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## Outcomes of Training Traditional Birth Attendants in Rural Honduras: Comparison with A Control Group

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### Abstract

**Objectives:** To compare obstetrical knowledge, referral practice, and integration into the public health system among trained and untrained traditional birth attendants (TBAs) in rural Honduras, an area of high maternal mortality.

**Methods:** Eighteen practicing TBAs in rural Honduras completed traditional lay midwife training in 2000, and 26 months later, a randomly selected six of these and six untrained “control” TBAs from a nearby village were interviewed to assess maternal mortality process indicators including obstetrical knowledge, referral practices, and monthly training meeting attendance.

**Results:** At 26 months post- training, the trained TBAs demonstrated uneven but persisting achievement of curricular learning goals relating to identification of high-risk pregnancies and management of obstetrical emergencies, increased and appropriate referrals to the government health system, and increased meeting attendance compared with the control group of TBAs.

**Conclusions:** These outcomes support this model of training TBAs as a component of programs to decrease maternal mortality in geographically isolated and impoverished regions.

**Key Words:** Health Personnel, Health Services, Midwifery, Latin America, Pregnancy Outcome, maternal Mortality

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### **Introduction**

The tragedy of unnecessarily high death rates for women as a result of complications of pregnancy and childbirth continues in Latin America and the Caribbean. The estimated maternal mortality ration for these countries is 190 per 100,000 live births, which translates to more than 22,000 deaths per year in the region (PAHO 2002). An estimated one-fourth to one-third of all deaths in women of reproductive age in developing countries is related to pregnancy (Royston & Armstrong, 1989). To place these data in context, the rates for Canada, Mexico, and Bolivia are approximately four, 51, and 390, respectively, per 100,000 live births (PAHO, 2003). Estimates of maternal mortality in many Latin American and Caribbean countries, however, are assumed to suffer from a high degree of underreporting of deaths, especially in the more rural areas of the countries and in areas of more extreme poverty. Underreporting in such areas has been estimated to be more than 70% (PAHO, 1990, 1992). Also, the World Health Organization has estimated that for each maternal death, there occur 135 cases of complications such as infection, uterine prolapse, fistulas, chronic urinary incontinence, and dyspareunia.

Analyses of the direct obstetric causes of mortality have shown that complications related to induced abortion, pre- and postpartum hemorrhage, infection, obstructed delivery, and eclampsia are most common, their relative importance varying from one developing country to another. Indirect obstetric causes include diseases concomitant with and complicating pregnancy, such as tuberculosis, hepatitis, malaria, and the various types of anemia. Poverty-related conditions such as inadequate nutrition often compounded by intestinal parasites, various other infections (including sexually-transmitted diseases), and excessive levels of physical labor increase pregnancy risk as well (PAHO, 1992). Finally, social conditions, cultural norms, and lack of access to family planning services contribute to elevation of maternal risk by contributing to frequent and closely spaced pregnancies, as well as to pregnancies earlier and later in the reproductive life of the woman.

It is abundantly clear that lack of access to obstetrical care, either due to geographical barriers to care, poverty, or both, is a major risk factor for maternal mortality (Penny & Murray, 2000; Schieber, O'Rourke, Rodriguez, & Bartlett, 1994). Indeed, maternal mortality is recognized as an important indicator of accessibility, coverage, and quality of health care in general for a given region (PAHO, 1992). Lack of access to prenatal care results in missed opportunities for identification of maternal risk; (such as concomitant disease, infection, poor nutritional status, fetal malpresentation, etc.), and lack of care during labor and delivery means that complications such as obstructed delivery and hemorrhage may become fatal. Hemorrhage and infection are the major treatable risks to maternal survival in the postpartum period.

For this reason, the primary strategies for reducing maternal mortality in Latin America and the Caribbean over the past decade have included education in sexual and reproductive health with community participation, use of a risk-based approach to care for pregnant women, organization of health services by level of care, personnel training, and improvement of basic supplies for prenatal and delivery care (PAHO, 1992). Clearly, a limitation of risk-based approach to care in pregnancy and delivery is the unpredictability in the occurrence of obstetrical emergencies such as prolonged or obstructed labor and hemorrhage (PAHO, 2002; Sibley & Armbruster, 1997; Theron, 2000).

