Models of Skilled Attendance in Rural and Resource-Poor Settings: A Review of the Literature

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Mujeres Enlazadas/Aliadas, Intern, June-August 2009

Introduction

Pregnancy and childbirth in resource-poor settings carry significant risk of death and disability. In 1985, the World Health Organization (WHO) announced that approximately 500,000 women die each year from obstetric complications, with upwards of 90% of these deaths occurring in the developing world (Starrs, 2006). For women in sub-Saharan Africa, where maternal mortality rates are highest in the world, the lifetime risk of dying during pregnancy or childbirth is as high as 1 in 16 (WHO, 2005). In response to the growing concern over these staggering statistics, the United Nations Population Fund (UNFPA), the World Bank, and the WHO sponsored the Safe Motherhood Conference which galvanized an international campaign to reduce maternal mortality (Starrs, 2006). This movement is supported by the United Nation's Millennium Development Goals, the fifth of which is to "improve maternal health" (WHO, 2005). The target of Millennium Development Goal 5 (MDG5) is to reduce the maternal mortality ratio by 75% between 1990 and 2015 (WHO, 2005). To achieve this target, the global task is considered twofold: (1) every delivery must occur in the presence of a skilled attendant and (2) every woman who has an obstetric complication must receive care either in a basic or comprehensive emergency obstetric care facility (Freedman, 2007).

The WHO defines a skilled attendant as:

"an accredited health professional—such as a midwife, doctor or nurse—who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth, and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns" (WHO, 2009).

In addition to the MDG5 target, which deals with maternal mortality broadly, the United Nations International Conference on Population and Development set specific targets for skilled attendance at births. By 2015, the global target for skilled attendance is 90%, and for countries with the highest maternal mortality ratios, the target is set at 60% (Stanton, 2007).

The effort to ensure skilled attendance has taken many forms. In Nepal and Guatemala, existing traditional birth attendants are trained to employ sterile technique (Freedman, 2007; Goldman, 2003). Mozambique's Ministry of Health has trained and deployed non-physician surgical technicians to rural areas to perform obstetric surgeries in the event of complications during childbirth (Freedman, 2007). In Afghanistan, where there were fewer than 500 midwives nationwide in 2002, an extensive competency-based midwifery training program has more than doubled the midwifery workforce to date (Currie, 2007). Malawi has begun to provide training in midwifery skills to a proportion of its community health workers, known as District Health Officers (Fauveau, 2008). In Burkina Faso, NGOs like Family Care International have mobilized village chiefs and traditional leaders to visit women in their communities and urge them to give birth in a local clinic where skilled care can be received (Freedman, 2007).

Clearly, there is no single model that has been used to increase skilled attendance internationally. However, the authors of the Lancet's 2006 Maternal Survival Series (Freedman, 2007) argue that an ideal strategy does, indeed, exist. This strategy employs health workers with midwifery skills – preferably midwives and nurse-midwives – who possess the ability to facilitate normal births at a basic health facility, to recognize and manage certain obstetric complications, and to refer women to a more comprehensive care center in the event of an obstetric emergency. In order to generate the human capital necessary to carry out this strategy, two general models of skilled attendant training are employed. In the first model, students participate in specialized midwifery education programs that aim to create a new workforce of trained midwives to be deployed to resource-poor areas where they attend to deliveries in clinical

and home settings. In the second model, previously untrained traditional birth attendants (TBAs) are mobilized and provided with short-term training that aims to discourage harmful practices, encourage sterile technique, and provide competency in managing normal births and in recognizing obstetric complications. These two models are not always mutually exclusive; numerous midwifery models also engage local traditional birth attendants in order to unify a community's birthing infrastructure around common practices. While the midwifery model is largely preferred over the TBA model, the merits and pitfalls of both—as illustrated by the experience of a variety of developing nations—shall be discussed.

Theory: Essential Elements for Scaling Up Skilled Birth Attendance

Until recently, there has been little agreement on what a scaled-up skilled birth attendance program should entail. Based on their critique of the Indonesian village midwife program, Shankar *et al.* (2008) suggest a theoretical framework of eleven essential elements and monitoring points for scaling up skilled attendance in the developing world. The overarching themes in this framework tend to recur throughout the literature, suggesting a consensus among researchers who have examined a variety of skilled attendance models.

