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Community-based delivery of maternal care in conflict-affected areas of eastern Burma: Perspectives from lay maternal health workers☆

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ABSTRACT

In settings where active conflict, resource scarcity, and logistical constraints prevail, provision of maternal health services within health centers and hospitals is unfeasible and alternative community-based strategies are needed. In eastern Burma, such conditions necessitated implementation of the "Mobile Obstetric Maternal Health Worker" (MOM) project, which has employed a community-based approach to increase access to essential maternal health services including emergency obstetric care. Lay Maternal Health Workers (MHWs) are central to the MOM service delivery model and, because they are accessible to both the communities inside Burma and to outside project managers, they serve as key informants for the project. Their insights can facilitate program and policy efforts to overcome critical delays and insufficient management of maternal complications linked to maternal mortality. Focus group discussions ($n = 9$), in-depth interviews ($n = 18$), and detailed case studies ($n = 14$) were collected from MHWs during centralized project management meetings in February and October of 2007. Five case studies are presented to characterize and interpret the realities of reproductive health work in a conflict-affected setting. Findings highlight the process of building supportive networks and staff ownership of the MOM project, accessing and gaining community trust and participation to achieve timely delivery of care, and overcoming challenges to manage and appropriately deliver essential health services. They suggest that some emergency obstetric care services that are conventionally delivered only within healthcare settings might be feasible in community or home-based settings when alternatives are not available. This paper provides an opportunity to hear directly from community-based workers in a conflict setting, perspectives seldom documented in the scientific literature. A rights-based approach to service delivery and its suitability in settings where human rights violations are widespread is highlighted.

Introduction

The delay of appropriate care (Thaddeus & Maine, 1991) is a key factor underlying the half million maternal deaths that occur annually worldwide (Ronsmans & Graham, 2006). International focus has been on a facilities-based health systems approach, the rationale being that in facilities (i.e. clinics, hospitals, etc) attendants can quickly provide all the components of comprehensive emergency obstetric care as needed (Campbell & Graham, 2006; Filippi et al., 2006; World Health Organization, 2005). However, debate over strategy continues, in particular because in some settings health systems are non-existent, poorly functioning, or inaccessible, making a facility-based approach prohibitive.

Where home birth is common and women either deliver alone or with traditional birth attendants (TBAs) and family members, mortality risks are highest (Lawn, Cousens, & Zupen, 2005; Ronsmans & Graham, 2006). Furthermore, the constraints to facility-based skilled attendance are intensified in conflict settings where resources and infrastructure are destroyed, supply chains are

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disrupted, and populations are often displaced. In these settings, alternative service delivery strategies that include community-based approaches must be explored.

The need for innovative approaches to maternal healthcare is acute in eastern Burma,[1] where coverage, utilization, and technical quality of facility-based care are grossly deficient (Sullivan, Sophia, & Maung, 2004). Healthcare spending by the military junta, the State Peace and Development Council (SPDC) is minimal (WHO, 2004), and the regime actively suppresses access to care in ethnic minority areas by attacking healthcare facilities and workers and restricting the humanitarian efforts of local and international organizations (Stover et al., 2007; The Global Fund, 2005). Mortality risk for both mothers (1000–1200 per 100,000 live births) and children (218 per 1000 live births) is high (Backpack Health Worker Team, 2006), and widespread human rights violations, such as forced relocation, destruction of crops, and forced labor (Thai Burma Border Consortium (TBBC), 2006) are directly associated with poor health outcomes (Mullany et al., 2007).

In response, a multi-ethnic collaborative of local community-based maternal and child healthcare organizations based on the Thailand–Burma border developed the "Mobile Obstetric Maternal Health Worker" (MOM) project to bring essential maternal and newborn health services directly to vulnerable communities, via a community-based approach. The initial multi-year effort (2005–2008) was led by health departments of Karen, Karenni, Shan and Mon states as well as Burma Medical Association and the Mae Tao Clinic in Mae Sot, Thailand. Although administered and monitored from directly across the border in Thailand, the MOM project's purpose is to increase access to maternal care inside Burma, specifically in 12 pilot areas (total population ~60,000) of eastern Burma. The project also aims to evaluate the feasibility and impact of community-based provision of evidence-based maternal health interventions.

Through the four ethnic health departments, the MOM project delivers care via three tiers of providers (Fig. 1). Closest to the community are the traditional birth attendants (TBAs), who work in collaboration with lay health workers (HWs). These two tiers receive technical support and oversight from a smaller tier of more highly trained ***maternal*** health workers (MHWs). Together, the three tiers form a service network that provides emergency obstetric care, blood transfusion, focused antenatal and postnatal care, and family planning services. While each area has one or more centralized community structures ("mobile clinics") where MHWs can offer services, the focus is on bringing services directly to women in the community, often in the home. Details of the program design have been previously published (Mullany et al., 2008).