Because traditional birth attendants (“TBAs”, also known as traditional lay midwives) in rural areas of developing countries, where the highest rates of maternal mortality occur, attend 70-95% of deliveries, one of the areas of focus in personnel training has been on traditional birth attendants (Piper, 1997; Sibley & Armbruster, 1997).

The expenditure of resources for training of TBAs has not been without controversy. Some public health analysts propose de-emphasis on training of TBAs and increased funding for establishment of a system of accessible “essential obstetrical care” centers (EOCs), which are conceptualized as providing “the short list of services that can save the lives of the majority of women with obstetric complications” (Penny & Murray, 2000). These centers would be capable of providing parenteral antibiotics and oxytocic medications, anticonvulsants for pre-eclampsia and eclampsia, of performing manual removal of products of conception and retained placenta, and of performing assisted vaginal deliveries. However, barriers to establishment of EOCs in areas currently without such services include lack of available or foreseeable funding, as well as the challenge of staffing EOC’s in relatively remote and economically impoverished areas.

Proponents of training of TBAs argue that since the TBAs attend the vast majority of deliveries in areas with the highest maternal mortality rates, knowledge and skill development among these care providers is a reasonable approach for the present, and may help bridge the gap in time until more highly developed EOCs can be established in outlying and/or poverty-burdened areas (Okafor, 1992; Piper, 1997). But research has shown that even in areas where EOCs are accessible to pregnant patients, these women still seek out care from TBAs for cultural reasons as well as for benefits related to psychosocial support (Casteneda Camey et al, 1996; Parra, 1993). Also, training of TBAs has typically included family planning promotion, and the influence of family planning programs on the reduction of maternal mortality has been amply shown, primarily through reduction of the numbers of high-risk pregnancies (PAHO, 1991).

Analyses of interventions involving training TBAs to provide maternity care to women living in communities facing geographical or poverty-related barriers to care have shown that many of the trained TBAs lacked sufficient skills to identify and manage complications of pregnancy and delivery (PAHO, 2002). Other studies have shown that while, for example, training of TBAs in “clean delivery” makes them significantly more likely to practice hygienic delivery, this intervention in itself does not appreciably reduce rates of postpartum infection, perhaps due to unintended consequences of training such as increased numbers of perinatal vaginal exams by TBAs practicing among a population with a high background rate of pre-existing pelvic infections (Goodburn, et al, 2000).

The wide variability in TBA and midwife nomenclature, as well as training curricula, in reported studies present’s challenges in the interpretation of outcomes studies as well (Casteneda Camey et al, 1996; Piper, 1997). Some programs studied have, for example, assessed interventions involving several semesters of university-level training, while others have involved weekly sessions over two to three months (Morelli & Missoni, 1986; Piper, 1997). Other outcome studies do not specify training duration or other curriculum details (e.g. Ransjo-Arvidson et al, 1998; Theron, 2000). The inconsistency in nomenclature also makes it difficult to assess comparability in training. It may be unclear whether a traditional birth attendant who has received a week or several weeks of training becomes a “trained birth attendant” in the same category as a trained nurse with obstetrics qualification, or a “midwife” with up to three years of specialized training.

While it appears that training of TBAs has been one component of achieving albeit minor reductions in maternal mortality in the region in the 1980’s and 1990’s, its impact may be limited by inadequacies in training curricula, inadequate integration of TBAs into local health systems, and inadequate ongoing support for TBAs from the

health infrastructure (Goodburn et al, 2000; PAHO, 2002; Schieber et al, 1994). Studies that have shown improvements in mortality data have involved not only the training of birth attendants, but also concomitant efforts to integrate them more effectively into the local health infrastructure and attempts to overcome barriers to care such as lack of transportation in emergency situations (Alto, Albu & Irabo, 1991; PAHO, 2002).