The first essential element is "support:" governments should create policies and allocate resources for skilled attendants that promote steady employment and retention in remote and rural areas. The second element is "systems," which involves the creation of strategies to integrate skilled attendants into existing health systems, or to create new health systems within which skilled attendants can operate. Thirdly, a comprehensive plan for the "sustainability" of the program must be generated and assessed for viability. The fourth point focuses on establishing extensive, competency-based "training" programs. Next, individuals who complete their training must receive "certification" and regularly undergo re-licensing procedures. Once a skilled birth attendant is deployed to a community or health facility, there should be a clear scope of what their "responsibilities" entail, which often requires establishing a formal job description. Skilled birth attendants should also have "realistic workloads," in which tasks are appropriate to the training received. Regular "supervision" should be built into the operations of a program such that a framework for mentoring and continuing education exists. In order to engage the community in which skilled birth attendants' services are provided, formal community "participation" in the monitoring and evaluation of services should be encouraged. Furthermore, a formalized "monitoring" process should continually measure quality of care and health outcomes. Finally, the program should undergo "modification" in the event of changes in the environment.

Two countries that have made vast improvements in maternal health by investing in sustainable skilled attendant models are Malaysia and Sri Lanka; these countries' respective programs have encompassed most, if not all, of the above elements. Unlike most programs currently under development, the Malaysian and Sri Lankan midwifery programs developed concomitantly with the wider healthcare system. Despite this major difference, Malaysia and Sri Lanka's successes carry important lessons of how to establish and sustain a scaled-up skilled birth attendant program, which are outlined by Pathmanathan & Liljestrand *et al* (2003) in *Investing in Maternal Health: Learning from Malaysia and Sri Lanka.*

Learning from Malaysia and Sri Lanka

Malaysia

Between 1949 and 1995, skilled attendance in Malaysia increased from 30% to 90%. This dramatic rise in skilled attendance occurred in three phases. During the initial phase, which spanned from 1945 to 1956, legislation was passed to professionalize midwifery, requiring

trained midwives to obtain certification and to register under the Midwives Act. The professionalization of midwifery occurred alongside the development of a large network of urban Maternal and Child Health (MCH) clinics, ensuring employment for midwives following training. From 1957 to 1975, the second phase was characterized by the rapid establishment of rural health services: 1,280 new midwifery clinics were built, and were supported by a network of 256 small health subcenters and 65 main health centers. While delivery at midwifery clinics was encouraged, midwives also attended the majority of rural home births during this time. In order to facilitate community partnerships and promote the use of midwives' services in rural areas, home deliveries and antenatal care provided by government midwives were free of charge. In addition, midwives provided 10 days of free postnatal care in the client's home. Finally, from 1976 to 1989, skilled attendant coverage increased to 90%, with a considerable proportion of women in rural areas giving birth in public sector hospitals. By 1988, all rural midwifery practices were standardized, recorded, and distributed in a manual of clinical procedures and protocols.

Following this third phase of development, the current midwifery workforce consists of certified nurse-midwives and public health nurses. In Malaysia, there is no direct entry program in midwifery studies; the path to graduate studies as a midwife begins with eleven years of general education, in addition to three years of nursing school. Following three years of training and registration as a nurse, a one-year midwifery course must be completed at a program accredited by the Midwifery Board of Malaysia and Malaysia Qualification Agency. This course entails rigorous clinical training, with 9 months spent in a hospital setting and 3 months spent in home settings. The training program curriculum is periodically assessed and adjusted by the Midwifery Board. Upon completion of this course, the Board conducts a standardized registration examination for all midwives, at which point certification is provided. With one additional year of training in public health, a nurse-midwife can qualify to become a public health nurse.