The MOM project determined that in this community-based setting, a key element to improving maternal health outcomes was that MHWs be trained in obstetrical care to a level where they could manage the most common emergencies. Accordingly, MHWs participated in a 6-month training course designed specifically for the MOM project and led by a Burmese–Canadian physician and senior medics from the Reproductive Health Department at the Mae Tao Clinic, with technical advice from the Global Health Access Program (GHAP) and the Johns Hopkins Center for Public Health and Human Rights. Components of the clinical training are shown in Table 1.

Significantly, to ensure community access to these skilled services, MHWs were also trained in non-clinical skills including strategies for community mobilization and engagement, counseling, and training and supervising, as they were additionally responsible for training HWs and TBAs to provide subsets of these reproductive health services (Mullany et al., 2008). While security concerns severely constrain travel, MHWs aim to return to the project headquarters in Thailand from project sites in Burma on a bi-annual basis. These visits allow for skills updating, protocol standardization, restocking supplies, and information exchange regarding project implementation.

Delivery of maternal health interventions through this community-based approach presents numerous challenges and obstacles. While some of these (security issues, population movement, etc) may be specific to eastern Burma and other active conflict settings, others are common to a wider range of settings. In order to design improved implementation strategies for community-based approaches that can overcome the critical delays underlying poor maternal health outcomes, information is needed on the real experiences of workers trying to bridge the gap between women in the home and services provided in health facilities. While quantitative evaluation is needed to determine the degree of success in reaching program goals, this manuscript focuses solely on the perspective and experiences of the lay workers themselves. Through their experience, we highlight specific challenges that have been overcome and those that remain in order to extend access to essential interventions outside of health facilities. For context, we also describe characteristics of the MOM MHWs, outline their efforts related to community mobilization, and provide illustrative case studies of specific emergencies/events in this setting.

Methods

Details of the MOM project design, description of target pilot populations, organizational structure, implementation strategy, and monitoring and evaluation process have been previously published (Mullany et al., 2008). Here, MHW selection and prior training are briefly reviewed, and the methodology used to collect information from these MHWs about their experiences during project implementation in their communities is described.

MOM MHWs: selection, characteristics, and health training

Leaders of the community-based health organizations responsible for MOM project implementation selected 33 candidates to travel from the targeted pilot communities to the Mae Tao Clinic in Thailand for training. These trainees were the participants of this study. All MHWs were themselves members of the served communities, spoke Burmese in addition to local language(s), had completed at least 4 months of basic medical training prior to and independent of the MOM project training, and made a commitment to three years of service in their communities. The MHWs' health service delivery experience varied from reproductive health to primary healthcare, but all had worked for at least two years. Only 7 (21%) reported their previous training was specific to reproductive health, but most (28 of 33; 85%) reported some experience assisting deliveries before joining the MOM project. The average age at time of initial training was 26 years (range: 20–44), the majority (30 of 33, 91%) were female, and about half (17 of 33; 51%) had completed secondary school.

Data collection

At the conclusion of the training phase (July 2006), MHWs traveled back to their communities for the implementation phase. Return visits by MHWs to the MOM project headquarters in

[1] Burma is also known as the Union of Myanmar. We use Burma throughout this article as this is the term used by the communities from which these data were gathered.

