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Assessment of Antenatal Care Including Malaria in Pregnancy, in Three Regions of Myanmar

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Abbreviations

ACT	artemisinin-based combination therapy
ANC	antenatal care
JHSPH	The Johns Hopkins University Bloomberg School of Public Health
LLIN	long-lasting insecticidal bed net
MCSP	Maternal and Child Survival Program
MDG	Millennium Development Goals
MIP	malaria in pregnancy
MOHS	Ministry of Health and Sports
mRDT	rapid diagnostic test for malaria
USAID	United States Agency for International Development
WHO	World Health Organization

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Executive Summary

Background

The effects of malaria in pregnancy (MIP) in Burma are largely underestimated and include maternal anemia, miscarriage, stillbirth, and delivery of a low birthweight baby. The diversity in malaria transmission, endemicity, and species contributing to MIP (including *Plasmodium vivax*, *Plasmodium falciparum*, and co-infections with both species) complicates how the needs of all pregnant women are addressed.¹ Antenatal care (ANC) services, attended at least four times by 73% of pregnant women in Burma,² are an important platform for comprehensively addressing the needs of this special population, including MIP.

Very few studies have been conducted in Burma related to MIP. However, given that MIP impacts the mother, fetus, and newborn, it is important to identify the current strengths and gaps across the reproductive, maternal, and child health platform of care in order to improve maternal and newborn outcomes as Burma moves forward with updating and promoting policies and programming for MIP.

The Maternal and Child Survival Program (MCSP), funded by the United States Agency for International Development (USAID), is working closely with the Ministry of Health and Sports (MOHS) to implement programs to help meet the country's maternal and newborn health service-strengthening needs. As part of MCSP's work, an assessment of ANC services was conducted to better understand the current state of services related to the prevention and treatment of MIP during ANC. The assessment results are described in this report.

The goal of the assessment was to inform the development or revision, or both, of future policies, guidelines, and pre-service curricula and in-service training materials, recognizing that improved MIP strategies delivered through ANC, based on regional differences in malaria burden and species, may yield better outcomes. The purpose was to: understand the type of information solicited from pregnant women during history and physical exam and conveyed to them during counseling regarding pregnancy in general and MIP, specifically, at the time of ANC visits; and observe actual malaria case management of pregnant women presenting with signs and symptoms of malaria. This assessment builds on and complements the rapid review of MIP policies and guidelines in Burma—*Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*—that was carried out by the USAID-supported Maternal and Child Health Integrated Program in 2014 to: assess how national-level documents address regional differences; assess the documents' consistency with World Health Organization (WHO) guidance; and inform the development of future policies and guidelines.³

¹ Myanmar Ministry of Health. 2012. National Strategic Plan Malaria Prevention and Control 2010-2015.

² UNICEF, WHO. Countdown to 2015: A decade of progress for maternal, newborn and child survival. WHO website. <http://www.who.int/pmnch/media/events/2015/countdown/en/>. Accessed April 8, 2016.

³ Maternal and Child Survival Program (MCSP). 2014. *Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*. Washington, DC: MCSP.

Methodology

Data collection was carried out between October 18 and November 5, 2015. A sample of health workers were observed and also asked to respond to written clinical scenarios relating to case management of MIP to assess their knowledge of evidence-based guidelines. In addition, retrospective chart reviews of cases of pregnant mothers diagnosed with uncomplicated and severe malaria were planned to assess how cases were managed and recorded.

Convenience sampling was used to select five health facilities across each type of malaria transmission zone: Kayin State (high-malaria transmission); Mon State (moderate-malaria transmission); and Yangon Region (low- or no-malaria transmission). A total of 15 facilities were selected. Up to five health workers were assessed in each facility, and each health worker was assessed after having provided care for up to two clients. Because the sample size was configured based on convenience and resources, a formal sample size was not calculated for this assessment.

After obtaining informed oral consent from health workers and clients, data collectors observed the health worker while she or he provided care and counseling during an ANC visit. Data was entered onto paper-based tools during and immediately after each visit.

Findings

Forty-nine health workers from 15 health facilities were observed as they provided care and counseling to 96 ANC clients. All health workers were female and the majority were midwives, with an average of nearly 19 years of experience. Most had received an in-service training and update in ANC in the past three years, but less than half had received an update in the prevention of MIP in that timeframe. Sixty-seven percent of health workers believed that MIP was a problem in their areas. The majority of ANC health workers, while respectful to clients, did not provide comprehensive malaria care to pregnant women. This includes scoring low in the frequency with which they asked women about history of travel to malaria-endemic areas and signs or symptoms of malaria illness. No health worker provided long-lasting insecticidal bed nets (LLIN) to clients and counseling about use of the LLINs was alarmingly low at 4%. Only 28% of health workers counseled women about the need to seek care immediately if they had a fever.

Health workers' scores on the written clinical scenarios for uncomplicated MIP were low when it came to obtaining adequate histories but nearly all reported that they would obtain a rapid diagnostic test for malaria (mRDT) before providing treatment. Nearly two-thirds of providers appropriately prescribed an artemisinin-based combination therapy (ACT) but did so without obtaining pertinent information to establish gestational age. Client counseling, however, was adequate only about half the time. In the scenario for severe malaria, nearly all health workers reported that they would obtain an mRDT, nearly three-quarters made a correct diagnosis, but less than two-thirds provided the correct treatment. Over 80% correctly stated that they would refer the client immediately to a higher level of care.

No cases of malaria were observed in the facilities visited during the assessment period; thus, no observations of case management of MIP took place. In addition, no cases of MIP were identified in the preceding six months in facilities where chart reviews of case management of MIP were to be done; thus, this component of the assessment was not carried out.