Once certified, nurse-midwives and public health nurses are deployed into the public sector and become the backbone of primary care services in rural Malaysia; they conduct all antenatal and child health clinics, provide basic health education to communities, and conduct all normal deliveries. While nurse-midwives are facility-based, they may also attend home-births; in the event of a complication during a home-birth, the skilled birth attendant conducting the delivery is supported via telephone by her peers stationed at a clinic. One of the other main responsibilities of midwives working within communities is to mobilize local leaders and educate them about the potential dangers of pregnancy and childbirth, such that they may urge women to deliver in local clinics or hospitals. In order to ensure a high quality of care, the Midwifery Board regularly monitors and evaluates the services provided by nurse-midwives.

When midwives were initially deployed, they were often not the only birth attendants operating within a given community. Until 1960, untrained traditional birth attendants handled almost 60% of births in rural Malaysia. With the presence of trained midwives threatening the livelihood of these traditional birth attendants, the Malaysian government facilitated a partnership between them. First, traditional birth attendant practices were extensively studied and classified as being (1) harmful and to be discouraged, (2) beneficial and to be encouraged, and (3) neutral and to be left undisturbed. Then, TBAs were trained to avoid harmful practices and were persuaded to provide child-birth related services like postnatal massage while a nurse-midwife oversaw the entire birthing process. Cash incentives were also provided for every delivery that a TBA assisted and did not conduct herself. By the 1990s, the responsibility of

conducting deliveries within rural communities completely shifted from TBAs to trained midwives. As a result of these maternal health interventions, Malaysia's maternal mortality fell from approximately 275 per 100,000 live births in 1947 to 41 per 100,000 live births by the year 2000 (UNICEF, 2004).

Sri Lanka

Much like Malaysia, Sri Lanka integrated midwives into its healthcare system from the earliest stages of its development; this early focus upon skilled attendance is credited with reducing the maternal mortality from 600 per 100,000 live births in 1950 to 60 per 100,000 live births in 2000 (WHO, 2000). The foundation of Sri Lankan health services is an extensive network of Health Units that are evenly dispersed throughout the country. The Health Unit is a geographic area of specified population—currently 60,000 individuals—that is subdivided into smaller wards known as Public Health Midwife (PHM) areas. Each PHM area is served by multiple field health centers staffed by Public Health Nurse-Midwives and Public Health Midwives. All activities of the Health Unit are overseen by a community physician known as the Medical Officer of Health; this individual supervises the Public Health Nurse-Midwives working in each PHM area, and each Public Health Nurse-Midwife supervises the Public Health Midwives with whom she works. The Medical Officer of Health also conducts a monthly staff conference, the goal of which is to assess health outcomes and the quality of all health services, to discuss any relevant health issues in the community, and to provide periodic refresher trainings for the staff. Overall, the Health Unit model in Sri Lanka has established a built-in institutional network that confers access to healthcare across the country, opportunities for continual education and guidance for all healthcare providers, as well as an opportunity for referral of patients whenever necessary.

Decades before Health Units were established in Sri Lanka, legislation was enacted in 1897 to require individuals who practiced midwifery to register and undergo training in accordance with a curriculum prescribed by the Sri Lankan Medical Council. Currently, there are two pathways to entry into midwifery training: direct, which yields Public Health Midwives, and indirect, which yields Public Health Nurse-Midwives. To qualify for either course of study, an individual must complete 13 years of schooling. The direct-entry midwifery program entails 18 months of training. The first twelve months involve preclinical training at a school of nursing, followed by six months of clinical training at a field training site. In order to qualify for the final examination, Public Health Midwives-in-training must observe 10 normal deliveries, conduct 20 normal deliveries under supervision, assist 5 abnormal deliveries, and oversee care of 25 healthy infants and 10 ill infants. In order to become a Public Health Nurse-Midwife, an indirect course of study is required: three years of training as a nurse, followed by six months of additional clinical midwifery training.