The challenge of utilizing maternal mortality data to assess the impact of various types of interventions on maternal morbidity is well documented (Penny & Murray, 2000), and the difficulty arises not only from gathering reliable data, but also from interpreting the relative effect of a given intervention against a background of complex issues of geography, socioeconomic situations, transportation issues, the effects of religious restrictions on the complications of induced abortions, and relative development of health infrastructure (PAHO, 1992).

In view of the difficulty in measuring mortality, several types of process indicators for assessing interventional efficacy have been proposed (Penny & Murray, 2000; Sibley & Armbruster, 1997). These have included markers such as increased proportions of TBAs correctly performing obstetric “first aid”; increased rates of appropriate referrals from TBAs to health centers in communities where referral facilities exist; increased rates of timely referrals, with decreased time intervals from problem recognition by the TBA to the decision to refer; and decreased case fatality rates, i.e. the proportion of complicated cases that result in the death of the mother. Specifically, numbers of appropriate referrals have been proposed as a key indicator of behavior change outcomes among trainees (Piper, 2000).

## **Background**

Honduras, according to 1997 data, suffers from a maternal mortality rate of 108 per 100,000 live births (in comparison with neighboring Central American nation rates as follows: El Salvador 120, Nicaragua 118, Guatemala 95, Belize 82; Panama 65; and Costa Rica 19.1), with acknowledged variations regionally and by place of residence, whether urban or rural (PAHO, 2002). A large portion of the rural population resides in areas many hours away by foot or by public transport from the 18 public hospitals in the country that are staffed and equipped to the level of “essential obstetric care” as described above. Approximately 47% of deliveries in Honduras, and an estimated 70-80% of deliveries in rural areas, are attended by TBAs (PAHO, 2001).

Subirana, located in the department of Yoro, is a community of approximately 3,000 inhabitants in a mountainous region of north-central Honduras. It is located some 60 kilometers by poorly maintained roads from the regional hospital, which is the nearest facility meeting criteria noted above for an essential obstetrical care (EOC) facility (i.e. with capability of providing parenteral medications, assisted vaginal deliveries, etc.). Economic activity in the area is primarily related to coffee-growing, forestry, and subsistence agriculture (corn, beans, some citrus and plantains, and cattle grazing). Subirana has a Honduran Ministry of Public Health rural health center staffed permanently by two auxiliary nurses, and intermittently by a social-service-obligation year physician. The rural health center is open weekdays only, and is neither equipped nor staffed for deliveries. Subirana also has a missionary medical clinic staffed by a professional nurse, and while a labor and delivery facility is planned (which would meet criteria as an EOC with the exception of blood bank capabilities), no obstetrical services are currently available aside from prenatal care. Several other smaller communities in surrounding mountains are served by the rural health center and mission clinic as well.

## **Methodology**

From January until July of 2000, author KR collaborated with staff members of the regional Ministry of Health office, the rural health center, the mission medical clinic, and the Ministry of Health in identifying traditional birth attendants practicing in the catchment’s area of the rural health center. Eighteen such practitioners were identified, and were invited to monthly meetings at the health center for purposes of gathering data on the numbers of pregnant women they were attending in their local communities, the number of deliveries they had

attended in the preceding month, and their levels of prior training and experience. The initial plan was to collect pre-training data related to obstetrical knowledge, but the local public health nurses expressed concern that there may be suspicion on the part of the TBAs that an effort was being made to expose their lack of formal training and suppress their practice. At that point, we decided to proceed with the training program, and establish confidence with TBAs in a nearby community and utilize a comparison-with-control approach to evaluating outcomes.

All of the TBAs in the intervention group were invited to continue attending meetings, into which training components from the Honduran Ministry of Health curriculum for training traditional lay midwives were introduced (Secretaria de Salud, 1998a and 1998b). The monthly meetings also served for sharing data with the rural health center staff on numbers of deliveries during the preceding month, discussions about complications, pregnant patients currently followed, high-risk pregnancies, and concerns about newborns.. In these meetings, the health center nurses also had an opportunity to inquire about patients not in prenatal control clinics at the health center, and infants not having been seen for immunizations.

