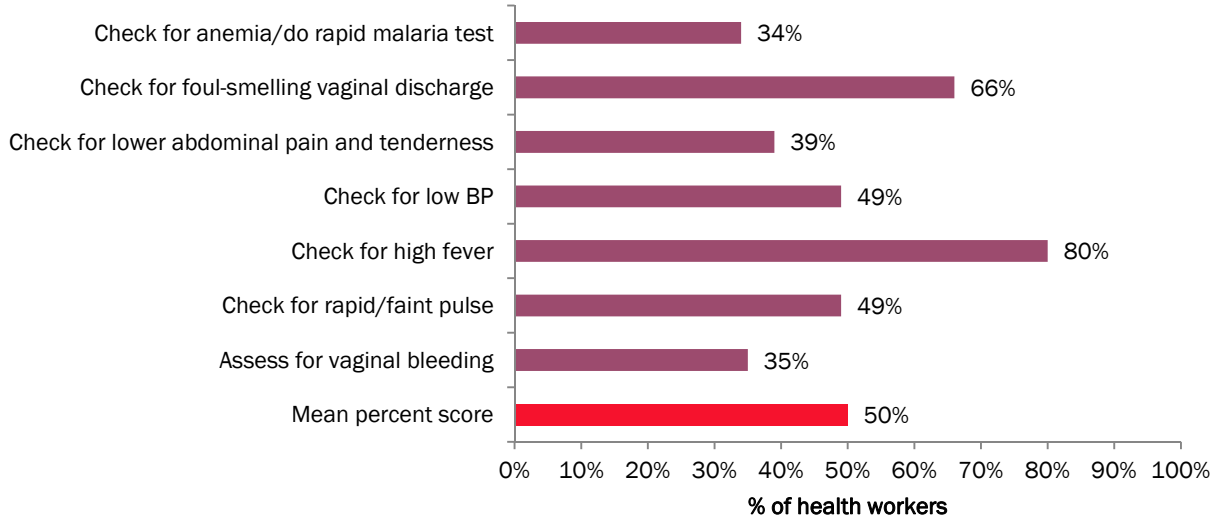


Figure 4.9 Knowledge of Immediate Newborn Care



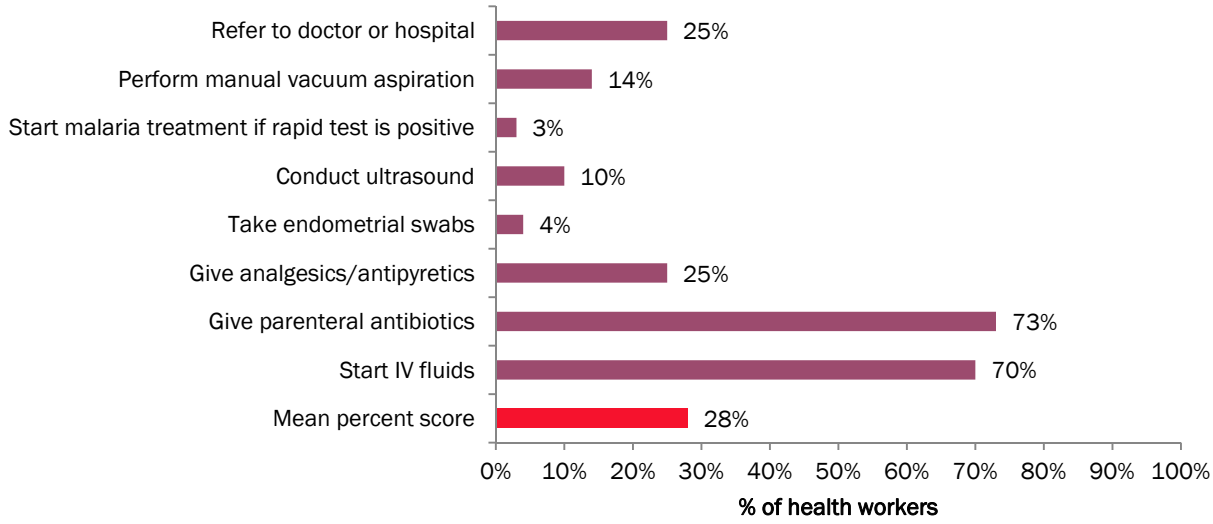
Finally, we assessed health worker knowledge of the steps needed to assess and treat a woman with possible postpartum sepsis (Figures 4.10 and 4.11).

Figure 4.10 Knowledge of Evaluation of a Woman with General Malaise 72 Hours Postpartum



Health workers showed considerable knowledge of the need to check for vaginal discharge and fever, but they did not score as well on assessing for vaginal bleeding, lower abdominal pain, and anemia/malaria.

Figure 4.11 Knowledge of Actions for a Woman with General Malaise 72 Hours Postpartum



Similarly, health workers scored well on treating women with antibiotics and analgesics for general malaise 72 hours after birth, but they scored very low on treating for malaria if the woman's malaria test was positive and on taking endometrial swabs.

4.5 SUPERVISION AND MANAGEMENT

Approximately 64% of the health workers interviewed (n=77, two missing) reported that they had been supervised in the last three months. Those health workers were asked whether their supervisor had performed specific actions (Table 4.3).

Table 4.3 Reported Supervisor Actions in the Previous Three Months

SUPERVISOR ACTIONS	PERCENTAGE OF CASES (N=49)
Check your records	90%
Observe your work	67%
Give you verbal feedback	88%
Provide any written comments	17%
Provide updates on administrative or technical issues	57%
Discuss problems you encountered	88%
Participate in quality of care improvement activities	73%

More than 80% of health workers reported that their supervisor had reviewed their record, provided verbal feedback, and discussed problems. However, few supervisors provided written documentation of their feedback to the health workers. Interestingly, 73% of health workers reported that their supervisor participated in quality of care improvement activities, but we do not have details on the nature of these activities. Sixty-seven percent of providers reported that they had been observed by their supervisor when carrying out their duties, suggesting that supervisors had the opportunity to directly assess the providers' performance.

5. ROUTINE ANTENATAL AND DELIVERY CARE

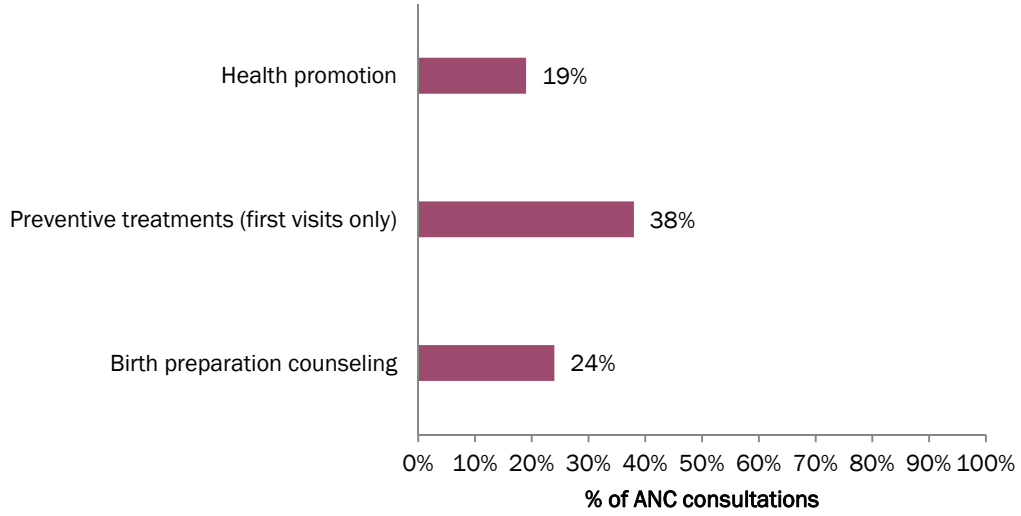
5.1 FOCUSED ANTENATAL CARE

Figure 5.1 shows the extent to which the ANC client observed received different elements of focused antenatal care (FANC). The observation checklist did not include an exhaustive list of the elements of FANC, but key evidence-based interventions (according to the World Health Organization) were selected from each of the main categories of FANC. In Figure 5.1 the elements of FANC grouped into three categories:

- Health promotion, including counseling on pregnancy danger signs and on postpartum family planning
- Preventive treatments given, including the administration of tetanus toxoid and prescription or provision of iron/folic acid
- Birth preparation counseling, including asking the client where she will deliver and counseling her to set aside money, use a skilled birth attendant, and have items ready for an emergency home delivery, in case they are needed

The ANC providers' provision of preventive treatments was considerably better than on the other two categories of FANC (i.e., health promotion and birth preparation counseling), which both require interaction with the client. However, fewer than 40% of ANC clients observed received each of the three sets of focused ANC services assessed.

Figure 5.1 Provision of the Elements of Focused Antenatal Care

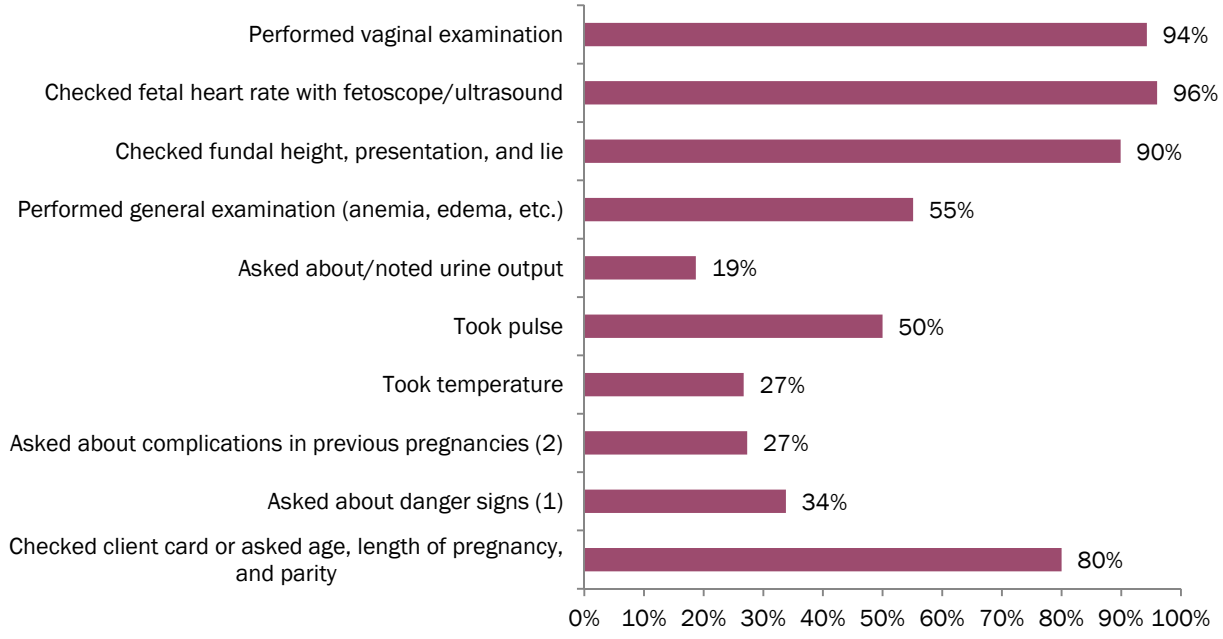


5.2 ROUTINE LABOR AND DELIVERY CARE

Initial Client Assessment

Routine labor and delivery care encompasses activities from initial assessment to care during the first, second, third, and fourth stages of labor. This section presents findings for initial assessment tasks (see Figure 5.2). Other tasks are discussed in other sections as appropriate.

Figure 5.2 Performance of Initial Client Assessment Tasks for Mothers in Labor



[1] Danger signs: headaches, fever, discharge, swelling of hands and face, convulsions/loss of consciousness, vaginal bleeding
[2] Complications: high blood pressure, convulsion, postpartum hemorrhage, previous cesarean section, still birth, prolonged labor

The quality of general initial intrapartum care was found to be adequate in the following areas: determination of age, parity and length of gestation; determination of fetal presentation; assessment of fetal heart; and vaginal examination. Providers performed these tasks in 80–100%

of the visits observed. On the other hand, tasks like measuring pulse, taking temperature, and examining the client for anemia/edema were performed in only 50%, 27%, and 55% of the cases, respectively. Asking about or assessing urine output was the least often observed practice (19% of cases).