Recommendations

Observations of ANC and performance on clinical scenarios indicated that a systematic approach to obtaining histories, performing physical exams, and counseling clients about pregnancy in general and malaria specifically needs to be reinforced. Given the challenges Burma faces with MIP and the prioritization of the government to address these challenges, an immediate next step should be a meeting with key stakeholders in the various divisions of the Ministry of Health and Sports and with implementation partners to disseminate, review, and plan actions based on the findings of this report as well as the report on *Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*. Specific recommendations to address the gaps identified in this report include:

- Bringing stakeholders together at the national level, including representatives from malaria; maternal, newborn, and child health; HIV/TB; commodities; and pre- and in-service educational institutions to update, harmonize, and disseminate national policies, documents, and educational materials related to the prevention and treatment of malaria to all levels of the health system
- Reviewing and updating pre-service and in-service ANC education and training materials and emphasizing a systematic approach to focused ANC, with an emphasis on history-taking, physical examination, and counseling
- Reviewing and updating the clinical components on the prevention and management of MIP during focused ANC, so that they include: screening for malaria illness at every ANC visit (history of travel, fever, other danger signs); diagnosis and treatment of malaria according to national guidelines (assessing degree of illness, appropriate diagnostic testing, and treatment by gestational age); and counseling (use of LLINs, danger signs, and immediate care-seeking)
- Adapting and utilizing existing job aids to assess women of reproductive age for malaria and prescribe correct treatment, based on pregnancy status and gestational age
- Updating village malaria workers and other community health volunteers to ensure that they counsel women in their communities about the need for early and continuous ANC, use of LLINs, danger signs of malaria, and other conditions in pregnancy
- Revising in-service and pre-service training materials to reinforce cross-cutting issues, such as respectful maternity care, clinical decision-making (e.g., malaria case management), and infection prevention to increase the overall quality of ANC services delivered
- Adopting health delivery standards for ANC at the national level and using the standards at all levels of the health system to improve the quality of ANC services, so that they serve as a platform for the prevention and treatment of MIP
- Advocating at state and regional levels for increased use of supportive supervision of ANC health workers so that once they receive updates in ANC and MIP, they can transfer new knowledge and skills to their workplace
- Assessing and strengthening the content of supportive supervision to ensure that health workers are encouraged by their supervisors to consistently screen for MIP and counsel women about prevention and timely treatment to improve maternal and newborn outcomes
- Advocating strongly with the National Malaria Control Program and Reproductive, Maternal and Child Health Divisions of the MOHS about the need for current information on prevalence of peripheral and placental maternal parasitemia, in the different malaria transmission zones, through targeted epidemiologic studies to develop strategies that will improve maternal, fetal, and newborn outcomes

Introduction

Background

While rates of maternal and newborn mortality have declined over the last 20 years in Burma, the country did not meet the 2015 targets for the United Nations (UN) Millennium Development Goals (MDG) 4 and 5 that relate to child and maternal mortality. The MDG target for maternal mortality was 130 deaths per 100,000 live births,⁴ but, as of 2013, the maternal mortality ratio in Burma was estimated at 200 per 100,000 live births. The current under-five mortality rate is 62 per 1,000 live births while the MDG target was 36 per 1,000 live births. Newborn mortality, at 43 per 1,000 live births,⁵ represents nearly 70% of mortality in children under five years of age. These indicators are higher than the regional averages and are attributable, in part, to challenges in the areas of human capacity development, public sector health service delivery systems, infrastructure, and community health systems.

In spite of significant advances, malaria remains a major health problem and threat to socioeconomic development in Southeast Asia. The World Health Organization (WHO) is supporting countries in its Southeast Asia Regional Office to reduce malaria cases and deaths by 85% and 75% respectively by 2020 relative to 2015 baseline and contain resistance to the anti-malarial drug artemisinin, with the long-term goal of eliminating the disease.⁶ Means to achieve this goal include promoting high-level regional political collaboration, finding mechanisms to address the financial gap, expanding access to high-quality medicines and technologies, ensuring universal coverage of key malaria interventions in priority areas, and accelerating research and development.⁷

The malaria burden in Burma is the highest among the six Greater Mekong subregion countries, where it remains a leading cause of morbidity and mortality. Out of 51.9 Million of total population, approximately 54% of the population lives in malaria risk areas (24% in high risk, 19% in moderate risk, and 11% in low risk areas).⁸ According to National Malaria Control Program, in 2015, Burma had 182,452 confirmed cases of and 37 deaths due to malaria.³ Malaria morbidity (per 1,000 population) and mortality (per 100,000 population) declined sharply from 24.4 and 12.6 in 1990 to 4.16 and 0.08, respectively, in 2015.⁹ *Plasmodia falciparum* and *vivax* are the major species of malaria parasite, and *Plasmodium falciparum* accounts for 65% of the malaria cases in Burma.⁵

In Burma, the severe effects of malaria in pregnancy (MIP) on the mother and fetus are largely underestimated. Only women displaying symptoms of malaria are routinely screened, and women living in malaria-endemic areas, who are more susceptible to MIP, may not show any signs or symptoms but still have malarial parasitemia. These women often remain undiagnosed, leading to negative consequences for the mother, fetus, and newborn.

Very few studies have been conducted in Burma related to MIP. One study conducted between 1998 and 2002 in the Thanton District Hospital found that the overall malaria prevalence was 12.3%; *Plasmodium falciparum* was detected in 62.71% of cases, *Plasmodium vivax* in 33.9%, and mixed infections in 3.39% of the cases.¹⁰ A 2002 study of fetal loss in pregnancy due to malaria showed that pregnant women with severe malaria had a risk for fetal loss that was 36 times higher than those with uncomplicated malaria, and pregnant women with uncomplicated malaria had a risk for fetal loss that was seven times higher than those asymptomatic for malaria ($p < 0.05$). Women with severe anemia

⁴ UNICEF, WHO. Countdown to 2015: A decade of progress for maternal, newborn and child survival. WHO website. <http://www.who.int/pmnch/media/events/2015/countdown/en/>. Accessed April 8, 2016.