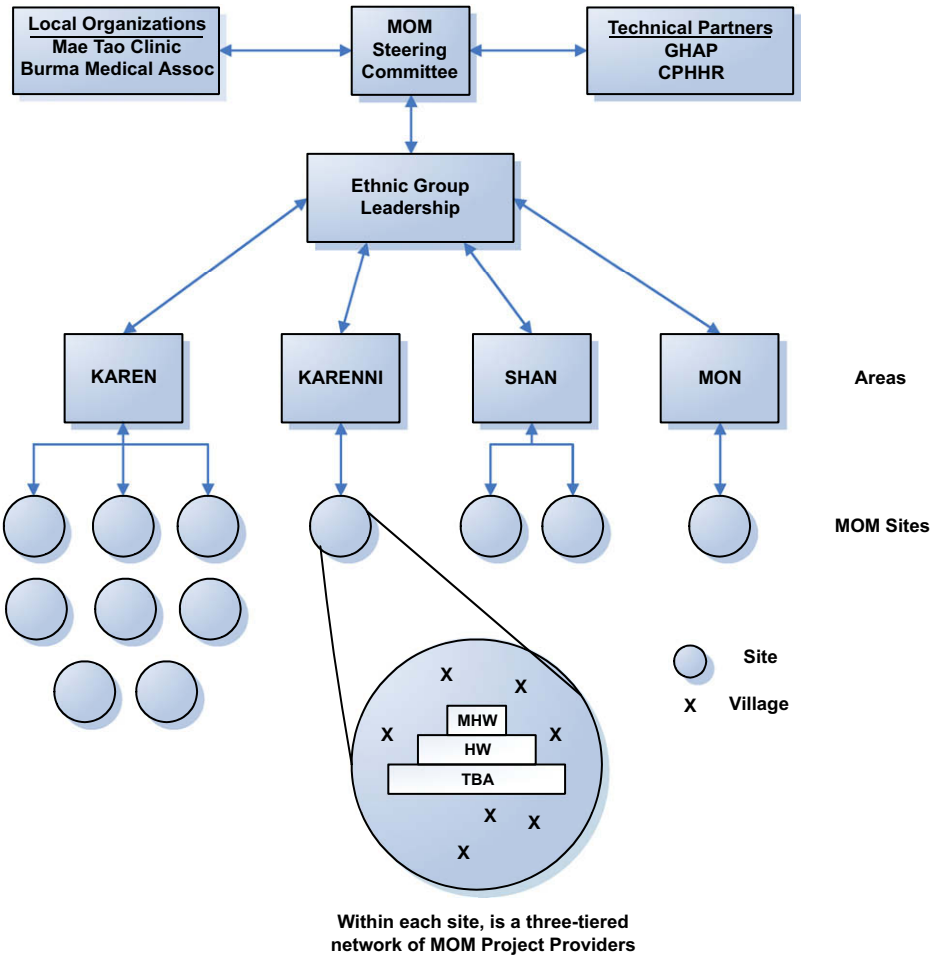

Fig. 1. Organizational diagram of MOM project showing overall steering committee, technical partners, local health organization, and a schematic of each pilot site and its corresponding three-tiered network of providers. GHAP: Global Health Access Program (www.ghap.org); CPHHR: Johns Hopkins Center for Public Health and Human Rights (www.jhsph.edu/humanrights).

Thailand for refresher training, progress reports, and re-supply were planned for February and October 2007. These visits were used to collect qualitative information from MHWs regarding implementation experience. For the February session 25 of the 33 MHWs returned (76%), and 8 were unable to do so due to security concerns. For the shorter October refresher training, 1 or 2 team leaders from each of the 12 pilot communities were asked to return; 18 of 19 (95%) were able to do so. Returning MHWs participated in focus group discussions ($n = 9$) facilitated by local MOM project staff and study investigators using a written guide. The 2.5-h sessions included 3–5 MHWs each, were conducted in Burmese with supplemental English discussion, and covered a range of topics, including: introduction of the project to the community, worker relationships with community members and leaders, collaboration with HWs and TBAs, specific intervention-related health topics (antenatal care, labor/delivery care, family planning, etc) and issues related to access and coverage. Hand-written notes were collected and discussions were audio-recorded (February only) to supplement the written notes. Discussions were translated and summarized in Microsoft Word by MOM project staff.

During the October session, an individual questionnaire form was completed by each returning MHWs ($n = 18$). The instrument included both closed- and open-ended questions focusing on relationships with stakeholders and community members, comfort level with service provision and counseling, specific problems related to supplies and logistics, and desired topics for additional training. Responses were entered into an electronic database (Microsoft Access). These forms enabled identification of specific case studies that were related to aspects of project implementation including provision and acceptance of services, and that highlighted handling of complicated cases and/or deaths of mothers and babies. MHWs that provided these selected case studies ($n = 14$) were followed up with an unstructured qualitative interview which documented the details of the case on a separate narrative Case-Report Form. These case-study interviews were audio-recorded, and then transcribed and translated into English by local MOM project staff. Initially collected as a valuable experience-sharing resource, the case studies stimulated further informal discussion among the MHWs and MOM project staff and leaders. Responses from the focus group discussions, interviews, and informal discussions were collated and categorized into four main areas: community mobilization and relationships; provision of emergency obstetric care/technical competence; security and logistical constraints; successes.

Approval

The process for collecting qualitative information from MHWs via focus group discussions and interviews, including obtaining informed consent, was approved by the Johns Hopkins Committee on Human Research and the MOM Monitoring & Evaluation

Table 1
Components of clinical training provided to MHWs.

Emergency obstetric care
• Intra-Venous (IV) and Intra-Muscular (IM) antibiotics
• Intra-Venous (IV) and Intra-Muscular (IM) magnesium
• Misoprostol as a uterotonic
• Manual removal of placenta
• Manual vacuum aspiration
• Vacuum extraction[a]
• Blood transfusion
Antenatal care
• Iron, de-worming, VDRL, malaria screening, insecticide-treated nets
• Education: nutrition, birth plan, danger signs, neonatal care
Postnatal care
• Kangaroo mother care
• Neonatal warming/wrapping
• Umbilical cord care (clean cutting; antisepsis)
• Delayed bathing
• Early/exclusive breastfeeding
Counseling on and provision of family planning services
• Condoms (male)
• Depo-Provera
• Combined oral contraceptives
• Emergency contraceptive pills

[a] Although one of the components of "basic" emergency obstetric care in which the MHWs were trained, vacuum extraction was not implemented in the MOM communities, as the training period was deemed insufficient (Mullany et al., 2008).

Committee, an ad hoc, independent border-based committee charged with overseeing monitoring efforts.