Overall, inquiries about danger signs in pregnancy were observed in only a small number of cases. Providers asked about at least one danger sign in only 34% of the cases observed. Providers asked about at least one complication during previous pregnancies in 27% of cases. Complications included high blood pressure, convulsions, postpartum hemorrhage, previous cesarean sections, stillbirth, and prolonged labor.

The initial evaluation of a client in labor should be comprehensive and must provide detailed information on the status of the mother, fetus, and labor. A substantial proportion of clients were evaluated adequately in terms of some of the assessment tasks (e.g., asking the client about her age and parity or performing an obstetric examination) but not others (e.g., the measurement-oriented examination tasks like taking pulse and temperature; or asking about danger signs). By not asking about danger signs, providers could be missing an important opportunity to identify women in need of more care. The uneven attention given to the various assessment tasks might reflect the different weights/emphasis that curriculums, guidelines, and/or supervisors place on particular tasks. Although it is not known which of the tasks are the most essential, busy providers might focus on those tasks that are most essential to assessing the particular client, based on verbal or visual clues (looks well or distressed) and on the gynecological exam. In addition, it is possible that the quantitative measures of a physical exam, such as heart rate, temperature, and so on, are not as valued in a medical culture that does not have consistent medical record keeping.

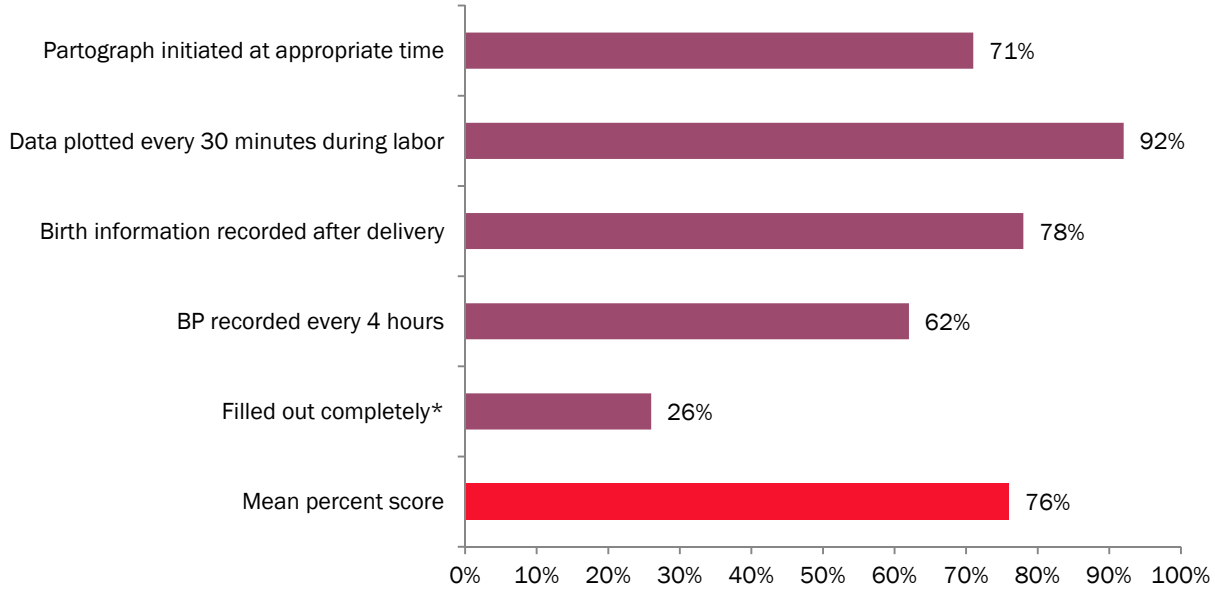
The initial assessment becomes the basis for further management. A complete assessment provides health workers with information as to whether or not a client needs extra care (risk classification) and helps them to determine the level at which the laboring mother should be managed. Therefore, the overall low performance on initial assessment tasks is concerning.

Performance of Prevention Practices for Obstructed Labor (Partograph Use)

WHO and other authorities recommend using a partograph to help birth attendants make better decisions for the diagnosis and management of prolonged and obstructed labor as well as to help detect fetal distress and pre-eclampsia. However, we found that a partograph was used in only 13% of labors observed (n=20) and 37% of facilities (n=19) assessed. District hospitals were more likely than central referral/specialized and zonal hospitals to use a partograph for management of labor. Most labors at mission hospitals were supported by a partograph (64%), but only 13% of labors at public hospitals were supported by one. Partograph use was observed primarily for deliveries conducted by midwives and not by general practitioners, health officers, or bachelor's-level nurses.

The overall use of the partograph was similar to what has been reported from Sweden (7%, n=200), but it was far below what has been reported from Uganda (70%, n=1,170), Zambia (61, n=84), China (39%, n=48) and in the MCHIP quality of care survey in Kenya (88%, n=433), which was conducted as part of the Kenya Service Provision Assessment (Sandin-Bojo et al. 2006; Ogwang, Karyabakabo and Rutebemberwa 2009; Maimbolwa et al. 1997; Gao and Barclay 2010, Kagema et al. 2011).

Figure 5.3 Quality of Partograph Use



*Plotted at least every half-hour; birth info and blood pressure recorded at least every four hours.

Among the observed deliveries that were monitored with a partograph (13%), only 26% of the records were filled out completely. Figure 5.3 shows the completeness of the partograph as assessed using selected variables. During labor, the partograph was filled out at least every half-hour more than 90% of the time. On the other hand, correct initiation of partograph use occurred less frequently (71%). Correct timing of partograph use was found to be higher with the use of the new WHO partograph (94% correct), compared to the old WHO partograph (0%) and other forms of the partograph (24%). These findings support the rationale given by WHO for the development of the new 4 centimeter partograph. However, with such a small number of partographs used overall, the percentages reported here should be read with caution. The low completeness rate of partograph is similar to studies done in comparable settings (Ogwang, Karyabakabo and Rutebemberwa 2009; Azandegbe, Testa and Makoutode 2004). The concern is that when information on the partograph is incomplete, misinterpretation is more likely and could lead to delayed diagnosis and inappropriate or no action, with the consequent development of serious complications.

Blank partographs were available in most facilities (16 of 19, or 78%). A majority of the health workers (68%) interviewed reported recent pre-service or in-service training on use of the partograph. Almost all of the observed deliveries (178 of 192, two missing) were attended by a skilled birth attendant (the others were attended by students/others). Understanding the possible barriers to as well as facilitators of partograph use is important because underuse and/or non-use is a likely contributor to continued maternal and neonatal morbidity and mortality from prolonged labor, including fistula. Furthermore, there has been no change in use of the partograph since the 2008 FMOH/WHO/UNICEF/UNFPA/AMDD survey in which the percentage of deliveries that were supported with a partograph was reported as 26% in the previous three months (Federal Ministry of Health et al. 2008).

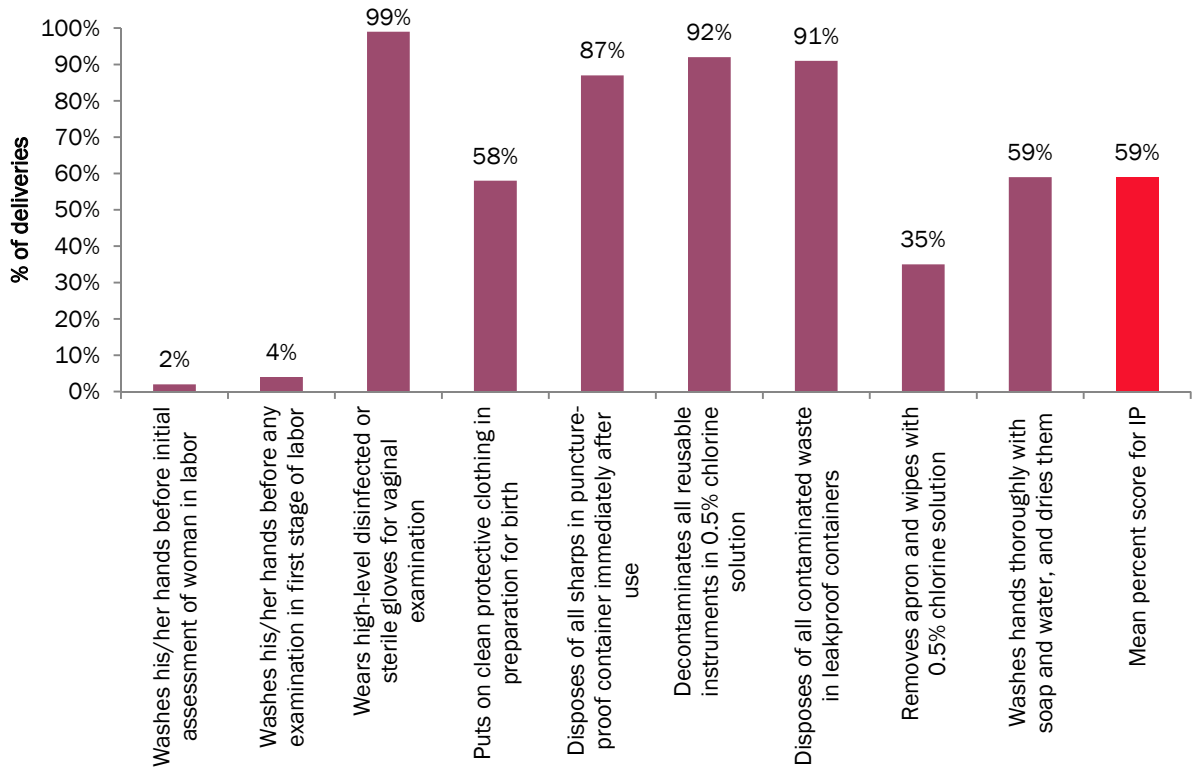
Performance of Infection Prevention Practices (Prevention of Puerperal Sepsis)

Sepsis is one of the five most common causes of maternal death in Ethiopia (Kwast, Kidane-Mariam, Saed and Fowkes 1985). It can be controlled if aseptic techniques are respected during labor management and if early signs of infection are recognized and treated in a timely manner.

Practices to prevent (or manage) sepsis in the mother or newborn were not examined in depth. For instance, no data were collected on frequency of vaginal examinations, artificial rupture of membranes, the timing of delivery after rupture of membranes, the management of cases of maternal or newborn sepsis. However, one key set of preventive practices was examined: infection prevention and hygiene practices. These results are shown in Figure 5.4.

Use of standard infection prevention and hygiene measures is, of course, a core concept for the prevention of infection transmission in health care settings (Garner 1996). Recommended infection prevention practices during delivery care are aimed at preventing infections not only in the mother and neonate, but also in health workers. Adherence to standard infection prevention practices was assessed against a set of standard measures that have been proven effective, including hand-washing practices, use of protective barriers, decontamination of reusable items in chlorine solution, and disposal of contaminated items in appropriate containers during routine L&D care. Because decontamination might not always be the appropriate or feasible technique in safe delivery settings, data collectors also observed health facilities' sterilization procedures. These observations are the same as those included in ICF Macro's SPA, so they are comparable to results obtained in countries where that assessment has been conducted.

Figure 5.4 Provider Performance of Infection Prevention Practices during Labor and Delivery Care



Running water for hand washing was available in the delivery units of almost all of the facilities (16/19), as were supplies like soap (12/19) and decontamination solution (19/19). Infection prevention practices, on the other hand, were considerably less common. The aggregate mean score for adherence to standard infection prevention practices was 59%. However, this aggregate score masks important differences in key infection prevention practices. Use of protective gloves for vaginal exams was near universal, whereas protective gear was used in only 58% of deliveries. Correct disposal of sharps, disposal of contaminated waste, and decontamination of instruments were all above 85%; however, hand washing was

done after less than two-thirds of deliveries and almost never before initial or subsequent assessments.

The Centers for Disease Control and Prevention (2002) recommends hand washing with plain soap and water before and after client contact at a minimum. We were disappointed to find that this simple practice is rarely performed, not only because it is cost-effective, but also because failure to do so increases the risk of maternal sepsis and the possibility of cross infections of serious diseases like HIV and Hepatitis B. The finding that routine hand washing after examination was much more common than hand washing before examination (59% after compared to 4% before) suggests that health care workers might place greater emphasis on self-protection than on protecting clients from cross infection. Surprisingly midwives with bachelor's degrees were less likely than both diploma-holding midwives and nurses to wash their hands after examination (bachelor's-level midwives, 43%; diploma-holding midwives, 80%; nurses, 82%).