⁵ UNICEF, WHO. Countdown to 2015: A decade of progress for maternal, newborn and child survival. WHO website. <http://www.who.int/pmnch/media/events/2015/countdown/en/>. Accessed April 8, 2016.

⁶ Myanmar Ministry of Health and Sports. 2016. Draft National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020.

⁷ Myanmar Ministry of Health. 2012. *National Strategic Plan Malaria Prevention and Control 2010-2015*.

⁸ Myanmar Ministry of Health and Sports. 2016. Draft National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020.

⁹ Myanmar Ministry of Health and Sports. 2016. Draft National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020.

¹⁰ Thida, Mya. 2002. Factors Influencing Fetal and Maternal Outcome in Pregnancy with Malaria in Thanton Township, Mon State, Myanmar. Dr. Med. Sc OBGYN thesis, Institute of Medicine I.

(Hb% < 7 gm) had a 10-fold increased risk for fetal loss than those without anemia.¹¹ A separate study in the states of Rakhine¹² and Eastern Shan¹³ revealed that 35% and 14% of women, respectively, attending antenatal clinic had clinical malaria. The states and regions identified with the highest incidence of malaria include Kachin State, Mon State, and the Mandalay Tanintharyi Region.¹⁴ Wide variations in prevalence of malaria parasitemia in women attending antenatal care (ANC) services were reported, ranging from 3% in the Tanintharyi Division to 37% elsewhere along the Thailand-Burma border, where the majority of women were asymptomatic and infected with *Plasmodium falciparum*.¹⁵

The Maternal and Child Survival Program (MCSP), supported by the United States Agency for International Development (USAID), is working closely with the Ministry of Health and Sports (MOHS) to implement programs to help meet Burma's maternal and newborn health service-strengthening needs. This ANC targets prevention and treatment of MIP during antenatal care to help inform MIP strategy as a component of maternal and newborn health services. It was designed to provide data that can be used for programmatic decision-making and for health services strengthening in Burma and will be shared with the various divisions of the MOHS, such as the Maternal and Reproductive Health Division and National Malaria Control Program, among others. This assessment builds on the USAID-supported Maternal and Child Health Integrated Program's report, *Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*. This rapid review of MIP policies and guidelines in Burma (Myanmar) assessed how national-level reproductive health and malaria control documents address regional differences in malaria transmission and how consistent these documents are with WHO guidance, and informed the development of future policies and guidelines.¹⁶

Objective of the Assessment

This assessment was carried out to inform efforts to improve maternal and newborn outcomes through increased coverage of high-impact interventions during pregnancy. It evaluated the content of routine ANC visits in three regions in Burma to better understand health workers' knowledge and skills related to ANC, in general, and MIP, specifically.

¹¹ Thida M, Tin TT. 2002. Factors associated with fetal loss in pregnancy with malaria. Presented at: Myanmar Health Research Congress. <http://www.dmrlm.gov.mm/publication/Goden%20Jubilee/Index%20of%20Research%20Papers.pdf>

¹² Tun MK, Thu TM, Nyein Z. 2005. Malaria in Pregnancy. Presented at: 13th Myanmar Mahidol Migration Center (MMC) 2005 Programmes.

¹³ Han KT, Kyaw M, Htut Y, et al. Malaria morbidity during pregnancy in Tarchileik. Presented at: Myanmar Health Research Congress 2004. <http://www.dmrlm.gov.mm/publication/Golden%20Jubilee/Index%20of%20Research%20Papers.pdf>.

¹⁴ Myanmar Artemisinin Containment Project

¹⁵ PMI Malaria Operational Plans (MOP) FY 2014

¹⁶ Maternal and Child Survival Program (MCSP). 2014. *Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*. Washington, DC: MCSP.

Methodology

Assessment Design

An observational assessment of health workers was conducted from October 18 to November 5, 2015, to understand the type of information solicited from clients during history-taking and physical exams, and what information was conveyed to them through counseling regarding pregnancy, in general, and MIP, specifically, at the time of ANC visits. This assessment examined the quality of ANC services provided in relation to evidence-based global standards.¹⁷ Observations of health workers who cared for pregnant women presenting with fever or other signs of malaria were also planned. Clinical scenarios relating to case management of uncomplicated and severe MIP were administered to health workers to assess their knowledge about these conditions. In addition, retrospective chart reviews of cases of pregnant mothers diagnosed with uncomplicated and severe malaria were planned to assess how cases were managed and recorded.

The facilities in each transmission zone were selected in collaboration with State and Regional Health Directors and malaria teams, with the only exclusion being districts, townships, or villages that were difficult to reach or had security issues. The states and region chosen represent the three different transmission zones as categorized by the MOHS (Figure 1):

- high malaria risk: Zone 1—Kayin State
- moderate malaria risk: Zone 2—Mon State
- low/no malaria risk: Zone 3—Yangon Region

These malaria-risk categories are in accordance with the National Strategic Plan (2010–2015) of Burma. High-risk areas are usually hyperendemic or holoendemic and mostly composed of hilly, forested environments where the main vectors are *Anopheles dirus* and *Anopheles minimus*. This environment ranges from Kachin State, through the Mandalay Region, to Mon State and the Tanintharyi Region in the south. The estimated population in the high-risk areas in 2011 was 21% of the total population. Moderate-risk areas, either coastal or plains, are usually mesoendemic. Coastal areas extend from Sittwe in Rakhine State to Dawei in the Tanintharyi Region, and through Ayeyarwady and Mon State; the main vectors are *Anopheles sundicis* and *Anopheles annularis*. The estimated population in the moderate risk areas in 2011 was 18% of the total population. Low-risk areas are usually hypoendemic plain areas and include the central-dry-zone belt of Mandalay, Sagaing, Magway, Bago, and Yangon Regions where the main vectors are *Anopheles culicifacies*, *Anopheles hyrcanus* and *Anopheles aconitus*. Epidemics are possible but malaria is generally sporadic in most towns in these areas. The estimated population in these areas in 2011 was 22% of the total population of Burma.