Once midwives have completed their training, they are deployed to a Health Unit, and are responsible for overseeing maternal healthcare within designated PHM areas that each serve a population of 3,000 to 5,000. While Public Health Nurse-Midwives are responsible for supervising the activities of Public Health Midwives, the division of labor between them is not made clear in the literature. On the whole, midwives are responsible for visiting the homes of pregnant women in the community, registering them for care, and persuading them to attend field health centers for antenatal care and delivery. They oversee deliveries at home and in the field health center, and work alongside physicians in the field health center to provide basic maternal and child healthcare. Many midwives live in the villages that they serve, which fosters essential community partnerships. As a result, these skilled birth attendants not only ensure that care is

provided at the community level, but they also ensure access to the next tier of care—the field health center.

For countries that do not boast high GDPs, the Malaysian and Sri Lankan midwifery models clearly illustrate the tangible reductions in maternal mortality that can be achieved by targeted investment in maternal health, particularly in the training of skilled birth attendants. In these models, midwives serve as a cornerstone of community health within a greater framework that ensures their employment and supports them through an extensive referral network. The strengths of the Malaysian and Sri Lankan systems are made even clearer when compared to the Indonesian midwifery model; while the Indonesian village-based midwife program made a concerted effort to scale up skilled attendance through a national policy of one midwife per village, it lacked the financial and infrastructural support to which the Malaysian and Sri Lankan programs' successes are attributed. Thus, the Indonesian midwifery model provides an equally important perspective of the substantial challenges that can be faced when establishing a skilled birth attendant program.

The Indonesian Midwifery Model: The Village-Based Midwife Program

Given the successful reduction of maternal mortality in its neighboring Malaysia, Indonesia turned its focus to increasing its midwifery workforce in 1989 by instating the Indonesian Safe Motherhood Initiative. This initiative put forth a one midwife per village policy; for larger villages, the policy was amended to one midwife per 1000 population. Between 1989 and 1996, Indonesia's Ministry of Health midwifery education program trained and deployed approximately 54,000 midwives, increasing midwife density from 0.2 per 10,000 people in 1986 to 2.6 per 10,000 people in 1996 (Shankar, 2008). By 1996, approximately 96% of Indonesian villages were assigned their own midwife, who was, in theory, trained to provide antenatal and postnatal care, family planning guidance, nutrition counseling, and immunizations (Achadi, 2007). Despite this rapid, large-scale deployment of skilled attendants, Indonesia's maternal mortality ratio remains high, at 310 per 100,000 live births (UNICEF, 2004). This stagnation is attributed to poor quality midwifery training, lack of continued governmental support following deployment, and low uptake of midwifery services within communities (Shankar, 2008).

Midwifery education in Indonesia entails three years of training as a nurse, followed by one year of training as a midwife. This final year of training focuses on teaching three core clinical competencies: care for normal birth, basic emergency obstetric and neonatal care, and post-abortion care. Although Indonesia utilizes a competency-based approach of midwifery education—which is currently the most preferred training model—90% of the country's midwives receive no continuing professional development (Hennessy, 2006). As a result, they are unable to maintain a minimum level of competency in necessary clinical skills such as infection prevention, manual removal of the placenta, and neonatal resuscitation. Less than three years after completion of their training, only 6% of practicing midwives in the Indonesian province of South Kalimantan could correctly address more than 60% of questions on a knowledge test conducted by a US education and training institute (Koblinsky, 2003). Since 2003, improvements in midwifery training have been made. The Clinical Performance Development and Management System for Nurses and Midwives in Hospitals and Community program now regularly reviews all midwifery curricula and enforces a formal set of professional standards (Hennessy, 2006).

Once midwives complete their training, they are deployed to villages with a three-year government contract. Upon completion of their contract, midwives are expected to establish

private practice within the communities in which they are stationed, even though they do not receive any education on client interactions or how to create a sustainable business model. As a result, after three years of practice, most midwives find themselves without formal job support or supervision (Shankar, 2008). Furthermore, in the face of the sudden growth in the number of midwives in Indonesia, most communities remain unwilling to utilize their services, preferring to deliver at home or with the assistance of a traditional birth attendant (Koblinsky, 2003). Not only are midwifery services underused, but they are misused as well; in a recent survey of Indonesia's midwifery workforce, 60% of respondents claimed that they routinely engaged in cleaning activities (Hennessy, 2006). Although the Indonesian government stipulated in the Midwifery Ministerial Decree of 2000 that only trained midwives should be responsible for deliveries, untrained traditional birth attendants still perform upwards of 34% of all deliveries (Hennessy, 2006). Therefore, even as training standards improve, uptake of midwifery services may not increase.