Use of personal protective gear: In a high proportion of labors, health care workers wore high-level disinfected or sterile gloves for vaginal examinations (99%), but clean protective clothing was worn in only 58% of the births observed. Even in the small sample for this assessment, the different cadres of health workers displayed significantly different behaviors. Although residents generally set an example for mid-level health workers in the infection prevention process, their compliance with standards for use of protective clothing was found to be significantly poorer than that of diploma-holding midwives (10% of residents and 64% of diploma-holding midwives protective clothing). Yet, current national policy concurs with global standards mandates universal use of personal protective equipment.

Decontamination of reusable items: The high rate (92%) of compliance with decontamination of reusable instruments in 0.5% chlorine solution indicates that providers and managers alike are attentive to the need for disinfection. The fact that already mixed decontamination solution was present in the labor wards in all surveyed facilities is an additional testimony in this regard. However, the other decontamination-related practice (making aprons safer for subsequent use) was observed only in a third of observations. The lack of adherence to these practices is cause for concern as it could lead to infection transmission and undermine other infection prevention practices.

The mean percentage score for sterilization capacity of sampled hospitals was 43%. Facility capacity for sterilization was assessed based on ten items (see Appendix Table D for details).

Disposal practices: International infection control guidelines stipulate that used sharps and contaminated waste must be placed in puncture-resistant and leak-proof containers, respectively. Our findings indicate adequate compliance with this recommendation. Appropriate disposal of sharps and contaminated waste was found in 81.8% (n=117) and 85.6% (n=116) of observations of labor and delivery care, respectively. Furthermore, the universal availability of sharps containers in all surveyed facilities is commendable; it is a clear indication of management support for this infection prevention practice.

Woman-Centered Care during Labor and Delivery

Quality of care during labor and delivery is measured in part by the extent to which women are treated with respect, have appropriate communication with and emotional support from a health care provider, and are provided with a degree of privacy. Lack of respect for women and their birthing preferences and abusive care have been shown to deter women from seeking facility-based care (Bowser and Hill 2010). Care that responds not only to the physical needs of women in labor, but also to their emotional needs and right to privacy is referred to in this report as "woman-centered care."

Table 5.1 below presents interpersonal communication and emotional support measures observed during initial assessment and the first stage of labor.

Table 5.1 Performance of Intrapartum Interpersonal Communication and Support Tasks

COMMUNICATION AND SUPPORT TASKS FOR INITIAL ASSESSMENT	PERCENTAGE OF CASES (N=106–107)
Respectfully greets pregnant woman	53%
Encourages the woman to have a support person present throughout labor and birth	31%
Asks woman (and support person, if present) if she has any questions	13%
Explains procedures to woman (support person) before proceeding	35%
Informs the pregnant woman of findings	36%
COMMUNICATION AND SUPPORT TASKS FOR FIRST STAGE OF LABOR	**PERCENTAGE OF CASES (N=134–137)**
At least once, explains what will happen in labor to pregnant woman and her support person	35%
At least once, encourages woman to consume fluids/food throughout labor	40%
At least once, encourages/assists woman with ambulating and assuming different positions during labor	28%
Supports the woman during labor in a friendly way	66%
Drapes woman	44%
Mean percentage score intrapartum interpersonal communication tasks	39%

Only about half of the women in labor were greeted respectfully by the provider, and only 13% of women were asked by the provider if they had any questions. Explanations of procedures and what would happen during labor were offered in about 35% of the labors observed. Only one-fourth of the women were encouraged to move around and assume different positions during labor, and 40% were told by the provider that they could have some food and drinks during labor. Only 44% of the women were draped to protect their privacy. On a positive note, 66% of women were supported by the provider during labor in a friendly manner.

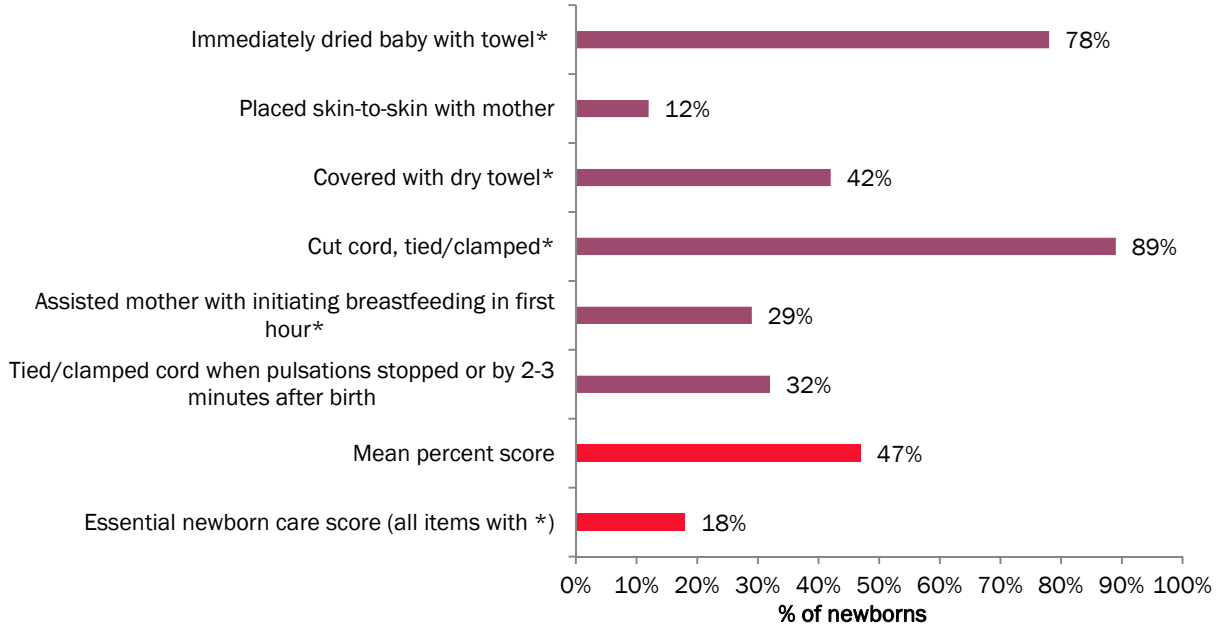
Although the majority of providers were friendly to the women, they did not always provide information that would help the laboring woman be more comfortable or feel more at ease. The overall mean score of 39% suggests that there is substantial room for improvement in how providers treat their clients. Providers need to be encouraged during basic and in-service training, and by their supervisors, to ensure that they communicate with women about what is happening during labor and birth and offer friendly and respectful support to promote a quality birth experience.

Performance of Immediate and Essential Newborn Care

Figure 5.5 shows the results of observations of newborn care provided until the first hour after birth. The vast majority of newborns were dried with a towel immediately after birth, but less than half were covered with another dry towel after the first (wet) towel was discarded. Only 12% of newborns were placed skin-to-skin on the mother's chest or abdomen. In only about a third of the cases did health workers help the mother initiate breastfeeding within the first hour of delivery and/or delay cord clamping/tying until the pulsations had stopped or at least 2–3

minutes after birth. Only 18% of newborns received all elements of essential newborn care (elements denoted with an asterisk in Figure 5.5).

Figure 5.5 Performance of Immediate Newborn Care Tasks



*Essential newborn care task

Table 5.2 Performance of Thermal Care Tasks for Newborns

NEWBORN CARE TASK	PERCENTAGE OF CASES (N=115)
Immediately dries baby with towel/cloth	78%
Discards wet towel and covers with dry towel	42%
Places newborn on the mother's abdomen skin to skin	12%
Mean percentage score for prevention of hypothermia	45%

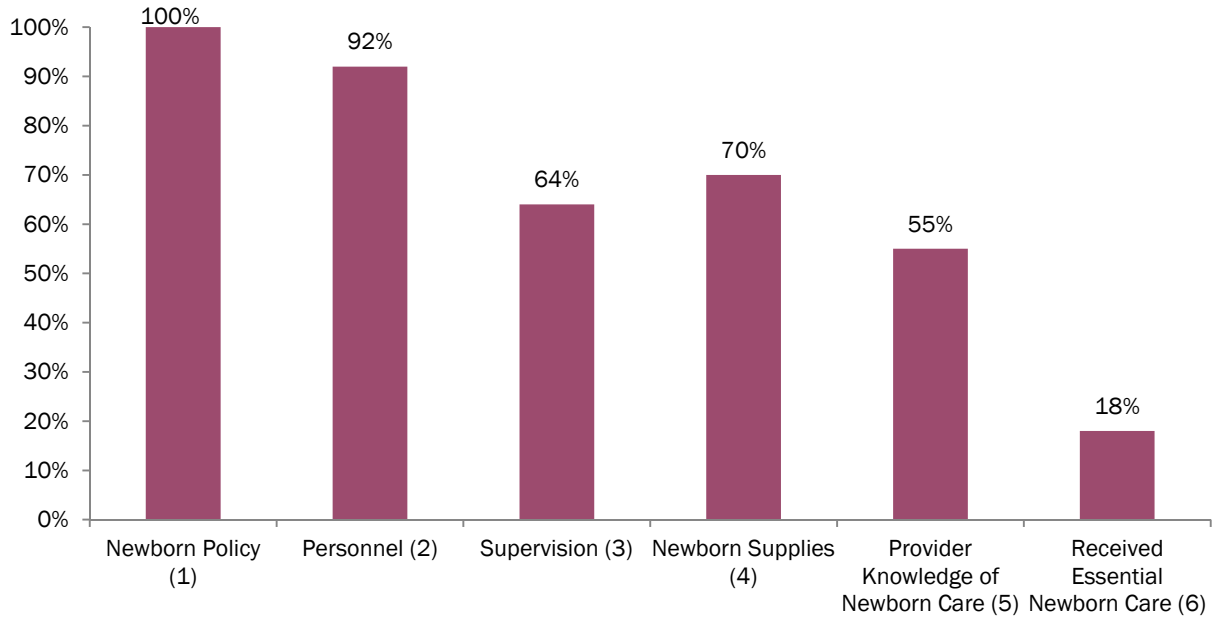
Although most newborns were immediately dried with a towel/cloth, the aggregate score for the three key newborn care standards that aim at preventing the occurrence of hypothermia was found to be far from standard (45%). Failure to place the newborn in skin-to-skin contact with the mother was the major contributor to the low aggregate score—a disheartening finding in the country that pioneered kangaroo mother care.

None of the babies delivered by high-level providers, including obstetrician-gynecologists, general practitioners, and bachelor's-level nurses, were placed in skin-to-skin contact with their mothers, but one-third of the babies delivered by diploma-holding nurses were placed in skin-to-skin contact. Diploma-holding nurses also did a better job of covering newborns with a dry towel and discarding the wet towel and compared to BSc nurses and diploma holder midwives (80% vs. 28% and 38%, respectively). The practice of covering newborns with a dry towel did not correlate with the correct use of AMTSL: newborns were covered with a dry towel after 39% of deliveries in which correct AMTSL was used and 38% of deliveries in which correct AMTSL was not used.

The very low adherence to thermal control standards is a significant concern. Hypothermia, apart from being a major cause of death on its own, is the most important contributing factor in neonatal deaths related to asphyxia (the most common cause of neonatal mortality), especially among low birth weight babies. According to the Central Statistical Agency and ORC Macro (2006), 28% of neonates in Ethiopia were reported to be very small. Given the poor adherence to this practice and the lack of thermal control capacity in the observed facilities (a functioning heat source was absent in 17% of facilities), it is clear that multiple barriers exist to achieving the desired standard of care.

Early initiation of breastfeeding is encouraged by WHO and UNICEF because first breast milk contains colostrum, which is highly nutritious and has antibodies that protect newborns from diseases. In addition, breastfeeding fosters bonding between mother and child. Helping mothers initiate breastfeeding within the first hour, especially when combined with antenatal education, increases the breastfeeding initiation rate and prolongs exclusive breastfeeding (Fairbank et al. 2000; Stockley 2004). Yet this simple and effective practice was provided to only 29% of postnatal mothers. No difference was found by gender of providers. According to the Central Statistical Agency and ORC Macro (2006), only one in three children less than four to five months old is exclusively breastfed. The strong relationship between the earlier initiation of breastfeeding and the duration of exclusive breastfeeding indicates that starting earlier is important.