Figure 1. MIP assessment states and region in Myanmar



¹⁷ WHO. 2015. Integrated management of pregnancy and childbirth: Pregnancy, childbirth, postpartum and newborn care; a guide for essential practice. WHO website. http://www.who.int/maternal_child_adolescent/documents/imca-essential-practice-guide/en/. Accessed April 8, 2016.

Data Collection Methods and Tools

Clinical observations of health workers providing ANC in the selected facilities were conducted using performance checklists based on WHO and Burmese guidelines for ANC and prevention and treatment of MIP.

Sample of Facilities, Health Care Providers, and Record Review

ANC Observations and Responses to Clinical Scenarios

For practical reasons, observations were carried out in five facilities in each of the transmission zones; up to five health workers were observed in each facility. Facilities were chosen after consultation with the Regional and State Health Departments to ensure a variety of levels (health centers and district, township, and station hospitals) and feasibility of transport of data collectors to these sites. It was planned to observe each health worker during a maximum of two ANC visits. Thus, because this was a convenience sample, a formal sample size calculation was not performed. During the assessment, a total of 49 health workers were observed as they provided care to 96 ANC clients. Each health worker also responded to a clinical scenario on uncomplicated and severe malaria during pregnancy, as shown in Table 1.

Table 1. Description of sample of health facilities, health workers, observations, and clinical scenarios

Number of facilities	Number of health workers	Number of observations	Respondents to clinical scenarios
15	49	<ul style="list-style-type: none">96 (up to 2 observations per provider x 49 providers)	<ul style="list-style-type: none">Uncomplicated malaria: 49Severe malaria: 49

Record Review

One health facility per transmission zone was randomly selected to review and abstract case data from all pregnant women who were treated for malaria in the past six months before data collection. However, no cases of MIP were found in the previous six months in the selected facilities, so it was not possible to review records.

Training of Data Collectors

Eight health workers (doctors, midwives, and nurses) were trained as data collectors from August 24 to September 1, 2015. The training emphasized standardizing data collectors' skills in obtaining informed consent, protecting providers' and clients' privacy, collecting data using checklists during observations of health workers as they conducted antenatal care visits, interviewing health workers using the MIP clinical scenarios, and extracting data from clinical records. Due to a delay in conducting the field visits, a refresher session on the tools and orientation for the field work was carried out on October 16, 2015. Data collectors worked in teams of at least four and spent one day at each facility. Field work began on October 18 and ended on November 5, 2015.

Data Quality Control, Entry, and Analysis

Data Quality Control

Data collectors were instructed to complete data collection tools after every observation and before continuing to the next observation. They also kept a field diary, updated after each facility visit, to make relevant notes about their observations and clarify any questions with the field supervisors, the principal investigator, and co-investigators. At the end of the day, each data collection team and its supervisor counter-checked the data collection forms for completeness. The teams had regular communication with each other as well as with the principal investigator to provide updates on field work progress and discuss issues as needed.

Data Entry

A database was developed using MS Access software (Microsoft, Redmond, Washington, USA) and the data were entered by a team to mitigate data entry errors. The team supervisor checked the data entry process and a consultant double-checked the data completeness. The team also clarified any questions with the data collectors, the principal investigator, and co-investigators, as needed, during the data entry process.

Analysis

Descriptive statistics were used to report outcomes included in the ANC observation checklist to describe the frequency with which each element was performed by the health worker during ANC visits. For each clinical scenario administered, a total score of correct answers was arrived at for each health worker, as well as the frequency of correct answers for individual questions.

Ethical Review and Procedures

The study protocol was submitted to and approved by the ethics board of the Myanmar Ministry of Health and Sports, in the United States, by the institutional review board of the Johns Hopkins Bloomberg School of Public Health (JHSPH). The JHSPH institutional review board ruled the protocol to be non-human subjects research.

Findings

Description of the Sample

A total of 49 health workers were observed providing care to 96 ANC clients across 15 health facilities in three transmission zones in Burma. Table 2 provides information about health workers included in this assessment. All health workers were female, and 73% were midwives with an average of nearly 19 years of experience. Eighty-two percent had received an in-service training or an update in ANC in the past three years, but only 47% had received an update about prevention and case management of MIP.

The health workers were asked whether they believed that malaria was a problem where they work. Sixty-seven percent said yes, naming potential complications, such as spontaneous abortion, maternal anemia, pre-term delivery, and maternal and newborn death. Health workers from the high and moderate malaria transmission regions also noted that people living in these regions are often not educated on the dangers of malaria, and few use LLINs. Twenty-nine percent did not believe that malaria was a problem in their area, as they rarely saw cases in their facilities. All of these health workers were from the moderate and low transmission regions of Mon State or Yangon Region, respectively.