In July 2000, a four-day-long intensive training session was held; during which the entire traditional laid midwife-training curriculum was completed. In the training sessions, curricular content was reinforced with practical experiences during prenatal clinics held at the rural health center with physicians and nurses, and simulated deliveries using artificial models at the rural health center. The TBAs also received an orientation tour of the regional hospital and the lying-in residence for high-risk pregnancy patients (funded and constructed by Doctors Without Borders in 2000), and the TBAs had a session in which to meet and to discuss their practical experiences (including their perceived barriers to referral of high-risk pregnancies) with obstetrical medical and nursing staff at the hospital.

Public health nurses in the nearby mountainous community of Tegucigalpa, approximately 15 km distant from Subirana, identified the practicing TBAs (n=6) in their health center's catchment area, and these TBAs were utilized as a comparison group. Tegucigalpa also has a rural health center staffed by two auxiliary nurses and open during weekday hours. High-risk pregnancy patients and patients with obstetrical emergencies from the Tegucigalpa and Subirana area are referred to the same regional hospital. The comparison group of TBAs represents an "intent-to-train" group, which due to time and budget constraints did not receive the training provided to the Subirana group; neither have there been monthly meetings involving traditional lay midwife curricular objectives at the health center in Tegucigalpa.

In July 2002 six of the TBAs from the trained group were randomly selected to participate in a structured interview consisting of 28 questions. The same interview was conducted with the six control-group TBAs. The interviews were designed to obtain demographic information relative to the TBAs' practice and training experience, as well as process indicators (e.g. Penny & Murray, 2000; Piper, 1997; Wardlow & Maine, 1999) related to current practices of the groups of trained and untrained TBAs. The interviews with individual TBAs were conducted in Spanish by authors ML and SN. The TBAs granted permission to audio-record their responses. The audiotapes and transcripts of the interviews (in electronic database format) are retained on file.

Whenever possible, information given by the TBAs in response to interview questions related to numbers of deliveries, known complications, and TBA referral practice was corroborated by data compiled by the nurses at the rural health centers. For example, local health center data showed that for the year 2001, of 165 deliveries recorded in the Subirana catchment area, members of the trained TBA group attended 102, 52 deliveries occurred at the regional hospital, 8 were unattended, and five were attended by private physicians in the area. Of these 165 deliveries, the health center nurses categorized 67 (40.6%) as "high-risk". No maternal deaths were officially

recorded, but the trained TBAs made author KR aware of two known maternal perinatal deaths due to hemorrhage in the catchment's area during that time period.

Comparison of the groups shows that the trained group had a mean of 16.3 years experience (range 5-30) as a TBA, while the untrained group had 12.7 years (range 5-17) of experience. Of the six trained TBAs, only one lived in the town where the rural health center was located, compared with four of the six in the untrained group. One of the trained TBAs was found to have also received two weeks of lay midwife training through a Catholic mission program in 1977, while one of the six in the untrained group received approximately one week of lay midwifery training from the Honduran Red Cross in 1983. Otherwise, no evidence of formal training was encountered in the interview process. The mean number of deliveries attended in the preceding year by the trained TBAs was 5.0 (range 0-17), and 5.5 (range 3-10) for the untrained group.

## **Results**

Interview questions were sorted into 5 categories: 1) demographics (community of residence, personal obstetric history, years of experience as a TBA, numbers of deliveries attended, etc.); 2) obstetric knowledge and practices; 3) referral practices and integration into the local health care infrastructure; 4) expanded health care activities beyond the TBA role; and 5) perceived barriers to adequate obstetrical care and perceived training needs. This report uses the demographic data obtained for assessment of comparability between the groups in terms of TBA training and practice experience, and otherwise focuses on the TBAs self-reported obstetric knowledge and practice, and on referral practices. Self-reported data in terms of referral practice were compared with health center data and found to be consistent.

### **Obstetric Knowledge and Practice**

Three process indicators were used as markers of obstetrical practice in comparing the trained and untrained groups of TBAs: 1) recognition of high-risk pregnancies; 2) identification of causes of prolonged labor; and 3) management of postpartum hemorrhage.