Figure 5.6 From Policy to Practice: Constraints Analysis for Essential Newborn Care



[1] Essential newborn care is part of national policy guidelines
[2] Percentage of births attended by skilled birth attendant
[3] Percentage of personnel received supervision in previous three months
[4] Availability of three essential newborn care supplies, including: disposable cord ties/clamps, towel or blanket, sterile scissors or blade
[5] Mean percentage score for provider knowledge of immediate newborn care tasks (see Figure 4.9)
[6] A composite indicator consisting of immediate drying/wrapping of newborn, cord care and breastfeeding within the first hour of birth based on observations of immediate newborn care provided (see Figure 5.5).

Figure 5.6 presents scores for factors that may influence the provision of essential newborn care, which we refer to as a "constraints analysis." National ENC policies are in place and ENC is part of the country's pre-service curriculum and service delivery guidelines. Skilled attendants were present at almost all observed births, but key newborn care supplies were not always available in the labor and delivery area (70%). Health workers' mean knowledge score for immediate newborn care steps was relatively low (55%) and suggests that lack of knowledge

may impede provision of ENC. In addition, not all providers reported receiving regular external supervision, i.e., in the previous three months.

Prevalence of Nonbeneficial and Nonindicated Practices

The frequency of nonbeneficial and nonindicated obstetric practices was assessed using 11 indicators: seven indicators for nonbeneficial practices and four indicators for nonindicated practices. *Nonbeneficial* practices are practices that are never indicated under any circumstance, whereas *nonindicated* practices may be useful under specific circumstances but are not indicated for the particular cases under review. Nonbeneficial and nonindicated practices both were found to be fairly common, observed in as many as one-third to one-fifth of the labor and delivery care observations. Only 15% of the deliveries observed included no nonbeneficial practices or nonindicated practices (Table 5.3).

Table 5.3 Prevalence of Nonbeneficial and Nonindicated Practices

NONBENEFICIAL PRACTICES	PERCENTAGE OF CASES (N=109)
Use of enema	0%
Pubic shaving	0%
Applying fundal pressure*	12%
Lavage of the uterus after delivery*	6%
Slapping newborn*	12%
Holding newborn upside down	22%
Milking newborn's chest*	0%
No nonbeneficial practices	56%
Nonindicated Practices	
Manual exploration of the uterus after delivery	29%
Use of episiotomy	15%
Aspiration of newborn mouth and nose at birth	4%
Restricting food and fluids in labor	5%
No nonindicated practices	34%
No nonbeneficial or nonindicated practices	15%

*These practices are not only nonbeneficial, they can be harmful.

The most common nonbeneficial practices included holding the newborn upside down (22%), slapping the newborn (12%), and applying fundal pressure (12%), and these all can be considered harmful. Lavage of the uterus, also a harmful practice, was observed in 6% of the deliveries. Routine use of enema, pubic hair shaving, and milking of the newborn's chest were not observed in any of the labor and delivery cases observed.

The use of nonindicated practices—those that can sometimes be beneficial but which the study observers judged to be inappropriate for the particular client being observed—included some that were used infrequently, such as aspiration of the newborn's mouth and nose at birth (4% of cases) and restricting food and fluids in labor (5% of cases), and others that were used occasionally, such as 15% and 29% for use of episiotomy (15%) and manual exploration of the uterus after delivery (29%).

Although the use of any nonbeneficial or nonindicated practice is a cause for concern, some practices, irrespective of their prevalence, need more attention because they pose a risk of serious harm. These include applying fundal pressure, nonindicated use of episiotomy, manual exploration of the uterus after delivery, and lavage of the uterus. The latter three practices were among the most frequently observed of nonbeneficial and nonindicated practices.

Limiting the use of episiotomy to circumstances in which it is indicated benefits mothers in various ways (Liljestrand 2003). Routine or nonindicated use of episiotomy is discouraged because various studies, including systemic reviews, have shown that it does not confer benefits and that it exposes women to risks such as perineal injury, which in turn increases the likelihood of fecal or gas incontinence, dyspareunia, and other conditions (Hartmann et al 2005). Nevertheless, nonindicated episiotomies were performed in 15% of the deliveries observed. This very high rate is cause for concern, particularly because fear of surgical interventions is one of the major factors that deter Ethiopian women from using skilled birth attendants.

The very high rate of nonindicated use of manual exploration of the uterus (29%) among the observed deliveries also raises concern because manual exploration of the uterus is associated with puerperal infections/sepsis. Manual exploration of the uterus is beneficial when it is clearly indicated, as in cases where retained fragments of conception are suspected and in the evaluation of PPH following vaginal birth after cesarean section. However, these conditions did not exist in any of the cases of manual exploration.

Lavage of the uterus was observed in only a few cases, but applying fundal pressure was observed in 12%. These practices are risk factors for fatal maternal complications—namely, puerperal infection and PPH secondary to iatrogenic injury to the uterus.
In addition, data collector comments suggest that one or more hospitals routinely gave oxytocin for induction of labor (without indication). The data collectors also noted cases of episiotomy or repair of lacerations without local anesthesia, frequent vaginal examinations, and not checking for another baby before giving oxytocin injection.

6. PREVENTION AND MANAGEMENT OF MAJOR MNH COMPLICATIONS

6.1 PROVISION OF EMERGENCY OBSTETRIC CARE SIGNAL FUNCTIONS

The assessed facilities were hospitals with the highest volume of deliveries in Ethiopia. All should have the capacity to provide comprehensive EmONC. The facilities' reported performance of the signal functions for both basic and comprehensive EmONC over the three months before the survey is shown in Table 6.1.

Table 6.1 Reported Provision of the EmONC Signal Functions in Previous Three Months

EMONC SIGNAL FUNCTION	PERCENTAGE OF FACILITIES PERFORMING FUNCTION (N=19)
Assisted delivery	100%
Removal of retained products of conception	74%
Use of parenteral oxytocic drugs	100%
Use of parenteral anticonvulsants for PE/E	95%
Parenteral antibiotics for pregnancy-related infections	100%
Manual removal of placenta	95%

EMONC SIGNAL FUNCTION	PERCENTAGE OF FACILITIES PERFORMING FUNCTION (N=19)
Newborn resuscitation	100%
Blood transfusion	84%
Cesarean section	63%

Performance of the signal functions was not universal across all the facilities. For instance, one had not performed a manual removal of the placenta in the last three months; another had not used parenteral anticonvulsants, and three had not performed a blood transfusion. Five facilities reported not having performed removal of retained products, and, surprisingly, seven facilities (37%) reported not having performed a cesarean section.

Table 6.2 shows the results of the assessment of the health facilities' physical capacity for performance of the signal functions.

Table 6.2 Availability of Supplies and Equipment to Perform Signal Functions

SIGNAL FUNCTION	PERCENTAGE OF FACILITIES WITH NEEDED SUPPLIES/EQUIPMENT
Assisted delivery[1]	100%
Removal of retained products of conception[2]	74%
Administering parenteral antibiotics for infection[3]	74%
Administering parenteral oxytocics[4]	95%
Administering parenteral anticonvulsants[5]	90%
Manual removal of placenta[6]	74%
Newborn resuscitation[7]	77%
Cesarean section[8]	84%

[1] Forceps or ventouse
[2] Manual vacuum aspiration (MVA) or dilation and curettage (D&C) kit, injectable oxytocin or ergometrine, syringes and needles, and ringer's lactate, dextrose 5% in normal saline (D5NS) or normal saline (NS) infusion
[3] Injectable ampicillin or gentamycin, syringes and needles, and ringer's lactate, D5NS or NS infusion
[4] Injectable oxytocin or ergometrine, syringes and needles, and ringer's lactate, D5NS or NS infusion
[5] Injectable magnesium sulfate, diazepam or phenytoin, syringes and needles, and ringer's lactate, D5NS or NS infusion
[6] Injectable ampicillin, injectable oxytocin or ergometrine, syringes and needles, and ringer's lactate, D5NS or NS infusion
[7] Bag and mask (infant size), suction bulb, suction apparatus for use with catheter, and resuscitation table for newborn
[8] Operating table, operating light, anesthesia-giving set, scrub area adjacent to or in operating, tray/drum/package with sterilized instruments ready to use, halothane or ketamine, health worker who can perform cesarean section present or on call 24 hours/day, anesthetist present or on call 24 hours/day

Very few cases in which a signal function was not performed can be explained by a lack of needed supplies and equipment. For cesarean sections, 84% of facilities reported availability of necessary supplies, but only 63% reported actually performing the procedure. In terms of readiness to perform cesarean section, one facility did not have any of the supplies and equipment needed, but the rest were largely stocked. Staffing does not appear to be a barrier; all but one facility had an anesthetist and a health worker who could perform cesarean sections and were available 24 hours per day. It seems unlikely that no clients needed cesarean delivery in the preceding three months. Thus, reasons why this life-saving procedure may be grossly underused must be identified and addressed. According to the 2008 AMDD/United Nations/UNICEF EmONC survey, the primary barrier to the provision of cesarean sections was

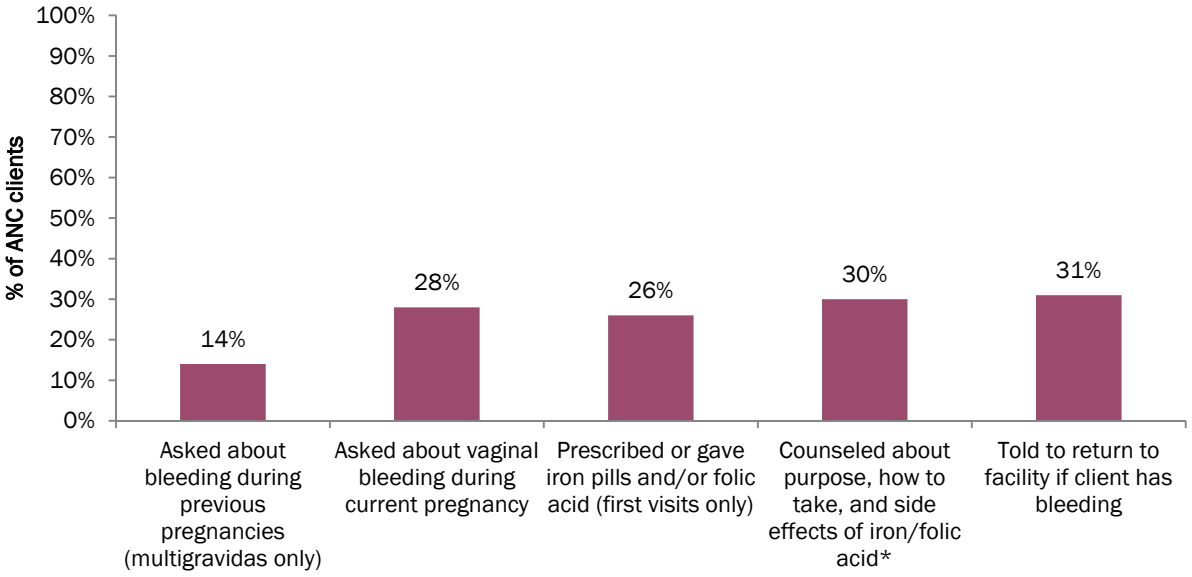
the lack of trained surgical staff. Given that staff were available at the facilities we observed, perhaps the barrier is training or experience or even the need for support from other staff to cover clients during surgery.

6.2 PREVENTION AND MANAGEMENT OF POSTPARTUM HEMORRHAGE

Adherence to PPH Prevention Standards

Antenatal care offers opportunities to reduce the risk of severe postpartum hemorrhage by asking about bleeding in previous pregnancies and the current pregnancy, by providing iron/folate and counseling clients about how to use it, and by counseling clients to return if any vaginal bleeding occurs. Figure 6.1 presents the observed performance of these tasks during ANC.