Table 2. Health care provider characteristics

Health care provider characteristics	Percentage of providers (%)	Number of providers (n= 49)
Sex		
Male	0%	0
Female	100%	49
Cadre		
Specialist	0%	0
General doctor	4%	2
Nurse	4%	2
Lady health visitor	16%	8
Midwife	73%	36
Other (PHS II)	2%	1
Experience profile		
Years of experience (mean; SD)	18.8; SD: 8.3	49
Proportion of health providers who received an in-service training on ANC in the last three years	82%	40
Proportion of health care providers who received an update in the prevention and case management of malaria in pregnancy in the last three years	47%	23

Of the 96 pregnant women observed receiving ANC during the assessment, 14% were less than 20 weeks gestation, and 85% were ≥ 20 weeks gestation. Sixty percent of first and subsequent visits were made at gestational ages greater than 20 weeks. As shown in Table 3, no cases of malaria were observed during the assessment period; thus, observations of health workers providing diagnosis and treatment of MIP were not possible.

Table 3. Antenatal care client characteristics

Client characteristics	Percentage of cases (%)	Number of cases (n= 96)
First visit	5%	5
Gestational age at visit		
< 5 months	40%	2
> 5 months	60%	3
Follow-up visit	95%	91
Gestational age at visit		
< 5 months	14%	13
≥ 5 months	60%	58
≥ 8 months	25%	24
Number of previous pregnancies	0 (32%) 1 (36%) 2 (17%) 3 (8%) > 4 (6%)	96

Respectful Maternity Care and History-Taking

Table 4 describes the components of respectful maternity care practiced by the majority of health workers observed. The practices included using visual aids (78%), speaking in easily understood language (100%), calling the client by the appropriate name and title (74%), and ensuring that clients knew when to return for the next visit (98%). Other components observed less often included greeting the client respectfully (14%) and introducing oneself at the beginning of the visit (5%).

Although all clients were asked about the number of previous pregnancies, a smaller number of them were asked about other components of their past obstetrical history, such as hemorrhage or anemia (0% of the time); high blood pressure (40% of the time); prior stillbirth (0% of the time); prior abortion or miscarriage (20% of the time); or cesarean section (20% of the time). Notably, only 20% of the clients were asked about a history of malaria and travel to malaria-endemic areas.

Table 4. Introduction and history-taking

Information asked for by health worker or mentioned by client	Percentage of cases (%)	Number of cases (N=96)
Client was respectfully greeted	14%	13
Health worker introduced herself or himself and title	5%	5
Health worker called the client by her appropriate name and title	74%	71
Health worker asked the client her age	90%	86
Health worker mentioned the presence of danger signs or problems the client has at the time of the visit	18%	17
Health worker asked the client about her number of previous pregnancies	85%	82
Health worker asked the client about medications she is taking	43%	41

Health worker asked the client about any of the following complications for prior pregnancies	Percentage of cases (%)	Number of multigravida first ANC cases (n=5)
Number of previous pregnancies	100%	5
Heavy bleeding before or after delivery	0%	0
Anemia	0%	0
High blood pressure	40%	2
Convulsions	0%	0
Malaria (or travel to malaria endemic areas)	20%	1
Multiple pregnancies (twins or more)	40%	2
Prolonged labor	0%	0
Assisted delivery	0%	0
Cesarean section	20%	1
Prior newborn death	20%	1
Prior stillbirth	0%	0
Prior abortion or miscarriage	20%	1

Health workers did not always ask about the presence of danger signs in the current pregnancy, including bleeding (7% of the time) and headaches or blurred vision (13% of the time). As shown in Table 5, in terms of screening for malaria and other infectious illnesses, only 9% of the clients were asked about the presence of fever (9% of the time) or other problems the client may be concerned about (10% of the time).

Table 5. Discussion of complications for current pregnancy

Information asked for by health worker or mentioned by client	Percentage of cases (%)	Number of cases (n=96)
Health worker asked the client about any of the following complications for the current pregnancy		
Vaginal bleeding	7%	7
Fever	9%	9
Headaches or blurred vision	13%	12
Swollen face or hands	7%	7
Convulsions or loss of consciousness	1%	1
Difficulty breathing	13%	12
Persistent cough for 2 or more weeks	8%	8
Severe abdominal pain	6%	6
Foul-smelling discharge, leaking of fluid, or both	11%	11
Frequent or painful urination	5%	5
Decrease or cessation of fetal movement	15%	14
Other problems client is concerned about	10%	10

Physical Examination, Tests, and Treatments

None of the health workers washed their hands with soap or used alcohol or glycerin hand rub prior to the examination. As shown in Table 6, during the physical examination, nearly all clients were weighed (99%), and all of them had their blood pressure taken (temperature is taken only if the client complains of fever or other symptoms that suggest infection but, as noted above, women were asked about history of fever only 9% of the time). While the fetal heart rate was listened to in almost all

cases (95%), in only 27% of the cases was the fundal height measured, and in 22% of the cases, the client's hands or face were examined for edema.

Table 6. Examination, tests, and treatment

Components of screening performed by health worker	Percentage of ANC cases (%)	Number of cases (n=96)
Health worker washed hands with soap or used alcohol or glycerin hand rub prior to examination	0%	0
Weighed client	99%	95
Took client's blood pressure	100%	96
Took client's blood pressure in lateral position	78%	75
Took client's blood pressure with arm at heart level	84%	81
Examined client's hands or face for edema	22%	21
Performed or referred client for urine test	53%	51
Checked for anemia	69%	66
Measured fundal height	27%	26
Listened to fetal heart rate	95%	91

In 95% percent of observations, health workers gave iron or folate to their clients, and nearly all health workers administered tetanus toxoid when it was indicated. However, in only 5% of the observations, health workers explained the purpose of the iron or folate; 43% of the health workers explained how to take it. Health workers explained the purpose of the tetanus toxoid vaccine in 3% of the observations. Notably, in only 4% of the observations did health care providers ensure that women owned or knew where to purchase an insecticide-treated bed net (national guidelines promote the use of LLINs during pregnancy, but they are not available in ANC clinics).