When asked to identify factors that put certain women at high-risk for complications of pregnancy and delivery, five of the six trained TBAs (for one, no response data were recorded) gave appropriate responses. These included bleeding before onset of contractions (with specific mention of placenta previa), history of hemorrhage in previous deliveries, extremes of ages of the pregnant women, null parity, grand multiparity, signs of pre-eclampsia, signs of low blood pressure before and during delivery, signs of malpresentation, fever during labor, and signs of urinary tract or vaginal infection in the laboring patient. No incorrect responses were recorded from TBAs in the trained group. Among the untrained group, responses in regard to high risk labor were highly variable among the TBAs: one TBA listed factors including "headache, previous miscarriages and bleeding or swelling, nerves, and a large fetal head size", while two others listed signs of anemia such as paleness or weakness. One other TBA listed "mismatched head size." Other responses were less specific and included "five days of labor pains," "women who can't lie down," and pregnant women "who look like they are going to die."

In regard to identification of causes of prolonged labor, the trained TBAs' responses included: "anemia, weakness, and swelling"; "malpresentation"; "weak women"; "stillbirth, poor nutrition, woman working too hard"; "stillbirth"; and "do not know." Responses from the untrained group included three stating, "do not know", "women who do not take care of themselves with food and medicine, not having sufficient blood," "Abandoned by husband", and "weak women." One of the responses from the trained group would be considered correct according to the curriculum, while none from the untrained group would be correct.

When asked to identify steps that should be taken if heavy vaginal bleeding persists after delivery of the placenta, all six of the trained TBAs responded with maneuvers to promote uterine tone (putting the baby to breast and

uterine massage) and/or immediate referral to the nearest open health care facility. Among the untrained group, responses included: “medications, vitamin K in particular”; “chamomile tea, other medications, side-to-side massage”; “tea from white root and lemon”; “give home remedies to stop the bleeding, and maybe send to hospital”; “buy and give pills—lots of bleeding is normal”; and “do not know.” While some of the traditional herbal medicines may in fact be oxytocics (having the effect of stimulating uterine contraction), none of the responses except the one mention of “send to hospital” from the untrained group represent standard of practice under the current WHO curriculum, and in fact would delay treatment of a life-threatening obstetrical emergency.

### **Referral Practices**

Of the 30 pregnancies followed by the trained TBAs in the year preceding data collection, the TBAs identified 10 of these as high-risk and referred them to the rural health center and/or regional hospital. Reasons the trained TBAs cited for making the referrals included “an older patient”, “fetus seemed very large”, “a 13-year-old patient”, and a “history of placenta previa”. The trained TBAs reported that of the 10 referrals they made, seven of the patients went to the referral clinic, and the three who did not go cited lack of money, distance, and someone to accompany them as barriers to going for further care. All of the trained TBAs demonstrated knowledge of the services available at the lying-in residence for high-risk pregnancy patients across from the regional hospital, and at the regional hospital. Further, they described their relationship with these facilities as either “good” or “very good.”

Of the 32 deliveries attended by TBAs in the untrained group, no referrals were made, except in the case of one TBA who reported that she successfully summoned the physician from Subirana for a difficult delivery. Of the six TBAs in this group, two characterized their relationship with the regional hospital as good. One described her relationship as “just OK; my husband died there and didn’t receive very good care”, and another described her relationship with the hospital as “don’t really know, but some patients should go there.” One TBA was aware of the services available to high-risk patients at the lying-in residence, but had not made a referral there.

### **Integration in the Health Care System**

Five of the trained TBAs reported attending monthly meetings on a regular basis (four attended all 12 meetings during the preceding year, and one attended 10 meetings; one TBA reported only attending one) at the rural health center. Among the control group, two TBAs reported attending 12 monthly meetings, two attended none, one attended four, and one attended six meetings. In statistical terms, trained TBAs attended 82% of possible meetings, while the control group of TBAs attended 47%.