Figure 6.1 Performance of Antenatal Care Tasks to Prevent Postpartum Hemorrhage



*For all ANC clients who were prescribed or given iron/folic acid pills

Prevention of PPH-related counseling was not frequently performed. Clients were counseled to return if bleeding occurred at only 31% of the observed ANC consultations. Less than 30% of women were asked about bleeding during their current pregnancy, despite bleeding being a key danger sign, and even fewer (14%) were asked whether they had a history of bleeding. Only 26% of women were given iron/folate at their first ANC visit, despite the fact that anemia is associated with higher risk of hemorrhage, especially severe hemorrhage (Christian, Khatry, LeClerq and Dali 2009). Among the women who did receive iron/folate, only 30% received complete counseling about the purpose, how to take it and potential side effects (Figure 6.1).

Active management of the third stage of labor is an effective intervention to reduce the risk of postpartum hemorrhage and the risk of maternal anemia (Begley et al. 2010). AMTSL consists of three interlocking components (World Health Organization 2006b; International Confederation of Midwives and Federation of Gynecologists and Obstetricians n.d.):

- Administration of an uterotonic drug within one minute of delivery (preferably oxytocin 10 units IM)
- Delivery of the placenta with controlled cord traction
- Immediate massage of the fundus of the uterus until the uterus is contracted.

The practice of AMTSL was assessed in the MCHIP study based on the criteria identified by the WHO and the International Confederation of Midwives (ICM) and the International Federation

of Gynecology and Obstetrics (FIGO). The Cochrane Reviews state the following: "Active management reduced the average risk of maternal primary haemorrhage (more than 1000 ml) (risk ratio (RR) 0.34, 95% confidence interval (CI) 0.14 to 0.87) and of maternal haemoglobin less than 9 g/dl following birth (RR 0.50, 95% CI 0.30 to 0.83) for women irrespective of their risk of bleeding." Due to time constraints, uterine massage was monitored only immediately after delivery of placenta and not up until the uterus was contracted.

Figure 6.2 Percentage of Deliveries with Correctly Performed AMTSL Elements (WHO/FIGO/ICM definition)

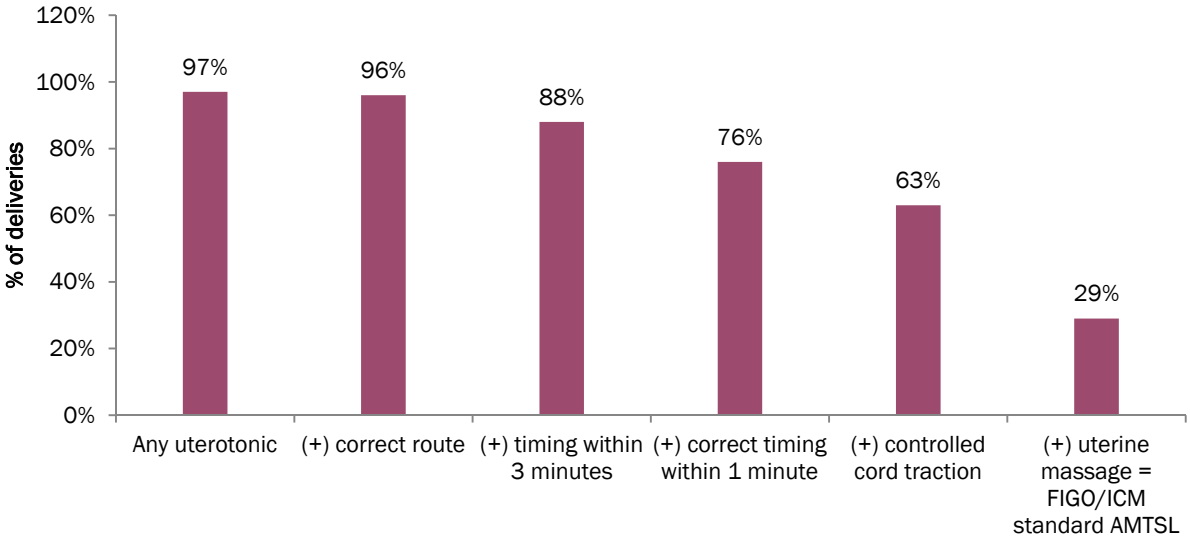


Figure 6.2 shows compliance with the FIGO/ICM definition of AMTSL in the bar on the far right (29%), which includes administration of any uterotonic within one minute of birth (with oxytocin preferred) plus controlled cord traction and uterine massage. The percentage of clients who received the necessary elements of AMTSL drops moving left to right with the addition of each element. Most women received a uterotonic (97%, with 95% receiving oxytocin), most received the uterotonic by the correct route (96%), and most received a uterotonic within three minutes of birth (88%). The proportion of women given a uterotonic with correct route within one minute decreased to 76%. Add in controlled cord traction and the percentage decreases to 63%. Add in uterine massage and the percentage decreases to only 29% (28% with oxytocin). The component of AMTSL most commonly missing was immediate uterine massage, which was performed correctly in only 42% of observed deliveries. Controlled cord traction was more widely performed (79%). These findings are similar to the 2005 POPPHI assessment, which also reported AMTSL use to be at 29%, based on a similar sample and methodology. However, the use of oxytocin appears to have increased since the 2005 POPPHI study, by greater than 20%. In the study here, the use of oxytocin during the third stage of labor was almost universal among hospitals surveyed.*

Although only 29% of women received all elements of AMTSL performed according to standards, it is important to note that it is not yet clearly known which component/s of AMTSL are most important and what timing is the most effective (within one minute or within three minutes) for the administration of a uterotonic drug. Cognizant of the above facts,WHO is conducting a multicenter non-inferiority clinical trial to assess the value of controlled cord traction as part of AMTSL, However, the study does not include an assessment of the timing of oxytocin. If a single provider is attending a woman at delivery, delivering the newborn, and providing essential newborn care— all of which are necessary before oxytocin is administered—it seems that more than one minute would be needed. Therefore, the ability to adhere to this requirement in the guidelines (uterotonic within one minute) is constrained unless there is more than one birth attendant. Measuring performance based on an unrealistic goal could demoralize both providers and policymakers. Research on the timing of uterotonic administration to would help to clarify

the guidelines and identify an indicator that can be included in countries' national HMIS. (A WHO working group is currently identifying a core set of maternal health indicators that can be incorporated into the HMIS.)

Figure 6.3 From Policy to Practice: Constraints Analysis for PPH Prevention

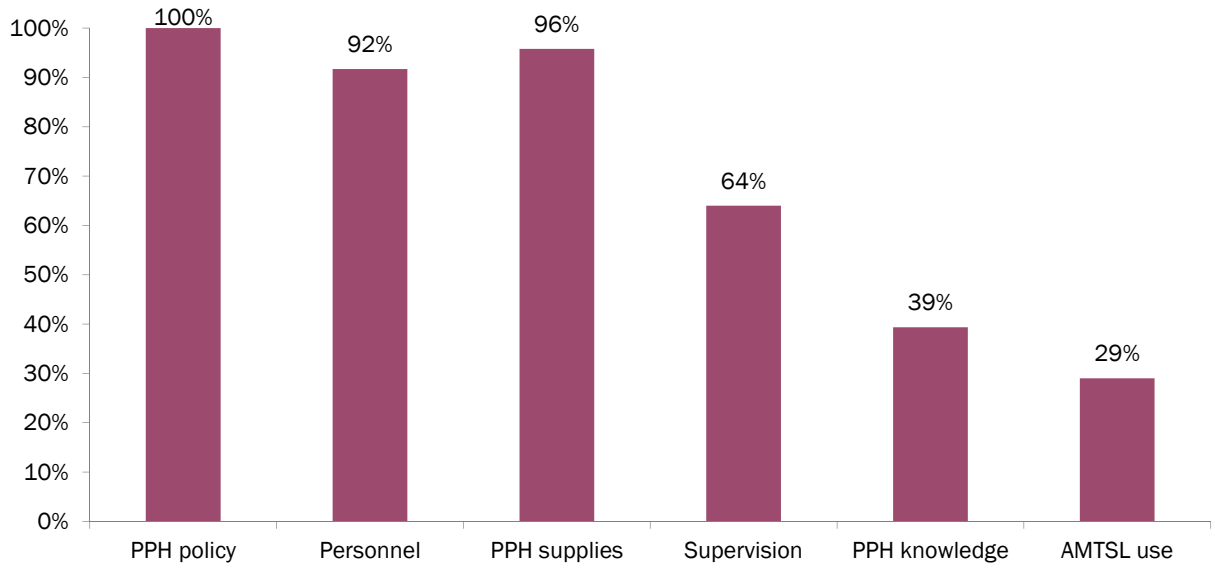


Figure 6.3 shows summarized data that might help to explain the low observed rate of AMTSL use. All policies thought to be supportive of AMTSL use are now in place in Ethiopia. WHO/ICM/FIGO guidelines for the use of AMTSL are included in the country's pre-service curriculum and practice guidelines. Skilled attendants were present at almost all observed births, and a supply of oxytocin or ergometrine was found in the labor and delivery ward in nearly all facilities (96%). However, health workers' aggregate knowledge score (39%) on the management of PPH suggests that lack of knowledge among providers may be an important barrier to the use of AMTSL. In addition, only 64% of health workers reported that they had had some sort of external supervision at least once in the previous three months. Although the supervision data are not specific to AMTSL review, they refer generally to the level of supervision and thus are assumed to be indicative of a supportive environment.

Furthermore, the 10% gap between the providers' scores on PPH knowledge and AMTSL use might indicate that other complex factors, such as a failure to translate learned knowledge into practice and/or a resistance to change practices, might also be in play. This hypothesis is strengthened by data collectors' observation that the majority of providers who were trained in AMTSL nevertheless failed to correctly apply skills. On a positive note, providers' scores on the provision of a uterotonic after birth by the correct route and within three minutes (88%) and one minute (76%) were high. If the uterotonic provision is the most essential life-saving step, then the performance gap may not be as critical as it appears when measuring all AMTSL Steps.

Observed Management of Women Experiencing Postpartum Hemorrhage

Eleven cases of postpartum hemorrhage were observed. Cause-specific diagnoses included three cases of uterine atony with placenta in-situ, two cases of uterine atony with placenta in-situ and vaginal laceration, and six cases of uterine atony with placenta delivered. In seven of the cases, the woman's condition improved and the woman was transferred to the postnatal ward. Data on the remaining four cases were missing. The mode of delivery was spontaneous vaginal delivery in five cases and instrumental delivery in two; data on four cases were missing.

Analysis of provider performance on several key steps in the initial management of PPH (calling for help, uterine massage, uterotonic administration, and initiation of IV fluids if bleeding continued) showed that providers performed the practices correctly in a majority of the cases. Beyond the initial steps, providers were less consistent in following the standard protocol for management of PPH.

6.3 SCREENING AND MANAGEMENT OF PRE-ECLAMPSIA/ECLAMPSIA

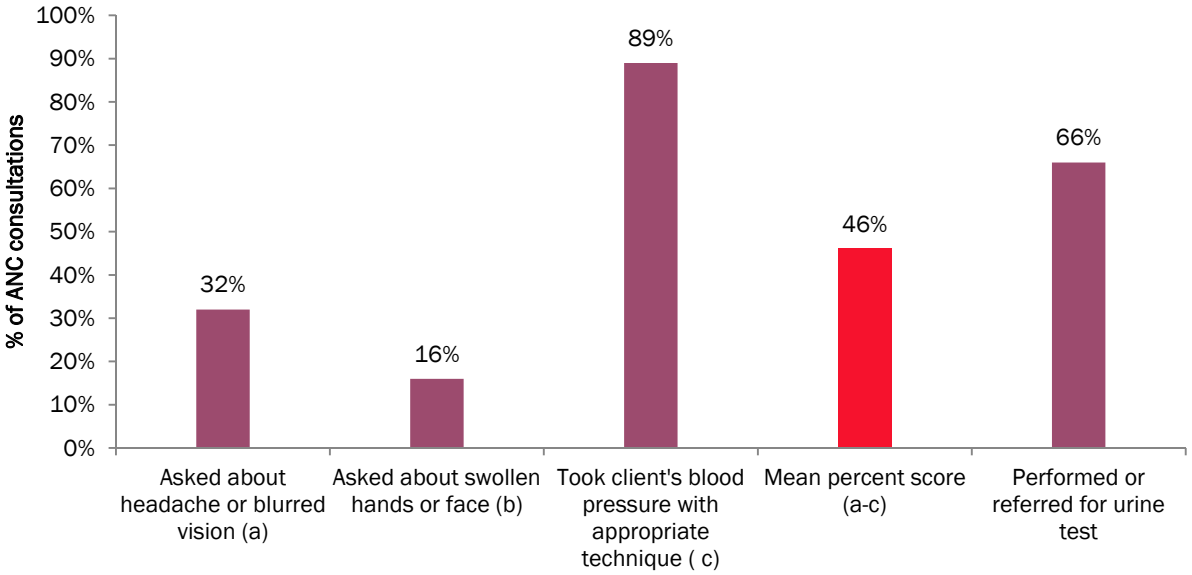
Pre-eclampsia and eclampsia are among the most dangerous complications of pregnancy. Eclampsia, the advanced stage of this disorder, is a major cause of maternal deaths.