Health workers counseled their clients on birth preparation and recognizing danger signs to varying degrees: from 64% of the time, the counseling was about the place of delivery and use of a skilled provider; 27% of the time, the counseling was about breathing difficulties. As shown in Tables 7, 8, and 9, although nutrition was discussed nearly 60% of the time, breastfeeding and birth spacing were discussed less often—18% and 20% of the time, respectively.

Table 7. Preventive treatments

Preventive treatments prescribed or given to client during antenatal care visit	Percentage of cases (%)	Number of cases (n=96)
Iron or folic acid tablets or syrup	95%	91
Tetanus toxoid injection	66%	63
Insecticide-treated mosquito net (owned/knew where to purchase)	4%	4

Counseling

Table 8. Counseling on preventive treatments

Health worker's counseling tasks	Percentage of ANC cases (%)	Number of ANC cases (n=96)
Counseling tasks for iron and folic acid		
Explain the purpose of treatment	5%	5
Explain how to take iron and folic acid	43%	39
Counseling task for tetanus toxoid injection		
Explain the purpose of treatment	3%	2
Counseling on importance of using an LLIN	11%	11

Table 9. Other counseling tasks during antenatal care visits

Health worker's counseling tasks	Percentage of cases (%)	Number of ANC cases (n=96)
Counsels the client in any of the following areas to seek immediate medical care		
If she has vaginal bleeding	53%	51
If she has convulsions	36%	35
If she has severe headaches with blurred vision	41%	39
If she has fever	28%	27
If she has severe abdominal pain	43%	41
If she has fast or difficult breathing	27%	26
If she has other problems/concerns	29%	28
Asks client where she will deliver	64%	61
Advises the client to save money for delivery	47%	45
Advises the client to use a skilled health worker or come to the facility during delivery	60%	58
Discusses with client what items to have on hand at home for emergencies (e.g., sterile blade)	25%	24
Discusses nutrition and healthy eating during pregnancy	59%	57
Discusses breastfeeding	18%	17
Discuss postpartum family planning	20%	19
Advises client on when to return for next visit	98%	94
Uses visual aids	78%	75
Speaks using easy-to-understand language for the client	100%	96
Looks at client card (before or during consultation)	100%	96
Writes on client card	100%	96

Health Worker Performance on Clinical Scenarios

Health workers were given clinical scenarios and asked what they would do in the situations presented to them. Scenario #1 described a case of uncomplicated malaria during pregnancy:

“Ms. H. presents to your antenatal clinic (in Mon State, a zone of moderate malaria transmission) today for her first visit. You perform a rapid initial assessment and find that she complains of fever that began yesterday. She also notes generalized aches and pains that began today. She has no other problems in this pregnancy; this is her first pregnancy. Per the first day of her last normal menstrual period, you calculate that she is 16 weeks pregnant.”

The health workers were prompted with questions about their management of this situation. The question and the frequency of their responses are presented in Table 10.

In the discussion of the uncomplicated malaria scenario, health workers included recent travel (59%) and vital signs (65%) in their history-taking but did not include assessment of respiratory status (6%), neurological symptoms (0%), signs of anemia (41%), or uterine cramping/bleeding (10%). Nearly 80% of the health workers did not assess uterine size, but 96% of the health workers said that they would obtain an mRDT. In terms of treatment, 65% of health workers would have prescribed an ACT (the recommended treatment in the second trimester); the rest would have provided quinine and clindamycin, chloroquine and amoxicillin, or just symptomatic treatment. Counseling included use of prescribed medication (73%), when to return for follow-up (35%), and use of an insecticide-treated bed net (47%).

Table 10. Case management in malaria in pregnancy (MIP)—uncomplicated malaria

Case management of MIP	Percentage of providers (%)	Number of providers (n=49)
History-taking and physical examination: What will you include in your history and physical exam of Ms. H?		
Health workers included the following in their history-taking and physical examination of the client.		
General health history to include presence of uterine cramping or vaginal bleeding, or both	10%	5
Existing acute or chronic medical problems, or both	24%	12
Surgical history	0%	0
Medications taken during pregnancy	8%	4
Use of LLIN	22%	11
Recent travel	59%	29
Vital signs	65%	32
Neurological status	0%	0
Respiratory difficulty	6%	3
Signs of anemia (conjunctival or palmar pallor, or both)	41%	20
Uterine size	22%	11
Investigation: Which tests will you order for Ms. H?		
mRDT or blood Smear	96%	47

Case management of MIP	Percentage of providers (%)	Number of providers (n=49)
Diagnosis: What is your diagnosis?		
Diagnose as uncomplicated malaria at 16 weeks of pregnancy	39%	19
Plan of care: What is your plan of care?		
Prescribe an ACT (artesunate and lumefantrine or Coartem)	65%	32
Counseling: How will you counsel Ms. H?		
Take all medication prescribed	73%	36
Return to the clinic in 2 days for follow-up	35%	17
Return immediately if she notes prostration, weakness, persistent vomiting, respiratory distress, jaundice, cramping or bleeding, and other danger signs	49%	24
Use a LLIN every night	47%	23

Health workers were given a second scenario related to severe malaria. The scenario was as follows and related questions and responses are in Table 11:

“Ms. A., a 25 year-old primigravida at 28 weeks gestation, is brought to the outpatient department of the township hospital in Kayin State (a high malaria-risk zone). Ms. A. noted a fever 2 days ago. No tests were done but an antibiotic was prescribed, and she felt better until yesterday when she developed generalized weakness and confusion. Examination shows a semiconscious woman who is disoriented to time and place. She withdraws her hand from a painful stimulus but cannot localize a stimulus applied to the sternum or forehead. There is no neck stiffness, jaundice, or rash. Pallor of the conjunctiva and palms is marked. Axillary temperature is 38.5°C, pulse rate 90/minute, and the blood pressure is 100/60 mmHg. The uterine fundus is consistent with her dates (28 weeks). The fetal heart rate is 144 beats per minute. No contractions are noted and the cervix is not dilated.”