One Indonesian district is currently working to transition birth attendance from traditional practitioners to certified midwives. In the Ngawi district in East Java, cash incentives amounting to $12 are provided to traditional birth attendants who refer pregnant women to village midwives for antenatal care and delivery (Analen, 2007). TBAs are also provided with cash incentives when they assist midwives during deliveries, thus fostering a collaborative partnership between all birth attendants, skilled and unskilled. The To Love Mother Programme, a small local NGO, educates rural communities on the importance of transporting women to community health centers and midwife delivery huts so that deliveries may be attended by a skilled practitioners. As a result of these initiatives, fewer than 1% of deliveries are attended by traditional birth attendants in the Ngawi district (Analen, 2007). While such interventions remain at the community level, they are illustrative of the innovative solutions that can be applied to communities attempting to promote the transition from unskilled to skilled birth attendance.

It is important to note that not all midwifery programs are scaled up to the extent of those in Malaysia, Sri Lanka, and Indonesia. One country that currently finds itself in the midst of establishing a national midwifery workforce is Afghanistan. This country has faced the challenge of establishing a skilled attendance program with only 467 midwives nationwide in 2002, widespread illiteracy, limited access to health services in its remotest areas, and the second highest maternal mortality ratio in the world (Currie, 2007). In the face of these odds, Afghanistan's midwifery model has been lauded as a success thus far, as it has paid close attention to ensuring high quality of care and sustainability of services.

The Afghan Midwifery Model: A "Bold New Beginning" (Currie, 2007)

In 2002, following decades of conflict, Afghanistan faced the task of reconstructing its entire healthcare system, which entailed establishing new healthcare infrastructure as well as generating human resources for health. Given the country's extremely high maternal mortality ratio—ranging from 1,600 per 100,000 live births to 6,500 per 100,000 live births in Afghanistan's remotest regions—the interim government, Ministry of Public Health, and participating NGOs, donors, and international organizations focused their reconstruction efforts on improving maternal health (Currie, 2007). Since fewer than 10% of deliveries were attended by a skilled provider, the goals of these efforts were to increase the number of skilled midwives, to ensure focused preparation and deployment of midwives, to improve the quality of midwifery care, and to expand the role of midwives to include broader community health issues (Currie, 2007).

There are currently two midwifery education pathways in Afghanistan. Individuals who attend trainings at an Institute of Health Sciences campus in an urban setting become midwives who provide care in hospitals. In order to ensure the quality of program candidates, admissions guidelines are implemented and enforced by the Institute of Health Sciences, Ministry of Higher Education, and provisional health departments. Individuals looking to become midwives who are stationed within smaller health facilities with outreach to their own community attend a community midwifery education program. Candidate selection for community midwife programs is no less rigorous: students are meticulously evaluated and selected by key community members with the agreement that upon completion of training, the midwife will return to the community to provide care. The logic of creating two parallel pathways of education—one urban and the other community-based—is that students can be recruited from areas where they will eventually be deployed, supported, and supervised, ensuring a high retention rate of skilled providers even in remote regions of the country (Bick, 2007).

Both the (urban) midwife and the community midwife training programs share an identical competency-based curriculum developed by the Institute of Health Sciences and Jhpiego, a Johns Hopkins affiliate. Any organization that aims to implement a community midwife training program must utilize this standardized curriculum and acquire approval from the Ministry of Public Health. In the Afghan midwifery curriculum, training focuses on the development of clinical skills necessary for basic maternal and newborn care, and the management of complications in pregnancy and childbirth (Currie, 2007). Due to past restrictions on female education, many students lack a much-needed pre-clinical background in basic science and math. Therefore, key concepts such as fractions, measurements, and percentages are also taught, with reference to how they are applied in the clinical setting. In addition, Jhpiego and the Johns Hopkins School of Nursing recently developed visual teaching aides and learning activities in anatomy, physiology, microbiology, and pharmacology (Jhpiego, 2006). Furthermore, adult literacy programs are conducted in parallel with midwifery training (Currie, 2007).