Adherence to Screening Standards for Pre-eclampsia

To date there are no accepted routine methods that can prevent the occurrence of pre-eclampsia, although both calcium supplementation and aspirin supplementation appear promising. Nevertheless, clinical experience suggests that early detection and treatment of pre-eclampsia is beneficial to the woman and fetus because they enable clinical monitoring and prompt therapeutic intervention for severe pre-eclampsia or eclampsia. Studies to date have indicated an inverse relationship between the quality of prenatal care and the incidence of eclampsia, strengthening the evidence for the value of early detection (Chesley 1953; World Health Organization 2003).

Adherence to four screening steps for pre-eclampsia was assessed. The four steps included two core functions (accurate blood pressure measurement and urine test for proteinuria) and one additional function (history-based risk assessment). These criteria were selected based on the available evidence on effectiveness and are in line with recommendations in the WHO IMPAC manual for ANC (World Health Organization 2006a). Results of the assessment are shown in Figures 6.4 and 6.5.

Figure 6.4 Completion of Pre-eclampsia Screening Tasks during ANC Consultations



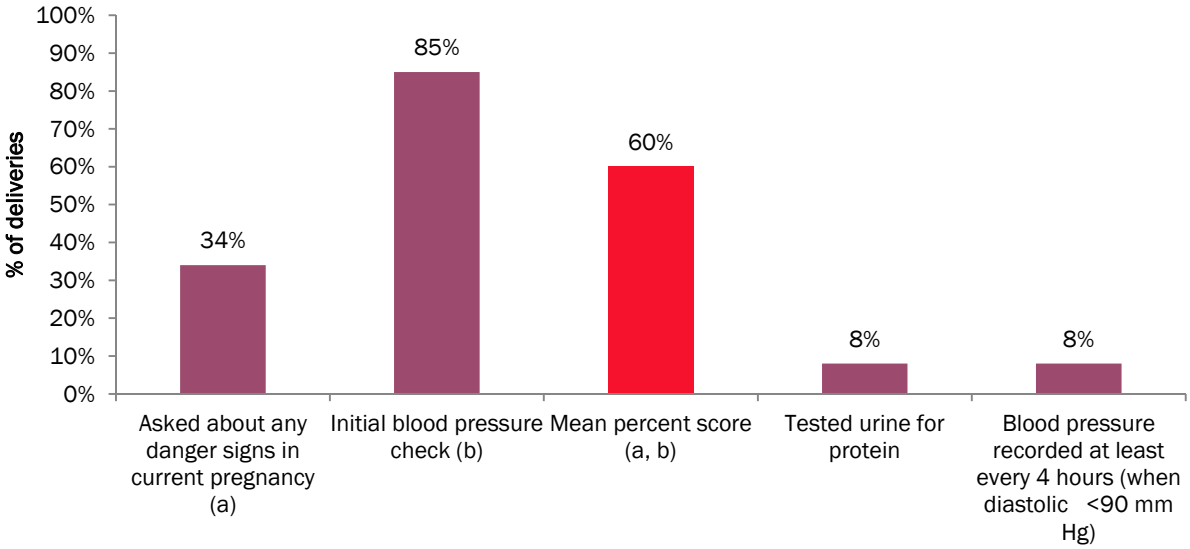
Adherence to *individual screening elements* for pre-eclampsia varied from as low as 16% to as high as 89%, with an aggregate/mean percentage score of 46% for the first three items. Performance was quite good on conducting the key screening test for pre-eclampsia: taking the client's blood pressure. Providers took the client's blood pressure in nearly all ANC cases. The majority of the blood pressure measurements (89%) were taken according to the recommended technique (i.e., measuring blood pressure with an appropriate-sized cuff when client is in sitting or left lateral position with arm at the level of the heart). However, it is not clear why 2% of the

clients observed did not have their blood pressure measured, even though this is a fundamental skill and functioning blood pressure equipment was available in 100% of the facilities. Because there has not been international consensus regarding whether urine testing should be performed routinely (at every ANC visit) or only at first visit, this task is shown at the end of the graph. Routine testing is not recommended in the WHO IMPAC series, but it remains an important screening test for pre-eclampsia. Recommendations have been made for universal testing at each ANC visit (National Collaborating Centre for Women's and Children's Health 2005). FMOH's *Management Protocol on Selected Obstetrics Topics* recommends routine urine testing for protein for all first visit ANC clients and in subsequent visits if the woman is nulliparous or if she has a history of hypertension, pre-eclampsia, or eclampsia in a previous pregnancy. The test for albumin in urine was carried out in only two-thirds of the observed ANC consults. We noted a correlation between the type of ANC visit and provision of urine testing for protein (81% for first visits and 46% for return visits). This finding is in line with WHO's new model of antenatal care, which recommends that that further urine testing beyond the first visit be performed only with indications.

For multigravida women, we also assessed whether providers asked women if they had experienced PE/E or PE/E danger signs in a previous pregnancy (data not shown). Although they asked about women's past history of stillbirth relatively often (58%), only a third of the clients were asked whether their previous pregnancy was complicated with pre-eclampsia (36%), and only one in ten mothers was asked about any history of convulsions (11%). The substandard practice on these measures has serious implications, because most pregnancy complications tend to recur in subsequent pregnancies and/or predispose women to other pregnancy complications. Thus, a huge opportunity for prevention, detection, and/or early management is lost. A past history of PE/E should prompt providers to look actively for PE/E in the current pregnancy and detect it before serious complications occur and/or institute timely management.

Pre-eclampsia can appear at any time during pregnancy, including labor. Thus, the initial evaluation of mothers in labor should be thorough and provide detailed information on maternal, fetal, and labor status. Figure 6.5 below shows that intrapartum PE/E screening tasks were not routinely performed.

Figure 6.5 Completion of Pre-eclampsia Screening Tasks during Labor

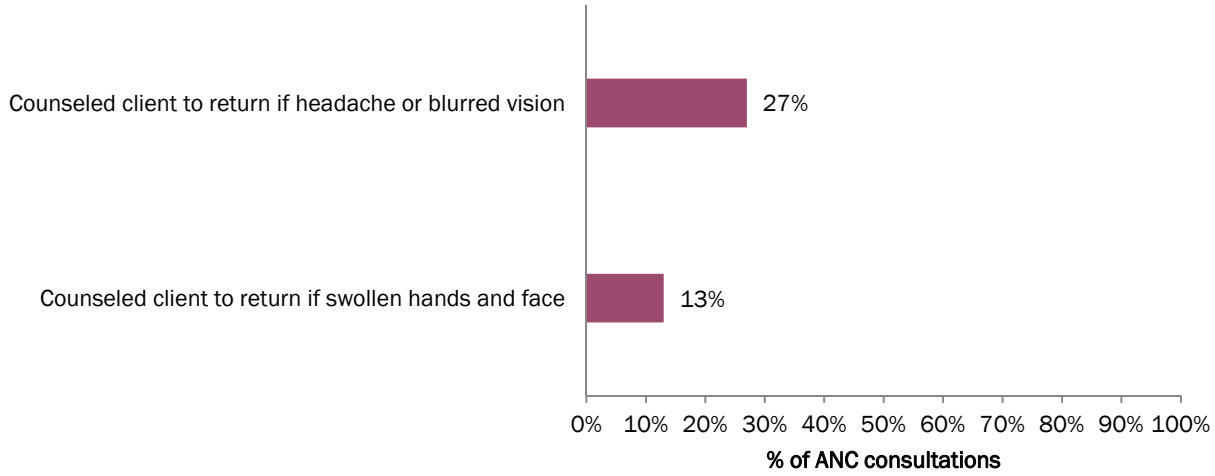


The mean performance score for intrapartum screening tasks of PE/E (asking about any current danger signs and checking blood pressure) was found to be 60%, but both screening tasks were

performed for only 29% of deliveries. Blood pressure screening was high during intrapartum care but proper blood pressure technique was not assessed as it was during ANC. Given the very low use of the partograph in the facilities assessed (13% of deliveries observed), it is not surprising that follow-up blood pressure measurements were recorded at least every four hours on the partograph in only 8% of the cases observed. Other tasks, such as measurement of protein in the urine and inquiries about PE/E-related signs, were not assessed for the majority of laboring mothers.

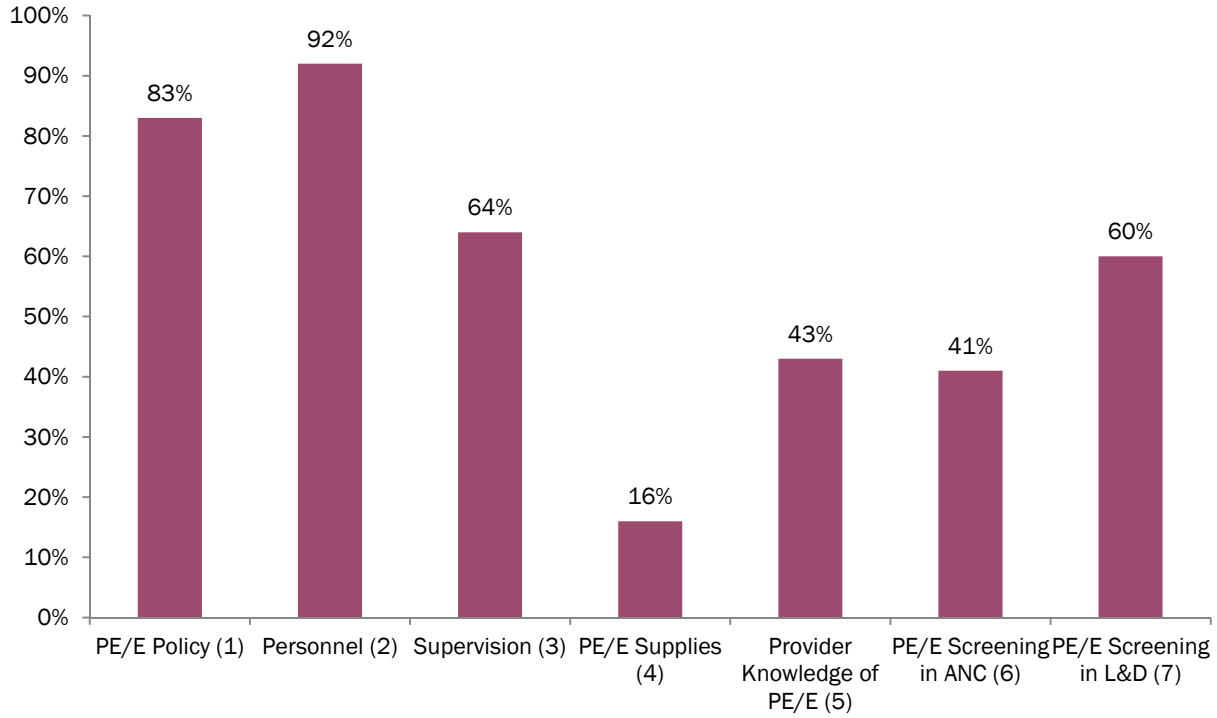
Pregnant women should be informed of the danger signs of pre-eclampsia and eclampsia, not only because these signs may be associated with poorer pregnancy outcomes, but also because early recognition of symptoms helps improve the woman's chances of timely treatment and survival (National Collaborating Centre for Women's and Children's Health 2005). In view of this, providers' adherence to PE/E-related pregnancy counseling protocols was evaluated using two symptoms that might indicate the occurrence of pre-eclampsia.