Results

Community mobilization and relationships

A community or client's trust in a program or its workers influences service-use both negatively and positively (Riewpaiboon, Chuengsatiansup, Gilson, & Tangcharoensathien, 2005; Russell, 2005) and, along with an individual's awareness of a service, is crucial in ensuring access (Thiede, 2005). When building trust to develop a successful healthcare program, all stakeholders (coordinators, providers, patients) should be involved in decisions, and two-way communication and solidarity emphasized (Gilson, 2003; Thiede, 2005).

The focus group discussions corroborate this literature on trust, as the majority of MHWs reported that positive relationships between themselves and other project providers (HWs and TBAs), village leaders and community members were critical for success of the project. MHWs described their efforts to form cooperative and trusting relationships by holding community meetings immediately upon return to their sites, and introducing themselves and the project objectives. MHWs from Karen, Karenni, and Shan project sites largely reported that this process facilitated acceptance and implementation. Mon MHWs, however, reported that a failure to have all-inclusive meetings and other forms of participatory communication with some key stakeholders prior to project implementation led initially to MHWs receiving delayed notification of some pregnancies, and occasional refusal from mothers to accept in-home services. Regardless of their success in achieving community trust and acceptance, MHWs from all areas identified early and open communication approaches as key elements in building positive relationships and influencing community attitudes toward provision of services.

MHWs' demonstration of their clinical abilities is similarly critical to acceptability (Gilson, Palmer, & Schneider, 2005). Described by a team leader from the Karen area, the following case study of provision of services within the context of a complicated labor, illustrates how direct demonstration of abilities might contribute to developing community confidence.

Case study 1

> *A 23-year-old woman went into labor with a TBA present. The MHW had spoken with this family before, but they didn't believe in her ability. It was clear after a point that the delivery was an emergency situation, at which point the TBA convinced the family to take the woman to the MHW. The woman presented with a stroke, hemoglobin level of 3, high blood pressure [suspected eclampsia], fits and seizures, and a coma, so the MHW gave her intra-muscular magnesium and 3 bags of blood. The woman and baby survived and are alive now… At the time of the emergency the family was very shy to bring the woman and ask for help. Now the family knows about the MHW's work and competency.*

In this setting, where higher level emergency obstetric care interventions may be new and/or unknown to the community, proof of technical competence is essential. In this case the team leader reported that the MHW provided life-saving medical care, but the mother was left with partial paralysis. It is not known whether the family's assessment of the quality of care provided by the MHW was congruent with the team leader's assessment of the MHW, or even if their assessment of the MHW's competency was positive. Improving acceptance and community confidence in MHWs' ability to deliver this level of care is a critical determinant in the provision of timely care—a lack of trust results in delays that cause increased morbidity and mortality.

Some MHWs reported barriers to instilling confidence in the communities they serve. One barrier faced by some MHWs, was their position in the community relative to TBAs. An MHW from the Karen area explained:

> *"Traditional birth attendants call for HWs and MHWs because they believe in their work and trust them, but (some) villagers still only believe in traditional birth attendants and don't really trust the skills of the [MHWs] right now because they are new and young."*

Greater trust in traditional community providers relative to facility-based or newly trained medics has been described in numerous settings (Bassey, Elemuwa, & Anukam, 2007; Nigussie, Mariam, & Mitike, 2004). As community members themselves, the solution likely lies in MHWs treating the TBAs with respect and building strong working relationships with them as partners with whom they share knowledge.

During a focus group discussion a Karen MHW described a case in which the family of a woman who required an urgent blood transfusion insisted on first performing a traditional religious ceremony with a healer, consuming time and increasing risk of a poor outcome. Fortunately, in this case, the woman received a transfusion and survived. Such traditional practices are highly valued by some community members and MHWs need to be cognizant of these practices and work to strengthen their relationships with associated traditional healers. Where positive, relationships with TBAs might be leveraged to improve communication between MHWs, traditional healers, and community members.

Relationships with community members (village leaders, church leaders, teachers, men, women, unmarried adolescents, TBAs, traditional healers), MHW team leaders, and Thailand-based MOM project were generally described positively (72.7% and 25.6% of all relationships were described as "good" or "medium", respectively). Among a total of 180 relationships assessed, 3 (1.6%) were reported as "bad" (2 with traditional healers; 1 with

adolescent males) and one was reported as "worsening" (traditional healer). Community-members' perceptions of these relationships might contradict or confirm the MHWs reports, and may vary substantially within sub-group, depending on individual interactions with the MHWs. Strained community interactions, when present, might reduce the likelihood of women accessing services from MHWs.

While recognizing this progress as ongoing, and dependent on community, MHW, and type of intervention, MHWs reported that demonstration of their abilities and open communication appears to have increased acceptance of the project by most communities. Acceptance and trust are seen as keys to increasing one of the major goals of the project: increased access to services. Experiences in provision of these essential services, including elements of emergency obstetric care in this setting where facility-based care is not feasible, are described below.