Table 11. Case management in malaria in pregnancy (MIP)—severe malaria

Case management of MIP	Percentage of providers (%)	Number of providers (n=49)
Investigation: What test is urgently required?		
mRDT or blood smear	98%	48
Diagnosis: What is your diagnosis?		
Severe malaria or cerebral malaria	73%	36
Plan of care: What is your plan of care?		
Administer a loading dose of parenteral artesunate	63%	31
Refer as soon as possible	82%	40

In terms of the scenario on severe malaria, 98% of the health workers said they would obtain an mRDT, 73% stated the correct diagnosis, and 63% stated the correct treatment. Eighty-two percent correctly stated that they would refer the client immediately to a higher level of care.

Further analysis was conducted to assess association between a health worker’s receipt of in-service training on ANC and performance on clinical scenarios. The results of the Mann-Whitney U test, for the total score on clinical scenarios among health workers who had been trained in ANC in the past three years and those who had not, showed a statistical difference ($p = <0.005$) where the mean total score of health workers trained in ANC in the past three years was 10.4 (SD: 2.6); the mean total score among health workers who had not been trained in ANC in the past three years was 7.11 (SD: 3.0) out of a possible total of 22 points.

Associations were also assessed by technical areas in the clinical scenarios (history and physical examination, investigation, diagnosis, plan of care, and counseling). In the first clinical scenario, there was a statistically significant difference between health workers who had received an in-service update and who ordered the correct test ($p = 0.031$, Fisher's exact test) and health workers who made the correct plan of care ($p < 0.001$, Fisher's exact test). Between health workers who had received an in-service update and those who had not, the Mann-Whitney U test for the score related to the correct development of a plan of care in the second clinical scenario showed a statistical difference ($p < 0.001$).

However, there was no difference in the mean score for taking history and physical examination in the first clinical scenario by whether health workers had been updated ($p = 0.210$). There was also no statistically significant difference between whether health workers: had been updated and made the correct diagnosis in the first clinical scenario ($p = 0.127$, Fisher's exact test); would order the correct test in the second clinical scenario ($p = 1.00$, Fisher's exact test); and made the correct diagnosis in the second clinical scenario ($p = 0.220$, Fisher's exact test). Between health workers who had been trained in ANC in the past three years and those who had not, the results of the Mann-Whitney U test for the score related to training and counseling in the second clinical scenario did not show a statistical difference ($p = 0.113$).

Limitations

This study has several limitations that should be noted. The sample size was not powered to find statistically significant associations on the performance of health workers on the clinical scenario based on their background characteristics or by malaria transmission zone. Observations of quality of care are subject to the Hawthorne effect, whereby the performance of a health worker could have changed as a result of being observed by the clinical observers.¹⁸ Facilities in which the observations took place were selected purposively, which may limit the generalizability of these findings.

¹⁸ Chen LF, Vander Weg MW, Hofmann D, et al. 2015. The Hawthorne Effect in infection prevention and epidemiology. *Infect Control Hosp Epidemiol.* 36(12):1444–1450. doi: 10.1017/ice.2015.216. Epub 2015 Sep 18.

Discussion

General Antenatal Care (ANC)

The findings from this assessment highlight the need to address current gaps in the delivery of comprehensive ANC services including MIP. This is not surprising and reinforces the findings from the Review of Policies, Guidelines and Training Materials¹⁹ that describes inconsistencies among national guidelines for prevention and treatment of MIP, especially in terms of promotion and distribution of LLINs and counseling about their use in ANC.

The quality of ANC observed during this assessment shows room for improvement. In general, health care providers included in this assessment provided respectful care to their clients, though most neglected to introduce themselves at the beginning of the visit; none washed her hands prior to examining the client, which is a cornerstone of infection prevention. Their scores were also low in the areas of history-taking for prior pregnancies as well as the current pregnancy (including travel to malaria-endemic areas and potential signs of malaria illness), which could lead to lower rates of detection of existing general health and obstetric conditions and could have an adverse effect on the pregnancy, including malaria. Nearly all health workers took the client's blood pressure, and temperatures were taken only if women noted fever. Since only 9% of health workers asked clients about a fever, it is possible that elevated temperatures and infectious illness, like malaria, were not diagnosed. The health workers performed incomplete physical exams, with less than one-third of the group measuring fundal height, an indicator of fetal growth.

Even though 67% of the health workers stated that MIP was a problem in their geographic setting, only 20% of the clients were asked about signs or symptoms of malaria, 4% were asked if they owned or had purchased an LLIN, and 28% of the clients were told that fever was a danger sign that warranted an immediate visit to the health facility. Only 11% of clients were counseled to use LLINs nightly. These results indicate a strong need to improve screening for malaria illness as well as counseling of women about symptoms of danger signs, especially fever and where to seek treatment if they occur. Of major importance is ensuring that women receive an LLIN during ANC visits or know how to purchase an LLIN, and then receive effective counseling on nightly use of LLINs.

Women in this study were not always provided with information that could be beneficial to them as they proceeded through their pregnancies. For example, insufficient explanation of the benefits and potential side effects of taking iron and folic acid is a key reason that many women discontinue use of these two medicines during pregnancy, increasing the risk of anemia and consequences from MIP. Low incidence of counseling about breastfeeding and postpartum family planning indicates missed opportunities to help women plan for these events. The development of an individual birth plan based on the client's situation can help her understand the importance of giving birth with a skilled provider and plan for complications; however, this assessment showed that a birth plan was not always discussed with clients. The use of the continuum of care or life cycle approach is one of the Burmese national strategies to address unmet needs of women and their families, and effective counseling should be recognized as a powerful tool that health workers should develop to promote women's health beyond the pregnancy.