Figure 6.6 Provision of ANC Counseling on Danger Signs of Pre-eclampsia



In aggregate, only 30% of the women observed during antenatal care were informed of how to recognize signs of pre-eclampsia. Surprisingly, only 13% of the women were given information on how to recognize edema (swollen hands and face). Given that edema is often the only clinical sign of pre-eclampsia (a major cause of maternal mortality in Ethiopia) that women can easily identify the observed lack of counseling on this danger sign is a cause for concern. In addition, given that headache is a common symptom of many illnesses, mothers might overlook headaches as a danger sign. Education on these important early warning signs must be improved to decrease undue delays in detecting pre-eclampsia before it becomes dangerous. The 2008 AMDD/United Nations/UNICEF study showed that 80% of maternal deaths occur after there has been a component of delay in recognition of danger signs.

Figure 6.7 From Policy to Practice: Constraints Analysis for Pre-eclampsia/Eclampsia Screening



[1] Mean percentage score: magnesium sulfate registered included in essential drug list and first line in standard treatment guidelines
[2] Percentage of births attended by skilled birth attendant
[3] Percentage of personnel received supervision in previous three months
[4] Availability of magnesium sulfate in facilities
[5] Score for knowledge of PE/E
[6] See Figure 6.4
[7] See Figure 6.5

Although national policy supports the use of magnesium sulfate as a first-line drug in the treatment of PE/E, few facilities had it stocked. Knowledge scores and observed practice of PE/E screening in ANC and L&D were only fair, indicating many missed opportunities to prevent this deadly disease.

Severe Pre-eclampsia and Eclampsia Treatment Practices

Data collectors observed the quality and adequacy of initial treatment of severe pre-eclampsia and eclampsia for nine cases: one woman with severe pre-eclampsia (diastolic BP > 110mm Hg and proteinuria ≥ 3+), one woman with eclampsia (convulsions observed), and the remainder whose condition was condition unclear. Because of the small number of cases, this analysis is qualitative. The reasons for limited data are that PE/E is a rare event and the observers stayed for only two days in each facility. Health workers might not have finished treating the client by the end of the observation period at each facility.

The primary drug used in Ethiopia as an anticonvulsant for treatment of severe PE/E was diazepam. In all three cases in which an anticonvulsant was given, diazepam was the drug administered. WHO recommends magnesium sulfate as the first-line drug because of the strong evidence supporting its effectiveness in reducing mortality from eclampsia. Yet only 16% of the facilities in this study had magnesium sulfate available in the labor and delivery room. Thus, most did not have the ability to offer the recommended treatment.

6.4 MANAGEMENT OF BIRTH ASPHYXIA (NEWBORN RESUSCITATION)

Neonatal deaths account for more than two-thirds of infant deaths globally. Neonatal asphyxia and infection account for 29% and 34% of those deaths, respectively (Lawn, Cousens and Zupan

2005). The adoption of simple, low-cost resuscitation practices improves the outlook for asphyxiated newborns, even in poor communities.

Data collectors observed the management of 18 cases of neonatal asphyxia. Two newborns died and 13 survived, and data on the remaining three cases are missing. Comments from data collectors suggest that prolonged or obstructed labor may have been a contributing factor in some of the cases. In three cases the delivery was breech, and in another the woman had to wait five hours before her labor was augmented (indicated by reaching the action line on the partograph). Two of the cases were twins undiagnosed until delivery.

The quality of care was scored for six key initial management tasks and two advanced management tasks (use of an ambu bag and mask). Initial drying of the newborn appeared to be inadequate in many cases, but suctioning was somewhat better. Data collectors observed delays related to the organization of services and equipment in two cases—one in which the newborn had to be taken to the operating room because no supplies were available in the delivery room and another in which the oxygen/suction machine was not functioning correctly. Midwives were observed giving oxygen directly after suctioning for two newborns, rather than using the ambu bag and mask first. The providers' ventilation technique was observed to be in adequate in three of 11 cases in which ventilation with a bag and mask was performed.

Table 6.3 Quality of Care in Neonatal Asphyxia Case Management

TASKS	YES	NO	MISSING/DON'T KNOW*	N
Initial steps (drying/stimulation/suctioning)				
Quickly dries newborn	8	10	0	18
Places newborn on his/her back on warm surface	13	3	2	16
Places head in slightly extended position	7	8	3	15
Clears airway by suctioning mouth first and then nose	13	2	3	15
Introduces catheter no more than 5 cm in to mouth	10	5	3	15
Introduces catheter no more than 3 cm in to nostrils	6	8	1	14
Ventilation with bag and mask				
Uses correct application of mask	8	3	0	11
Uses correct technique of ventilation	8	3	0	11
Total				

*Either the task aborted logically, the observers' time ended, or the task was not observed.

7. DISCUSSION AND CONCLUSIONS

Although the quality of service provided to ANC and L&D clients in terms of prevention, early detection, and treatment of common maternal and neonatal complications appears to be mixed, ranging from very poor in some aspects to up to standard in others, the quality of care overall falls far below WHO's recommended standards. Poor quality was observed at all levels of hospitals and among all provider types. However, some practices do have a high level of adherence, including correct timing and use of uterotonics during the third stage of labor (part of AMTSL), blood pressure screening for pre-eclampsia, immediate drying of newborns as a component of essential neonatal care, and decontamination of used medical instruments as a component of IP.

The reasons for the observed low quality of care appear to be multiple, encompassing various distinct and interrelated factors that range from lack of knowledge of high-impact evidence-based interventions (or skills to perform them) to a lack of guidelines or guidelines that are outdated. In some facilities, all of the elements of facility readiness were in place, but practice was still observed to be inadequate. Low partograph use is one example. This finding may point to other less tangible barriers such as beliefs or attitudes (that is, health care workers or their supervisors being unconvinced of the advantage of a particular standard of care) or the organization of care. Essential MNH equipment and supplies appear to be widely available, which suggests that this is unlikely to be the *major* factor responsible for the overall very low use of recommended practices. However, a few very important items were missing from facilities—most importantly, magnesium sulfate and neonatal resuscitation equipment.

The deficits identified pose a serious threat to the health of Ethiopian women and newborns, and greatly hinder Ethiopia in its journey toward achieving MDGs 4 and 5. Recognizing this threat, the FMOH and its development partners are working tirelessly to fill the gaps in care. For example, magnesium sulfate is being introduced, and guidelines on selected obstetric topics are being prepared and will soon be available at facilities. However, additional strategies and interventions to reduce the observed deficits in care and increase the quality and availability of high- impact interventions are urgently warranted.

A summary of key findings and conclusions is presented below.

General:

- Designated skilled attendants (doctors, health officers, nurses and midwives) attended 92% of deliveries observed and midwives attended 55%.
- The initial evaluation of mothers in labor should be comprehensive and must provide detailed information on maternal, fetal, and labor status to support decisions about care. Improvements are needed in basic tasks such as taking pulse and temperature and asking clients about danger signs.
- Although providers were friendly to women for the most part, the overall mean score of 39% for woman-centered care suggests that there is substantial room for improvement in supporting clients and their privacy.

Supervision:

- Most of the health workers (> 60%) reported being supervised in the three months before they were interviewed.

Drug and Supply Logistics:

- Drugs and supplies for EmONC were generally available at the national Pharmaceutical Fund and Supply Agency central warehouses, according to interviews and record reviews.

- Essential supplies were *not* available in all 19 of the facilities assessed; eight facilities lacked more than one of the needed supplies for normal delivery on the day they were assessed.

Health Worker Knowledge and Training:

- Knowledge scores were low: providers scored only in the 40 percentile range for knowledge for maternal conditions and 32-59% for knowledge of newborn care.
- The fact that the good proportion of the health care workers had in-service training in the recent past indicates that the FMOH is fully committed to improving the quality of MNH services through improved in-service training.

Antenatal Care:

- Provider performance on FANC treatments was considerably better than performance of the elements of FANC that required interaction with the client (i.e., health promotion and birth preparedness counseling).

Postpartum Hemorrhage:

- AMTSL (all components) was used at 29% of the births observed, which is comparable to the result found in the 2005 POPPHI/FMOH study (29%).
- Use of oxytocin for AMTSL has increased since 2005 and is almost universal and 84% of facilities had oxytocin in the labor and delivery area.
- The fact that uterine massage is commonly missing in AMTSL indicates a lack of information/emphasis during training and/or poor provider adherence. In the 2008 MOH EmONC survey, only 4% of providers mentioned uterine massage as a component of AMTSL.
- Knowledge scores for diagnosis and management of PPH were low (41% mean score overall). This is a serious cause for concern because postpartum hemorrhage is the most frequent cause of maternal deaths.

Pre-eclampsia/Eclampsia:

- Screening during ANC and L&D by taking blood pressure was observed to be high and was generally performed with the proper technique (measured for ANC only).
- Few providers asked clients about a history of PE/E danger signs, either in the ANC clinic or in the L&D ward.
- The primary drug used for prevention of eclampsia is diazepam, which is a much less effective drug than magnesium sulfate.
- Magnesium sulfate was available in only 16% of the facilities (n=19) and antihypertensive were available at 84% of facilities.

Obstructed Labor:

- Partograph use was extremely low—used in only 13% of labors—but most facilities had partographs in stock (78%).
- When partographs were used, the information recorded was often incomplete.
- Cesarean section appears to be underutilized; 37% of facilities did not report performing a cesarean section in the previous three months.

Sepsis:

- Overall, the performance of infection prevention practices in L&D was just above average (observed mean score of 59% of deliveries with tasks performed). The infection prevention

tasks that were performed most poorly were hand washing (especially handwashing before assessing or examining a woman in labor) and use of protective clothing.

- Nonindicated use of manual exploration of the uterus, which is a risk factor for maternal puerperal sepsis, was unacceptably high (29% of deliveries).

Immediate Newborn Care and Birth Asphyxia:

- Several aspects of immediate newborn care need significant improvement, especially skin-to-skin contact and initiation of breastfeeding.
- Equipment needed for immediate newborn care was available in almost all facilities. Newborn size bag and mask were available at 89% of facilities.

8. RECOMMENDATIONS

8.1 OVERALL RECOMMENDATIONS

Policy and Guidelines:

- Disseminate and orient providers to the FMOH clinical guidelines, *Management Protocol on Selected Obstetrics Topics*.
- The FMOH policy on the WHO four-visit FANC model is in place and included in the *Management Protocol on Selected Obstetrics Topics*, but it needs further dissemination and providers need to be oriented.

Capacity-Building/Training:

- Pre-service training for skilled birth attendants should cover all basic EmONC signal functions and other MNH services—specifically, AMTSL, partograph, and immediate newborn care.
- Pre-service and in-service training should include a stronger emphasis on PE/E history taking, use of the partograph, and use of magnesium sulfate. Pre-service and in-service training for skilled birth attendants should also address nonbeneficial and nonindicated practices.

Drug and Supply Logistics:

- Magnesium sulfate should be made available at all hospitals that offer EmONC services
- Facilities should maintain effective procedures for procurement and distribution of key drugs and supplies for emergency obstetric and newborn care (i.e., magnesium sulfate and oxytocin).

Monitoring and Evaluation:

- Evaluate the reasons for low use of partograph.
- Institute maternal and perinatal death audits in those facilities where they have not been started.
- Consider including in the monthly facility reports at least one quality of care indicator for each serious MNH complication.
- Evaluate and strengthen the bachelor's-level nursing curriculum as their performance appears to be poor compared to other providers.
- Ensure that a mechanism is in place that facilitates the rapid and effective implementation of the national management protocol on selected obstetrics topics.