### **Discussion**

While the trained TBA group demonstrated superior knowledge and practice two years post-training, it is possible that confounding variables such as pre-training difference in knowledge levels or differences in access to support by trained healthcare personnel account for the outcomes observed. While no pre-training assessment was performed, the groups are comparable in self-reported prior training exposures, and both groups practice in areas with a rural health center staffed by auxiliary nurses. Analysis of the location of the TBAs’ location of residence and practice showed that the members of the trained group tended to live in smaller villages outlying the rural health center communities. The trained and untrained groups are comparable in terms of numbers of deliveries attended per year, but the trained group did, however, have a mean of 3.6 years (28%) more experience working as TBAs.

Clearly, there is variability of achievement of learning goals among the areas of the TBA training curriculum. This study has identified a need, for example, for reinforcing training in the area of recognition of the causes of prolonged labor (perhaps best addressed in follow-up monthly meetings, or a special training session to address

this topic). In the area of identification of high-risk pregnancies and attention to postpartum hemorrhage, trained TBAs have demonstrated good acquisition of and persistence of curricular goals. But as prior studies have noted, since many obstetrical emergencies can not be predicted based on risk assessment, and since knowledge of appropriate first response to emergencies such as hemorrhage is not likely to be beneficial without adequate transportation systems and accessible EOC centers, training interventions in and of themselves are not likely to significantly improve maternal mortality rates.

Nevertheless, it appears that this improvement in knowledge of risk factors in pregnancy has contributed to the achievement of appropriate referrals of high-risk pregnancy patients to EOC facilities for evaluation and delivery, as evidenced by local health center data showing that of 67 identified high-risk patients, 57 deliveries were attended at the regional hospital or by local physicians.

Further, perhaps the most striking finding of this study is in the area of referral practice. The six trained TBAs made 30 referrals of patients perceived of as high risk, compared with zero referrals among the control group, with the exception of the one case involving a local physician being summoned to assist with a complicated delivery after labor was already in progress. As Piper (1997) and Penny & Murray (2000) point out, when reliable maternal mortality data are lacking, process indicators such as increased rates of appropriate TBA referrals are important markers of progress in reducing maternal mortality.

It is not possible to evaluate, based on the design of this training intervention and the follow-up interviews and practice assessment, the benefit of the concentrated training session over a one-week period relative to the ongoing monthly training and follow-up sessions held for the trained TBAs. Interviews with the health center nurses strongly suggest that the follow-up sessions seem to help the trained TBAs refine their knowledge and practice through the feedback and discussion opportunities the meetings provide. This observation correlates with results from other studies, which suggest that a key component of TBA training initiatives involves ongoing support, training, and integration into the local health care system (e.g. Alto et al, 1991; PAHO, 2002; Piper, 1997; Sibley & Armbruster, 1997). This study suggests that offering ongoing training and the TBAs' ability to successfully make referrals to the local health care system may promote ongoing opportunities for improving TBAs' skills.

## **Conclusions**

As measured at two years post-training, a four-day curriculum (utilizing interactive learning techniques, practical applications, and an on-site orientation to referral facilities) and follow-up monthly feedback meetings for training traditional birth attendants (TBAs) in rural Honduras resulted in improved and retained knowledge as well as marked improvement in referral practice when compared with control TBAs.

Training alone, however, is not sufficient for improving health outcomes, especially in terms of maternal mortality and morbidity. Also necessary is integration of the trained TBAs into the local health infrastructure, establishment of accessible centers capable of providing essential obstetrical services, and development of transportation systems available to high-risk pregnancy patients and those with emergent complications at the time of delivery. Addressing underlying social and health care system conditions that predispose women to increased obstetrical risks, such poor health status as well as frequent pregnancy and pregnancy at the extremes of their reproductive lives, are also critical to improving maternal health status.

Continued and improved efforts are also needed at the regional and national level to modernize epidemiological monitoring of deaths of women during childbirth years. Without accurate data it will continue to be exceedingly



difficult to assess the efficacy of interventions such as TBA training except by surrogate process indicators, and to address the tragic problem of maternal mortality in rural areas of developing countries such as Honduras.

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