In order to maintain high standards of midwifery education during such rapid development, all midwifery education programs in Afghanistan are mandated to achieve accreditation. The accreditation process begins with an internal assessment based on national educational standards in the areas of classroom and practical instruction, clinical instruction and practice, school infrastructure and materials, school management, and clinical care. If a program achieves fewer than 80% of these standardized criteria, the National Midwifery Education Accreditation Board conducts an external assessment, and when necessary, implements performance improvement procedures. By early 2007, 19 midwifery schools achieved accreditation, fulfilling an average of 91% of the required national standards. To date, only one school has been closed by the Accreditation Board due to an inability to achieve at least 80% of the necessary standards (Smith, 2008).

Upon completion of training and deployment, Afghan midwives do not operate in isolation. Rather, they become members of the Afghan Midwives Association (AMA), a professional network of skilled birth attendants whose aim is to "promote and strengthen the midwifery profession and the role of the midwife to ensure the well-being of women and families in Afghanistan through representation for and on behalf of midwives and women" (Currie, 2007). The AMA's objectives include ensuring continuing education, adherence to professional standards, establishing representatives in each province to identify and resolve midwifery issues at the local level, to collaborate with the Ministry of Public Health in

developing policies that promote and support midwifery, and to create partnerships with other midwifery associations on an international level.

Between 2002 and 2007, 805 new midwives were trained, nearly doubling the existing midwifery workforce. The Afghan midwifery model is only in its fledgling state; a proposed 8,000 to 10,000 additional midwives are still required to meet the country's maternal health needs (Smith, 2008). Yet, by establishing a standardized competency-based curriculum, a formal accreditation process, and a professional association of midwives, it has already avoided many of the pitfalls experienced by Indonesia, which also attempted to rapidly increase its midwifery workforce within a matter of decades.

While all of the aforementioned midwifery programs possess unique components that are relevant to the cultural, economic, and political environment in which they are established, they share a notable common element: they aim to increase skilled attendance in environments where, previously, the majority of women gave birth at home with unskilled providers. This is not the only possible scenario. For example, in Mexico, where 93% of births are already attended by a physician or other skilled attendant (Cragin, 2007), some organizations establish midwifery programs in order to reorient the birthing process around high quality, women-centric practices. One such organization is Centro para los Adolescentes de San Miguel de Allende, known as CASA, located in San Miguel de Allende, Mexico.

Midwifery in Mexico: the CASA Model

Obstetric care in Mexico is provided by a wide range of practitioners: in the poorest states of Chiapas and Oaxaca, traditional birth attendants are employed, whereas elsewhere in Mexico, births are attended by professional midwives, obstetric nurses, and general physicians (Cragin, 2007). With over 90% skilled coverage of deliveries, Mexico's maternal mortality ratio remains at 62 per 100,000 live births (UNICEF, 2004), compared to an ideal level of below 50 per 100,000 live births (Freedman, 2007). The highest maternal mortality rates are not found in Chiapas and Oaxaca, where 60% of deliveries are conducted by a traditional birth attendant (Braine, 2008). Rather, they occur in states where 96-98% of births are attended by a skilled provider—most often a pre-graduate or newly-graduated physician—based at a health facility (Cragin, 2007). The Pan American Health Organization asserts that these findings indicate substandard education of and quality of care provided by skilled attendants in Mexico (Cragin, 2007).

In addition, caesarean section rates in Mexico's public healthcare institutions, where 80% of deliveries occur, were as high as 25-45% by the late nineties; these values exceed the highest admissible rate, which is cited in the literature as 20% (Gonzalez-Perez, 2001). The reason that such guidelines for c-section rates exist is that the procedure carries with it high risks of maternal mortality, infection, and hemorrhage (Gonzalez-Perez, 2001). In some states in Mexico, such as Veracruz, legislation has been passed to curb the increasing caesarean section rate, considering c-sections that occur without medical necessity an act of "obstetric violence" (Braine, 2008) In response to the poor quality of care provided by skilled attendants, coupled with an excessive c-section rate, CASA aims to train competent midwives and to provide access to high quality reproductive health services.