Provision of emergency obstetric care/technical competence

Access to emergency obstetric care is essential to reducing risk of maternal mortality; 50–75% of maternal deaths worldwide are attributed to complications (postpartum hemorrhage, sepsis, abortion complications, obstructed labor) requiring such care (Ronsmans & Graham, 2006). The MOM project focuses on community-based provision of five of the six components of basic emergency obstetric care, plus blood transfusion. (Although MHWs were initially trained in vacuum extraction, the sixth component of basic emergency care, limited opportunity for supervised practical training on this intervention has delayed implementation.) Furthermore, local HWs were trained to administer antibiotics and misoprostol, and TBAs to provide misoprostol for prevention of postpartum hemorrhage in certain circumstances (Mullany et al., 2008). By bringing these services directly to the community, often in homes, MHWs can potentially fill a critical need in this vulnerable population. During focus group discussions, MHWs recounted numerous emergencies where they faced challenges to successful implementation, including difficult terrain, inadequate transportation and communication infrastructure, and security concerns. A difficult but successful manual vacuum aspiration (MVA) procedure performed by an MHW from Shan area is described below.

Case study 2

> *A 41-year-old woman was twelve weeks pregnant with her fifth child. She had been experiencing vaginal bleeding for four days when she sought help from a village medic, who referred her to the MOM mobile clinic, to which she walked. When examining her, the MHW noticed a foul smell and pieces of the placenta on the cervix. The MHW started intravenous fluid and began performing manual vacuum aspiration. The MHW worked through the day and the next morning until all tissue was removed and vaginal bleeding was stopped. She gave the woman prevention doses of misoprostol and antibiotics, as well as counseling on family planning while the woman recovered.*

In this case basic emergency obstetric care procedures were successfully provided at the "mobile clinic", but more often women rely on the MHWs for in-home services. Beyond the basic procedures, MHWs can also provide community-based blood transfusion when needed. Blood transfusion is particularly important in these communities, where the consequences of postpartum hemorrhage are exacerbated by high prevalence of anemia in pregnancy due in part to endemic malaria transmission (Richards et al., 2007). Lacking blood storage capacity, the MOM project uses a "walking blood bank" where blood-type specific lists of potential future donors are maintained and, when needed, a sequential protocol for screening of blood using heat-stable rapid diagnostic tests is followed to identify a donor (Mullany et al., 2008). In the third case study, below, an MHW from Karen state performs a successful home-based blood transfusion during an obstetric emergency.

Case study 3

> *In a remote area of Karen state, a 28-year-old woman started bleeding vaginally as she neared her due date. After three days of bleeding, a relative walked three hours … to seek help from the local MHW. The MHW, along with a HW and TBA, returned to the woman's house and found her in a dangerous state – she was bleeding heavily, was extremely pale, and had a high pulse. The MHW immediately started intravenous fluid, mobilized relatives, and did rapid screening tests to find a suitable [blood] donor. Contractions started and the placenta expelled from the woman's vagina. A few minutes later, the stillborn fetus was delivered. The MHW gave the woman two units of blood and sat with the relatives as the woman stabilized. Later, she counseled the woman and her family on family planning and health education. The family was grateful to the MOM project – although the baby [died] they believe the mother was likely saved by the quick action and resourcefulness of the MHW.*

This case highlights the fact that MHWs have been able to provide, at the home level, an intervention normally considered feasible only in facility-based settings. Also highlighted, however, are the limitations of this approach. In this case, the life of the baby was not saved, and it is not clear from the MHW report whether or not anything further could have been done given the circumstances. Furthermore, the MHW report of the conclusions drawn by the family regarding the MHW's ability to provide essential care may not fully reflect the family's perceptions. She can only report that which the family initially stated, but given the death of the fetus, the family's position may be both deeply conflicted and changing with time. Despite these limitations, the case study does provide an illustration of the potential role of community-based delivery of emergency services in saving lives.

Security and logistical constraints

MHWs aim to make antenatal and postnatal care, family planning, basic emergency obstetric care and blood transfusion accessible to every woman in their target population. Security, logistical constraints, and acceptability of services, are obstacles to meeting this goal.

Security

Security concerns can substantially impact service provision in target communities located in areas of active conflict. A Karen MHW recalled:

> *"When we arrived back [from Thailand], we found the villagers in the jungle. For 3 months [villagers] moved around in the jungle based on news about SPDC activities. The whole village had been burned and destroyed. During those 3 months we provided antenatal care, counseling, and delivered babies – all without supplies. If there was a pregnancy or delivery, we would travel to that woman. TBAs would usually call us to come for delivery, but also villagers came for us. After 3 months it was decided that we would move to a new location across the river and rebuild the village. At that time, [MOM project] supplies started to come. Because of security only about 1–3 bags could be brought up per week."*

In this instance, MHWs stayed with their community and provided care with limited resources. Some villages within the

MOM areas have, however, occasionally become completely cut off from the provider network. An MHW from Karen state described how military movement limited access of MHWs to the population, shifting the burden of service delivery entirely to TBAs.