8.2 COMPLICATION-SPECIFIC RECOMMENDATIONS

Prevention and Early Treatment of PPH:

- Train skilled birth attendant on AMTSL as well as early and key treatment functions:
  - Because adherence to the use of uterotonics in the third stage of labor appears to be up to standard, training should primarily emphasize other AMTSL components—specifically, building providers' knowledge about the importance of uterine massage as well as skills related to controlled cord traction. Ensure that trainings on manual removal of the placenta focus on the importance of adhering to critical steps (i.e., starting IV fluids and providing analgesics before the procedure).
  - Use competency-based training approaches that use mannequins (anatomic models) for simulated training in life-saving skills (i.e., bimanual compression and aortic compression). Knowledge in this area is below average.
  - Training initiatives should give priority to provider cadres that carry out the majority of deliveries (i.e., midwives and nurses) and should focus on the facilities where AMTSL and early treatment are expected to have the biggest benefit (e.g., health facilities that lack the supplies or human resources to provide advanced management of PPH).
  - Increase providers' counseling skills on danger signs.
  - Eliminate observed practices that might increase the likelihood of PPH (e.g., applying fundal pressure, exploration of uterus) through information, education, and communication strategies.
  - Provide job aids that reinforce AMTSL and early treatment protocols in all labor wards. It is particularly important to make quick reference guidelines on key tasks.
- Improve facility readiness:
  - Make sure that uterotonics are available at all times and in all facilities that provide delivery services. Uterotonics were present in all facilities except one, which is an indicator of an excellent uterotonic drug management system that includes dedicated finance. However, the fact that uterotonics were absent in one of the visited facilities should be a concern, particularly given our understanding (based on information obtained from in-depth interviews with key Pharmaceutical Fund and Supply Agency staff) that Ethiopian drug-related policy directives have already put uterotonics on the priority (i.e., life-saving) drug list and that a centralized, dedicated drug management and financing system exists to ensure availability at all times.

Prevention of Severe Pre-eclampsia and Eclampsia:

- Train providers on screening for pre-eclampsia:
  - Emphasize testing urine for protein as a mandatory task in each of the four FANC visits.
- Ensure that magnesium sulfate is available at all hospitals that provide delivery care, and ensure that facilities are staffed by skilled birth attendants trained in using magnesium sulfate.

Prevention of Obstructed Labor and Its Sequelae:

- The disparity between the level of partograph use and the proportion of providers who reported that they were trained in partograph use (as well as its inclusion in the pre-service curriculum) indicates a need for strategies beyond simple training. We recommend that an in-depth qualitative study of causes for the low uptake be the first strategic step in this endeavor, or at least that it be undertaken concomitantly with provider training.
- Further examination is needed of the reasons why 37% of facilities had not performed a cesarean section in the three months before this assessment.

Prevention of Sepsis:

- Providers need to improve their hand-washing practices before examining the client.
- Nonindicated use of manual exploration of the uterus, which was found to be unexpectedly high, should be discouraged through appropriate educational strategies and supervision.

Essential Newborn Care and Prevention and Treatment of Neonatal Asphyxia:

- Several aspects of immediate newborn care need to be improved, particularly the health worker's role in promoting skin-to-skin contact and early initiation of breastfeeding.

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APPENDIX

Table A. Facilities Assessed, Expected Number of Deliveries per Month, and Number of Deliveries Observed

NUMBER OF FACILITIES	REGION	NO. DELIVERIES IN 2007 (AMDD DATA)	ESTIMATED NO. DELIVERIES OVER TWO DAYS (2007)	ACTUAL NO. OBSERVED DELIVERIES (2010)
Hospital A	Addis Ababa	5,842	32	14
Hospital B	Addis Ababa	3,124	17	8
Hospital C	Addis Ababa	2,581	14	11
Hospital E	Addis Ababa	2,285	13	7
Hospital C	Addis Ababa	2,554	14	7
Hospital D	Amhara	3,154	17	11
Hospital E	Amhara	2,980	16	11
Hospital F	Amhara	2,095	11	12
Hospital G	Amhara	1,987	11	13
Hospital H	Dire Dawa	2,714	15	0
Hospital I	Oromiya	2,378	13	12
Hospital J	Oromiya	2,356	13	17
Hospital K	Oromiya	1,666	9	10
Hospital L	Oromiya	3,168	17	13
Hospital M	Oromiya	2,149	12	11
Hospital N	Oromiya	2,079	11	11
Hospital O	SNNP	1,687	9	10
Hospital P	Somali	2,015	11	11
Hospital Q	Tigray	2,711	15	3
Total		49,525	271	192

Table B. Characteristics of Women Observed during Antenatal Care Consultations

TYPE OF ANC VISIT	PERCENTAGE OF CASES (N=123)
First visit	46%
Follow-up visit	54%
GESTATIONAL AGE AT VISIT	**PERCENTAGE OF CASES (N=126)**
≤ 20 weeks	18%
21–36 weeks	60%
≤ 37 weeks	22%

GRAVIDA	PERCENTAGE OF CASES (N=124)
Primagravida	38%
Multigravida	62%

Table C. Types of Health Workers Providing L&D Services in Sampled Facilities

FACILITY	DOCTOR	NURSE	MIDWIFE	HEALTH OFFICER	OTHER (MAINLY STUDENTS)	TOTAL
Totals, number	91	52	176	11	4	334
Totals, percent	27%	16%	53%	3%	1%	100%
% Deliveries observed	20%	11%	55%	5%	8%	100%

Table D. Availability of Infection Prevention Commodities

INFECTION CONTROL ITEMS	PERCENTAGE OF FACILITIES WITH COMMODITY (N=19)
Soap for hand washing	63%
Water for hand washing	84%
Piped water or bucket with tap	94%
Sharps container	100%
Already mixed decontaminating solution	100%
Clean (or sterile) gloves	95%
Mean percentage score for infection control	89%
CAPACITY FOR STERILIZATION	**PERCENTAGE OF FACILITIES WITH COMMODITY**
Functioning electric autoclave	89%
Functioning non-electric autoclave	5%
Functioning electric dry heat sterilizer	26%
Functioning electric boiler or steamer	11%
Non-electric pot with cover AND functioning heat source	0%
Functioning electric or non-electric equipment for sterilization	95%
Functioning automatic timer	68%
TST indicator strips	47%
Functioning automatic timer or TST indicator strips	74%
Written protocols or guidelines for sterilization or disinfection	11%
Mean percentage score for sterilization capacity	43%

Table E. Infrastructure- and Management-Related Indicators of Newborn Care

ESSENTIAL NEWBORN CARE ITEMS	PERCENTAGE OF FACILITIES WITH INDICATOR (N=19)
Disposable cord ties or clamps	72%
Towel or blanket to wrap baby	44%
Sterile scissors or blade	95%
Mean percentage score essential newborn care	70%
THERMAL CARE OF LBW NEWBORNS	**PERCENT OF FACILITIES (N=18)**
Functioning incubator	33%
Other functional heat source	67%
Functioning incubator or other heat source	83%
REGULAR REVIEWS OF NEWBORN DEATHS	**PERCENTAGE OF FACILITIES WITH INDICATOR (N=19)**
Regular reviews of newborn death or near miss	32%

Table F. Infrastructure-Related Indicators of Pre-eclampsia/Eclampsia

ROUTINE PE/E SCREENING BEFORE ANC CONSULTATION	PERCENTAGE OF FACILITIES WITH INDICATOR (N= 15)
Taking blood pressure	93%
Urine test for protein	87%
Mean percentage score for routine PE/E screening before ANC consult	90%
CAPACITY TO PERFORM PE/E SCREENING	**PERCENTAGE OF FACILITIES WITH INDICATOR (N=19)**
Screening of urine protein reported as routine during ANC consult	100%
Functioning blood pressure apparatus	100%
AVAILABILITY OF GUIDELINES OR PROTOCOLS	**PERCENTAGE OF FACILITIES WITH INDICATOR (N=19)**
Availability of guidelines or protocols for ANC services	58%
Availability of guidelines or protocols for management of PE/E	21%

Table G. Counseling on Danger Signs and Birth Planning during Antenatal Care

COUNSELING FOR DANGER SIGNS	PERCENTAGE OF CASES RECEIVING COUNSELING (N=124)
Tell client to return if vaginal bleeding	31%
Tell client to return if swollen hands and face	13%
Tell client to return if severe headache or blurred vision	27%
Tell client to return if decrease or absence of fetal movements	22%
Mean percentage score for danger signs counseling	23%

BIRTH PREPARATION COUNSELING	PERCENTAGE OF CASES RECEIVING COUNSELING (N=124)
Ask client where she will deliver	32%
Advise client to prepare for delivery (e.g., set aside money, arrange for emergency transport)	19%
Advise client to use skilled health worker during delivery	28%
Discuss with client what items to have on hand at home for emergencies (e.g., sterile blade)	15%
Mean percentage score for danger signs and birth preparation counseling	24%

Table H. Standard Tasks for Initial Intrapartum Assessment for a Woman in Labor

TASKS FOR INITIAL CLIENT ASSESSMENT	PERCENTAGE OF CASES ADHERING TO STANDARDS (N=105–107)
Checks client's card or asks client her age, length of pregnancy, and parity	75.7%
Asks client whether she has experienced at least one danger sign of pregnancy	32%
Asks about at least one complication during previous pregnancies	25.8%
Takes temperature	25.3%
Takes pulse	47.3%
Asks/notes amount of urine output	17.7%
Performs general examination (e.g., for anemia, edema)	52.1%
Performs abdominal examination: checks fundal height, presentation, and lie	84.9%
Performs abdominal examination: checks fetal heart rate with fetoscope/ultrasound	90.7%
Performs vaginal examination (cervical dilation, fetal descent, position, membranes, meconium)	89.1%
Mean percentage score	54%

Table I. Health Workers' Knowledge of Pre-eclampsia/Eclampsia Management Functions

SEVERE PRE-ECLAMPSIA/ECLAMPSIA MANAGEMENT FUNCTIONS	PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE (N=76–78)
Action to Take Immediately for Severe Pre-eclampsia	
Stabilize with magnesium sulfate	70%
Stabilize with antihypertensives	70%
Mean percent score for severe pre-eclampsia	70%

SEVERE PRE-ECLAMPSIA/ECLAMPSIA MANAGEMENT FUNCTIONS	PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE (N=76–78)
Action to Take Immediately for Convulsion	
Administer oxygen at 4–6 L per minute	29%
Place in side-lying position	36%
Protect from injury	68%
Give magnesium sulfate	26%
Provide antihypertensives	47%
Mean percentage score for initial management of severe pre-eclampsia	37%
Action to Take One Hour Later for Convulsion	
Repeat magnesium sulfate four hours after last dose if reflexes and respiration are normal	35%
Maintain diastolic blood pressure between 90 and 100 with antihypertensives	35%
Monitor her labor and begin partograph	71%
Record fluid intake and output hourly	26%
Get and record respirations, reflexes, and patellar reflexes hourly	15%
Mean percentage score for subsequent management of eclampsia	26%

Table J. Health Workers' Knowledge of Newborn Resuscitation

PART 1: STIMULATION ACTIONS	PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE
1. Dries baby by rubbing her head-to-toe with a dry towel/cloth	61%
2. Throws away the used wet cloth	39%
3. Wraps baby is second dry towel/cloth	23%
4. Observes that baby is not breathing after drying and wrapping	17%
5. Briefly tells the mother her baby is not breathing and needs special assistance immediately	6%
6. Places baby on her back on firm, flat surface	14%
7. Places a small folded cloth under the baby's shoulder so that the head is extended	27%
8. Suctions first the baby's mouth then the nose using bulb syringe or mucus extractor	6%
9. Suctions only while pulling out the bulb syringe or mucus extractor	9%
10. Observes that baby is still not breathing after suctioning	5%

PART 1: STIMULATION ACTIONS	PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE
Mean percent score for stimulation actions	21%
PART 2: VENTILATION ACTIONS	**PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE**
1. Covers baby's nose and mouth with face mask size 1, and makes sure that a seal is formed over the chin, mouth, and nose	38%
2. Tests to make sure air is entering the lungs by squeezing the bag 2-3 times and observe the chest rise with each squeeze	36%
3. Ventilates the baby by squeezing the bag about 40 times per minute	23%
4. After one minute of ventilation stops and checks to see if the baby is breathing on her own	40%
5. Baby breathes spontaneously 30 times per minute, and no chest indrawing or grunting is noted; discontinues ventilation with bag and mask	31%
Mean percent score for ventilation action	34%
PART 3: POST-RESUSCITATION ACTIONS	**PERCENTAGE OF HEALTH WORKERS WITH CORRECT RESPONSE**
1. Places baby in skin-to-skin contact with the mother and initiates breastfeeding	23%
2. Documents resuscitation information on mother's record	25%
3. Explains to mother what care was given, what signs to look for, and what action to take	24%
Mean percent score for post-resuscitation actions	24%