CASA is a non-governmental organization whose programs include a fully-functioning maternity hospital, a professional midwifery school, and counseling on sex education, family planning, and violence prevention (CASA, 2009). The midwifery school was established in 1990, and is the only government-approved program of its kind to date. In order to qualify for midwifery training at CASA, students are required to complete secondary school education, pass

an admissions exam, and interview with a faculty member. Once admitted, midwives-in-training engage in a three-year training program that includes one year of basic science courses, a second year of nutrition, pharmacology, health education, and introductory obstetrics courses, and a final year of advanced obstetric pharmacology and neonatal coursework. The CASA curriculum also includes education in psychosocial issues, community health, culture, customs, and traditional midwifery practices. Throughout the three-year program, students receive clinical training at CASA's maternity hospital, at local public hospitals, and in home settings. For many of its educational modules, CASA employs a peer-teaching model, whereby senior students support their junior colleagues, and all students participate in community building with outside midwives (Cragin, 2007).

In 2007, Mexico's National Institute of Public Health and the University of California San Franciso's Department of Obstetrics, Gynecology, and Reproductive Health assessed the quality of midwifery training at CASA (Cragin, 2007). Using competency standards established by the WHO and the International Confederation of Midwives, they compared CASA's curriculum with that of the Universidad Nacional Autonoma de Mexico (UNAM) School of Medicine and the UNAM Obstetric Nursing School. Overall, 214 separate competencies were evaluated, falling under six major categories: (1) general social sciences, public health skills, and ethics; (2) health education and services to promote healthy family life; (3) antenatal care; (4) labor and delivery care, and emergencies; (5) postanatal care; and (6) care of newborns from birth to two months of age. CASA incorporates 83% of the WHO/ICM competencies, compared to UNAM School of Medicine's 54% and UNAM Obstetric Nursing School's 43%. As a result of this assessment, Cragin *et al* (2007) conclude that CASA graduates the most competent providers compared to the two UNAM institutions evaluated.

The CASA model is not without limitations. To date, the midwifery training program's capacity does not exceed 10 students per year. Upon graduating, these few midwives find limited options for long-term steady employment, as Mexico's Secretary of Health does not have permanent positions for midwives in public hospitals (Cragin, 2007). If midwives in Mexico continue to meet resistance from the medical community, it is still unknown if CASA's midwives will be able to forge sustainable long-term careers.

In order to increase the number and quality of skilled attendants, CASA (Mexico), Afghanistan, and Sri Lanka have focused their efforts on training new midwives who were never previously unskilled attendants. Contrastingly, Malaysia and Indonesia have utilized a hybrid approach, whereby traditional birth attendants are trained to complement the work performed by a new midwifery workforce. In Guatemala, a third approach—albeit one that is less preferred—is employed, which focuses on training traditional birth attendants as a sole strategy.

The Traditional Birth Attendant Model in Guatemala: Midwives for Midwives

Even though the current international approach to increasing skilled birth attendants is to train professional midwives, there is still debate on what type of strategy is most effective. In Guatemala, traditional birth attendants conduct more deliveries—60% nationwide and 90% in rural areas—than trained professionals (Replogle, 2007). Therefore, some argue the value of this human capital, stating that programs should focus on training traditional birth attendants on hygiene, how to recognize and handle complications, and when to refer women to a health facility (Replogle, 2007). The WHO considers this strategy a failure, as it has not contributed a great deal to reducing maternal mortality in countries that have implemented TBA training programs (Campbell, 2006). Replogle *et al* (2007) cite Davis-Floyd's argument that "international agencies have tended to blame traditional midwives for maternal mortality but

what actually happens is lack of transport and lousy care once you get to local health facility." In fact, TBAs who receive training in Guatemala, Indonesia, and Brazil are indeed able to identify early signs of complications and successfully refer women to treatment (Campbell, 2006). Not only do proponents of the TBA model argue that supportive infrastructure is lacking, but they also state that insufficient attention has been paid to the quality of TBA training programs. In Guatemala, TBA training programs in rural areas are cited as being overly-technical, and are often conducted by physicians who do not speak the local language (Replogle, 2007). In order to address these shortcomings, a North American organization—Midwives for Midwives—established the Ixmucane Centro de Parto y Salud de la Mujer in Antigua Guatemala, which offers women's healthcare services as well as a TBA training program.