"*[MHWs and HWs] could not go to [village] for 3 months because SPDC came there. TBAs were in [that] village. If the SPDC heard that an MHW or HW went to [the village], the SPDC would come very quickly to that area because they know the health workers work with [Karen National Union]. If they went and the SPDC came, the SPDC would arrest, beat or kill the health workers. They might also burn the village. If they saw the medicine or the instruments, the SPDC would take it or destroy it. TBAs stay there a long time so there is no problem. The TBAs wrote on the [monitoring and evaluation] form very secretly and hid it.*"

This illustrates the exacerbation of the circumstances because of active conflict and how the flexible nature of the multi-tiered provider network was able to partially overcome security constraints and maintain coverage of some services.

Logistical constraints

Inadequate transportation and communication infrastructure delay notification of labor and travel to home to provide labor and delivery assistance. Eastern Burma is predominately hill country under dense jungle cover, with heavy monsoon rains and intensely hot dry seasons. The majority of target populations are reachable only by walking long distances, sometimes through harsh weather conditions. Often lengthy in-home stays by MHWs are necessary for extended monitoring of recovery. In the fourth case study, below, a Karen MHW describes how these difficult conditions contributed to an otherwise preventable maternal death.

Case study 4

A 33-year-old woman was 6 months pregnant with her first pregnancy. When the MHW visited the woman for antenatal care, the woman had high blood pressure, a urinary tract infection, was anemic, and had a hemoglobin level of 9. On the evening she started to deliver, no one came to get the MHW because of rainy season flooding. The baby was delivered quickly and lived, but the placenta was retained in the woman's vagina and she had postpartum hemorrhage. Early the next morning the village people came to ask for help, but the area was still flooded and the MHW could not get to her in time. The woman died.

During the group discussions, MHWs suggested numerous practical solutions to some logistical constraints, including the use of walkie-talkies for communication, donkeys for travel and transport of supplies, and headlamps for improved lighting needed during provision of services (for example, while conducting manual vacuum aspiration). While some solutions (e.g. headlamps) were implemented, others (e.g. donkeys) were not because of budget and procurement constraints.

Program successes

One area of success that MHWs reported was the improving collaboration across the three tiers of the MOM provider network. In the fifth case study, a Karenni MHW described how this cross-tier collaboration enabled successful management of a maternal emergency where facility-based care was not an option.

Case study 5

Only 6-months pregnant with her fourth baby, a 37 year old woman … started bleeding vaginally. After three days, the woman's family contacted the MHW, who went to the woman's home with two other MHWs, two HWs, and one TBA. When they arrived at the house they found the woman very weak and pale from heavy vaginal bleeding. After starting an intravenous drip, the MHWs induced labor. The baby was stillborn. The placenta smelled foul, so MHWs administered antibiotics. The woman went into shock [hemoglobin level 4.0], so the MHW administered 5 units of blood. When the team ran out of intravenous fluid, one MHW returned to the mobile clinic to get more. The MHW team leader stayed with the woman at her home for 6 days while she recovered, offering counseling and support. The family was very grateful to the MOM project team – they had no money for care and couldn't take the woman to a hospital even if they did.

This case study is one of numerous reported experiences from the field where cooperation among different tiers of workers in the MOM project led to improved health outcomes. The TBA provided initial antenatal care then worked with the HW and MHW during the emergency. While the collaborative effort is positive, the emergency might not have reached such a critical level if the original delay in care-seeking (contact by family occurred only after 3 days) had been avoided.

Collaboration between tiers, as exemplified above, has eventually enabled an expansion of the role of TBAs in some communities. For example, while initially TBAs were not charged with providing misoprostol, MHWs suggested during focus group discussions in February 2007 that the responsibility to administer prophylactic misoprostol be extended to TBAs in some communities. After further discussions among program leaders, an appropriate TBA-specific training module was developed, and misoprostol was distributed to TBAs.

Increased ownership over the project (as demonstrated by the MHW-led initiative to expand access to misoprostol), regular training and capacity-building workshops, and practical experience, has lead to increased confidence on the part of MHWs. In the individual semi-structured interviews in October 2007, the MHW expressed full confidence in their ability to provide emergency obstetric care procedures. However, some MHWs indicated discomfort in providing counseling on family planning ($n = 1$), breastfeeding/neonatal care ($n = 1$), HIV and other sexually transmitted infections ($n = 2$), and demonstrating condom use ($n = 2$). In response to these identified needs, subsequent workshops focused on counseling techniques.

Expansion of family planning services is another project accomplishment. Prior to the MOM project, open promotion of family planning was essentially regarded as illegal, especially in Karen State, partly for religious/cultural reasons, but also because of a widespread fear among ethnic leaders of "ethnic cleansing" related to the long conflict with Burma's military regime. Although restricted to counseling during antenatal, postnatal, and post-abortion care visits, MHWs were able to make substantial inroads into increasing the access to and use of family planning (male/female condoms, oral contraceptive pills, depot medroxy-progesterone acetate (Depo-Provera), and emergency contraception). This progress was sometimes attributed to their improving status in the community, as illustrated by the following quote from an MHW:

"…Village leaders [initially said] that contraception kills children; but after MHW explained and offered more information, the village leader tried a condom [and] liked it!"