Malaria Case Management

Since no cases of MIP were identified during this assessment, there was no opportunity to observe health workers performing malaria case management. Likewise, no cases of MIP during the previous six months were documented in the designated facilities; thus, record reviews of case management were not possible. However, use of clinical scenarios allowed assessment of knowledge about malaria case management for uncomplicated and severe malaria at the primary health facility level.

¹⁹ Maternal and Child Survival Program (MCSP). 2014. Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials. Washington, DC: MCSP.

During the discussion of the uncomplicated clinical scenario, although 96% of health workers said they would obtain a diagnostic test for malaria prior to treating, only 22% based their diagnosis and treatment on confirmed gestational age. The indicated treatment, an ACT, was recommended only 65% of the time, and health workers would counsel women on LLIN use less than 50% of the time. During the discussion of the scenario on severe malaria, nearly all health workers said they would obtain an mRDT, 73% correctly diagnosed severe malaria, and 63% said they would provide a loading dose of the correct drug, which is crucial prior to referral.

Some elements of diagnosis and treatment of MIP brought up during the scenario discussions were positively associated with whether the health worker had received an update on ANC in the preceding three years, specifically, recommendations to use a diagnostic test to confirm malaria and the appropriate medication for treatment. Associations were not found between the ANC update and improved history-taking, physical examination, or correctly diagnosing uncomplicated and severe malaria during the scenario discussions. Previous ANC updates also were not associated with the delivery of effective counseling to women about preventive measures for MIP. It would be worthwhile to review the training packages used in these updates to assess the adequacy of information taught to health workers, specifically the components dealing with screening, treatment, and counseling women about MIP.

Harmonization of national guidelines for ANC as a platform for the prevention and treatment of MIP could lead to revised in-service and pre-service training materials that include evidence-based best practices to prevent, identify, and manage the most common pregnancy complications encountered (including MIP) in the various Burmese regions. Periodic technical updates of health workers in ANC and MIP, along with regular supportive supervision that reflects current technical content in these areas, could help to address the gaps identified in this assessment.

Recommendations

Inconsistencies are evident in terms of information gathering, clinical decision-making, and client counseling during ANC that can lead to inadequate prevention, screening, diagnosis, and treatment of malaria and other conditions in pregnancy. Given the challenges Burma faces with MIP and the Burmese government's prioritization to address these challenges, an immediate next step should be a meeting with key stakeholders, as described below, to disseminate, review, and plan actions based on the findings of this report, as well as the report: *Malaria in Pregnancy in Burma: A Review of Policies, Guidelines and Training Materials*. Potential activities to address gaps include:

- Bringing stakeholders together at the national level, including representatives from malaria; maternal, newborn, and child health; HIV/TB; commodities; and pre- and in-service educational institutions to update, harmonize, and disseminate national policies, documents, and educational materials related to the prevention and treatment of malaria to all levels of the health system
- Reviewing and updating pre-service and in-service ANC education and training materials and emphasizing a systematic approach to focused ANC, with an emphasis on history-taking, physical examination, and counseling
- Reviewing and updating the clinical components on the prevention and management of MIP during focused ANC, so that they include: screening for malaria illness at every ANC visit (history of travel, fever, other danger signs); diagnosis and treatment of malaria according to national guidelines (assessing degree of illness, appropriate diagnostic testing, and treatment by gestational age); and counseling (use of LLINs, danger signs, and immediate care-seeking)
- Adapting and utilizing existing job aids to assess women of reproductive age for malaria and prescribe correct treatment, based on pregnancy status and gestational age
- Updating village malaria workers and other community health volunteers to ensure that they counsel women in their communities about the need for early and continuous ANC, use of LLINs, danger signs of malaria, and other conditions in pregnancy
- Revising in-service and pre-service training materials to reinforce cross-cutting issues, such as respectful maternity care, clinical decision-making (e.g., malaria case management), and infection prevention to increase the overall quality of ANC services delivered
- Adopting health delivery standards for ANC at the national level and using the standards at all levels of the health system to improve the quality of ANC services, so that they serve as a platform for the prevention and treatment of MIP
- Advocating at state and regional levels for increased use of supportive supervision of ANC health workers so that once they receive updates in ANC and MIP, they can transfer new knowledge and skills to their workplace
- Assessing and strengthening the content of supportive supervision to ensure that health workers are encouraged by their supervisors to consistently screen for MIP and counsel women about prevention and timely treatment to improve maternal and newborn outcomes
- Advocating strongly with the National Malaria Control Program and Reproductive, Maternal and Child Health Department of the MOHS about the need for current information on prevalence of peripheral and placental maternal parasitemia, in the different malaria transmission zones, through targeted epidemiologic studies to develop strategies that will improve maternal, fetal, and newborn outcomes

Conclusions

The information gathered in this assessment provides an excellent opportunity for the Ministry of Health and Sports and its partners to consider reviewing, revising, and disseminating policies, protocols, and health worker training materials on ANC and the prevention and control of MIP. These documents can be made consistent across malaria, maternal, newborn, and child health platforms at all levels of the health system, with the hope of strengthening ANC and MIP services throughout Burma.

As Burma moves forward with updating and advancing policies and programming for MIP prevention and control, it will be important to focus services across a reproductive, maternal, and child health platform of care. An understanding of the MIP burden, including variations in malarial endemicity and transmission across the country, differing *Plasmodium* species, and the effect on migrant populations, will need to be gained to ensure comprehensive coverage for all pregnant women.

Finally, fostering the partnership between national-level reproductive and child health and malaria control partners will be necessary to ensure effective program implementation, management, and technical oversight.

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