The Midwives for Midwives TBA training program entails 150 hours of instruction by a certified nurse midwife. The content of the program includes components of history-taking, management of normal pregnancy, labor and birth, identification and management of complications, infant resuscitation, nutrition, breast feeding information, family planning, reproductive tract infections, and sexually transmitted infections. This content is delivered through a variety of media: lectures, audiovisual aids, group participation, and skills demonstrations. Once trained, TBAs return to their own communities to provide care. Yet, they maintain a partnership with the Ixmucane women's health center. TBAs are encouraged to refer patients with complicated pregnancies to Ixmucane in order to receive prenatal care and to deliver. In addition, 24-hour phone consultation is available to TBAs in the field. Furthermore, TBAs are invited to Ixmucane for biweekly support meetings, and receive professional support from the Associacion Comadrona de Area Mam (Association of Mam-Speaking Midwives). Midwives for Midwives also conducts periodic evaluations of the services that TBAs provide in the field (Foster, 2004).

While the efficacy of TBA trainings like those conducted by Midwives for Midwives is still much debated, it is clear that such programs have the greatest impact when they are supported by a strong referral system such that obstetric emergencies can be handled appropriately. While it may seem more financially feasible to provide short-term training to already existing unskilled practitioners, some still argue that investments are better targeted towards long-term professional midwifery programs.

Conclusion

This review of the skilled attendant training models utilized in Malaysia, Sri Lanka, Indonesia, Afghanistan, Mexico, and Guatemala is by no means exhaustive. Rather, it highlights the variety of approaches that have been employed to increase the number and quality of skilled birth attendants in rural and resource-poor settings. Furthermore, it illuminates key characteristics that have conferred sustainability to some programs, as well as critical obstacles that have challenged the growth and efficacy of others. As far as sustainable programs are concerned, Malaysia and Sri Lanka are certainly the most renowned success stories. Their skilled attendants have had numerous decades to flourish within healthcare systems that integrated their services from the earliest stages of development. In an attempt to model its neighbor's successes in increasing skilled attendance and subsequently reducing the maternal mortality ratio, Indonesia attempted large-scale training and deployment of 54,000 midwives; without professional support at the governmental level and with low uptake of services at the community level, the Indonesian model's challenges point to support networks and partnerships that must be established in order to sustain a large-scale midwifery program. While Afghanistan currently aims to train and deploy up to 10,000 professional midwives in the coming decades, it

has made a concerted effort to foster the types of support systems that were lacking in Indonesia's village midwife program. The efforts of NGOs operating in Mexico and Guatemala are also noteworthy. While CASA and Midwives for Midwives have employed very different training models, they both demonstrate how smaller organizations may contribute to a shift in birthing practices.

An important question remains: What is the best way to measure the contribution that a skilled attendant training program makes to a community? Current literature tends to measure the efficacy of programs indirectly, by assessing changes in maternal mortality ratios, by evaluating program curricula against core competencies, and by determining the rate at which birth attendants refer women to more advanced care in the event of an obstetric emergency. Yet, more immediate measures may provide a more cogent argument for the efficacy and long-term sustainability—or lack thereof—of a program. Such measures include an assessment of the actual uptake of midwifery services in the community and retention rate of midwives in remote areas, and appraisal of the quality of skills employed by midwives in the field beyond the ability to recognize complications and refer patients for care. From comparative research of various skilled attendant training models that utilizes such measures, a single, most impactful approach may emerge. Using current measures, however, it is clear that the most effective skilled attendant training programs are those that are entrenched in an extensive support system that includes a referral network, professional mentorship and supervision, and opportunities for employment upon completion of training.

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