MHWs generally identified the delivery of maternal health interventions as their most important role, but also took pride in their role as educators, leaders, and confidants/supporters of women in their community. One stated that her role as an MHW had transformed her into someone who "brings together families

and communities." In eastern Burma, where many face consistent violence and forced relocation, communities may feel a lack of physical and mental soundness. MHWs have a unique opportunity to provide "pragmatic solidarity" (Farmer & Gastineau, 2002) with their communities amidst conflict. Rather than just sentiment, they can offer useful services to the communities of which they are members. Their ability to act as a constant amidst the upheaval, offering consistent support and impartial care, was voiced by many MHWs as one of the most important successes of the MOM project.

Discussion

The observations and comments above provide insight into the experiences of the MHWs as they provide community-based, in-home maternal health services, including emergency obstetric care. While there have been previous reports of the experiences and perceptions of TBAs and peripheral facility-based health workers in relation to maternal health services, this current work adds to this domain in two specific ways. First, MHWs are working among communities of eastern Burma that have been displaced and some are doing so in areas of ongoing conflict. The importance of delivering a range of reproductive health services in conflict settings is becoming increasingly apparent (Krause, Meyers, & Friedlander, 2006; McGinn, 2000), yet little information is available on how health providers navigate the security and logistical constraints particular to such settings. Secondly, and perhaps more importantly for its broader relevance, these MHWs are, by necessity, providing services (emergency obstetric care) that are normally considered only possible within facilities. As provision of facility-based intrapartum care is not a credible near-term strategy in this and numerous other communities (Costello, Osrin, & Manandhar, 2004), the case studies presented here illustrate scenarios, challenges, and potential solutions that might be externally applicable.

There have been few efforts to provide elements of emergency obstetric care in home-settings. Rather efforts have been directed at recognition of danger signs so that care-seeking is not delayed, preparation of birthing plan with individual, family, or community resources to facilitate transport in the event of an emergency, and strengthening links between in-home providers (normally TBAs) and facility-based workers who can provide the needed emergency obstetric care (Fullerton, Killian, & Gass, 2005; Koblinsky et al., 2006). Notable exceptions include the emerging effort to prevent postpartum hemorrhage in the community through misoprostol use (Pfitzer & Sanghvi, 2004; Prata, Mbaruku, Campbell, Potts, & Vahidnia, 2005), improved blood loss measures (Prata, Mbaruku, & Campbell, 2005), and an anti-shock garment (Miller et al., 2006). In addition, the Home-Based Life Saving Skills program (Buffington, Sibley, Beck, & Armbruster, 2004; Sibley, Buffington, Tedessa, & McNatt, 2006) has explicitly recognized the need for home-based solutions. These efforts, as well as the provision of more complete emergency obstetric care, including blood transfusions outside of facilities as exemplified by the MOM project, offer an alternative approach to addressing the "three delays" in settings where facility-based care is not feasible. The individual stories and case studies presented here provide a compelling case for further exploration of expanded roles for community-based workers in severely constrained settings.

An adaptation of the "three delays" model (Barnes-Josiah, Myntti, & Augustin, 1998; Thaddeus & Maine, 1991) can provide a lens through which the experiences of the MHWs might be interpreted. The MOM project tries to address the first delay ("care-seeking decision") by increasing trust in MHWs, HWs, and TBAs and increasing community engagement with and ownership of the project. In this context, the second delay ("identifying and reaching medical facility") is addressed by offering community/home-based services and increasing communication between workers and community to promote attendance MHWs at the time of birth. Technical competence of workers and provision of supplies and support through refresher trainings from Thailand-based staff address the third delay ("receipt of adequate/appropriate treatment"). While the case studies presented here provide evidence that the MOM model can to some degree overcome these three delays, substantial obstacles and challenges remain. For example, in Case studies 3 and 5, above, the family delayed care-seeking for days before alerting the MHW of the heavy bleeding (delay 1), flooding prevented the MHW from reaching the home of a woman in need of services in Case study 4 (delay 2), and direct military action disrupted supply chains to the project area (delay 3).

The MHWs shared their experiences in building community acceptance of the MOM project with regard to worker roles (i.e. MHWs vs. traditional providers) and interventions (e.g. obstetric procedures, introduction of modern contraceptive methods). While stakeholder engagement and demonstration of competence are two fundamental concepts in achieving community trust in the MOM project and promoting increased access, negative security and logistical factors (distance, topography, weather) are obstacles to reaching that goal. Furthermore, a more refined framework for achieving improved access within a community-based program should consider other factors such as social norms surrounding care-seeking, perceptions of the seriousness of obstetric emergencies, gender and power relations, household-decision-making, and traditional practices (Kyomuhendo, 2003; Okafor & Rizzuto, 1994).

The MHW experiences also provide a unique glimpse into the additional challenge of conducting community-based programs in settings with widespread human rights violations (Karen Human Rights Group, 2006; Mullany et al., 2007). MHWs aim to deliver essential health services in these vulnerable communities while the military regime actively works to prevent services and targets healthcare workers associated with ethnic groups. In this context, the MOM project emphasis on empowering individuals and communities through multi-ethnic collaboration, expanding capacity of MHWs, engaging stakeholders, and local decision-making can be seen as a rights-based approach.

Programmatic and methodological limitations should be recognized. First, because access to HWs/TBAs and community members is severely constrained, and only MHWs can move across the border for interviews, direct case studies were limited to MHWs. While the voices of the MHWs indirectly include input from HWs/TBAs and community members, these other stakeholders themselves were not interviewed and their direct perspective should be included in future evaluations. Their exclusion prevents a more thorough discussion of other socio-cultural factors at the maternal, household, village, or TBA level that may play an essential role in maximizing access to care in this type of community-based model. The exclusion of other voices also prevents presentation of a more nuanced and community-wide view of the perceived progress of the project. For example, the MHWs often perceived those receiving care as "grateful" for their services, yet this perception might not be consistent with that of either the family members or the larger community. Also, often MHWs tended to highlight the more positive aspects of complicated cases that they handled. This may be understandable given the background context of high rates of adverse outcomes and perceived normality of a lack of any viable option for improved outcomes. However, it can also lead MHWs to overestimate progress made in demonstrating their abilities and increasing community trust and acceptance. Incorporating the perspective of the community members themselves is essential to fully understand how the MHWs' competency and array of services are viewed by the target

populations. Another limitation of this study is that among the entire pool of MHWs, those from the most security constrained regions were not able to attend either of the sessions. Thus data presented here may not represent the project experiences in its most challenging areas.

These limitations preclude using the experiences of MOM project workers, as directly related by the MHWs, to evaluate the progress of the MOM project. Such progress, including estimating improvements in coverage to basic services, and attendance at delivery by individuals capable of delivering components of emergency obstetric care, will be measured through population-based surveys and routine data collection procedures built into the program. These case studies are not intended for this purpose. Rather, they provide contextual information from lay providers and highlight real-world obstacles and challenges that might be faced when implementing community-based approaches to healthcare delivery in a conflict setting.

Conclusions

The MOM project has established a community-based, multi-tiered, flexible, and mobile network of providers aimed at increasing timely and appropriate access to essential maternal health interventions including emergency obstetric care. When asked about the future of the MOM project, one MHW exclaimed: *"We must continue until no maternal death!"* While working toward this ambitious goal, MHWs are increasing their own capacity and serving a vital role in their communities. The experiences related here illustrate aspects of this innovative multi-ethnic collaborative effort to provide a feasible context-specific alternative to the more narrowly defined facility-based intrapartum care model, which would arguably be less effective given current realities on the ground.

While a more complete understanding of the impact of the project awaits a quantitative evaluation, interim analysis of adequacy surveys indicates that malaria screening and treatment during pregnancy, receipt of insecticide-treated nets and iron/folate supplementation, attendance at delivery by individuals (MHWs) with capacity to provide emergency obstetric care, and access to prophylactic misoprostol have increased from near zero levels at baseline to approximately 70% (Lee et al., 2008). The narratives presented here complement these quantitative results, by illustrating both the context and the possible mechanisms by which progress is achieved. In particular, they illustrate how trust in MHWs and MOM project interventions takes time and builds from community engagement, strong relationships, and proof of technical competence. MHW narratives of emergency cases that were handled successfully suggest that expansion of the types of medical and health workers that can provide services is possible, even in these difficult settings, where perhaps such expansion is most essential.

This paper offers an important opportunity to hear directly from community-based workers in a conflict setting, voices that are not often documented in the scientific literature. Case studies suggest that ownership and decision-making power for both project personnel and community members (e.g.: ethnic leader input into program design; misoprostol use for TBAs), paralleled with material support from the MOM project (e.g.: supplies), create a balanced community-based, rights-based approach to healthcare that allows for "pragmatic solidarity" and challenges the burden of human rights violations and lack of facility-based healthcare in eastern Burma.

Although the MOM project was designed specifically for the unique conflict situation of eastern Burma where largely homogenous populations in target sites and solidarity against a common foe may increase trust in the project and its workers, the project model might further inform the overall design of healthcare delivery programs in similar conflict and other very low-resource settings elsewhere. The model may also have utility in non-conflict settings with similar topographical, resource, and human-capacity constraints, thereby helping others develop solutions to the critical shortage of human resources, an issue that must be addressed in order to meet the millennium development goals 4 (child mortality) and 5 (maternal mortality) (World Health Organization, 2006).

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