

Partnering with *parteras*: Capacity building for lay midwives in Mexico

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Synopsis: Undergraduate medical students, when collaborating with facilitating organizations and local ministries of health, can improve lay birth attendants' confidence in basic obstetric knowledge and skills in partnership with local government authorities in developing countries.

Abstract:

Objective: To evaluate the implementation of a training program for Mexican traditional birth attendants (*parteras*) administered by US medical students in collaboration with a facilitating US-based non-governmental organization and a local governmental entity.

Methods: A four-day training for *parteras* from rural Oaxaca, Mexico included 32 participants. Training was delivered by visiting US medical students collaborating with local health officials, and was facilitated by a global health education non-governmental organization, Child Family Health International (CFHI). Training encompassed educational objectives from the local Ministry of Health, with didactic and interactive exercises. Evaluation included oral pre- and post-test self-reported knowledge and task-specific ability, and student observations.

Results: Participants were receptive to the curriculum. Many were found to be illiterate, innumerate, and unfamiliar with the term “confidence.” Participants reported increased knowledge/ability in all topics except nutrition and postpartum care, with statistically significant improvement in 5/12 categories. *Parteras* demonstrated reluctance to apply lessons on evaluation and management of postpartum hemorrhage.

Conclusions:

Medical students, when collaborating with longitudinally-engaged institutions, can lead successful training programs for traditional birth attendants when working with a facilitating organization and local health practitioners. Issues of literacy, numeracy and cultural constructs limit evaluation of such programs. Furthermore, successful training programs may require local health officials to empower and encourage trained birth attendants to utilize new information.

Abbreviations:

TBA= Traditional Birth Attendant

CFHI= Child and Family Health International

NUAID= Northwestern University Alliance for International Development

Introduction:

Traditional birth attendants (TBAs) are significant contributors to health in several developing nations where access to medical facilities may be limited by distance, cost, and cultural barriers. A traditional birth attendant is defined by the WHO as “a person who assists the mother during childbirth and who initially acquired her skills by delivering babies herself or through an apprenticeship to other TBAs.”¹ While the role of traditional birth attendants has been questioned, organizations like the WHO and UNICEF have suggested TBAs should be used to “bridge the gap until there is access to acceptable, professional, modern health care services for all women and children.”

Studies to date have examined the effects of TBA training programs on birth attendants and birth outcomes.²⁻⁴ A recent Cochrane review found a lower perinatal death rate, stillbirth rate, and neonatal death rate in trained versus untrained birth attendants. They also found no additional benefit to instruction in advanced resuscitative neonatal efforts (mouth-to-mouth or bag-valve-mask resuscitation) over basic training in clean delivery.⁵ Maternal death rate was found to be lower with trained attendants but not significantly so. The authors concluded more information is still needed to determine the potential for TBAs to improve peri-neonatal mortality. Another meta-analysis concluded that TBAs are able to reduce mortality when well trained and provided with adequate resources.⁶

Several barriers, including illiteracy, innumeracy and different learning methods, complicate the training of TBAs.^{7, 8} Creative curricula have been developed utilizing pictorial representations, role-plays, simulators, and oral instruction with call and response.^{2, 3, 9, 10} The same challenges that limit education also make assessment of interventions difficult. Common survey mechanisms may not be accessible to TBAs, necessitating the use of more expensive and time consuming measures like interviews, observed role-plays, and simulations with checklists.^{2, 3} In one study where TBAs and nurses were both taught bimanual massage for postpartum hemorrhage on a simulator, only nurses were evaluated through surveys because of the challenges of using this tool with illiterate midwives.³

In Mexico, 60% of women will see a TBA (*partera*) during their pregnancy, because of lower costs as well as the social/emotional support received through this relationship.¹¹ *Parteras* assist women throughout the antepartum period, attend the birth, and remain present to help cook and take care of the family. These workers play a prominent role in the delivery of obstetric care, and may be the first responders in cases of obstetric complications and emergencies. *Parteras* partner with local government health facilities and are required to record birth information and refer patients to health centers for routine neonatal and postpartum care. *Parteras* attend trainings every three years to maintain certification.

NUAID is a student-led global health organization at Northwestern Feinberg School of Medicine. Prior to 2011, NUAID was undertaking brigade-style global health activities with supervision by physicians from the US.¹² As of 2011 NUAID began collaborating with the Northwestern Center for Global Health who engaged with US-based global health education organization Child

Family Health International (CFHI) to facilitate integration of NUAID student learning into existing health systems and projects with local capacity building at their core. Since 2011, NUAID students have collaborated through CFHI with the Oaxacan Department of Public Health to facilitate annual training of parteras from the region. Local officials identified this project as a priority in order to capacitate parteras to recognize birth complications early and respond to intrapartum emergencies. In addition, the local public health officials considered the training an opportunity to build camaraderie between *parteras*, as well as relationships between the local health system and the parteras who are often isolated in rural villages. NUAID partnered with local leaders in midwifery and medicine to design a training curriculum based on the twelve areas of focus outlined by the Mexican Ministry of Health. NUAID also designed a basic assessment tool to be delivered as a part of the course. This article outlines the pilot of the assessment tool, as well as NUAID student participants' observations and challenges throughout the course.

Materials and Methods:

Parteras from the state of Oaxaca, Mexico participated in a 4-day training program held in Puerto Escondido. 10 medical students from NUAID in the United States led the training in conjunction with local healthcare workers and officials. 6 students had completed 1 year of training, 4 had completed 3 years of training; 6 were female, 4 were male.

Pre-clinical and clinical US medical students co-facilitated a 4-day training for *parteras* based on the 12 principles outlined by the Mexican Ministry of Health (**Table 1**) with local physician and public health officials. CFHI facilitated the US medical students' involvement in the project. Activities included discussion, call and response, role-play, and simulation activities. Discussions were supplemented with visual cues, including pictures, models and drawings. Groups of 2-3 students lead each topic, while other students facilitated activities and assisted as needed. Each day began at 9:00 following breakfast and concluded between 2:00-3:00, at which time some students would remain to interact with the *parteras* over lunch. Breaks were held twice each day, lasting approximately 15 minutes.

In order to evaluate the effects of the program, students chose to assess confidence in basic topics. A pre/post-test design was used to query *parteras*' confidence before and after each lesson (**Table 2**). Because many of the participants were illiterate, questions were administered orally. The physician and nurse responsible for overseeing the training reviewed the questions to ensure they were properly translated. After the question was read, each participant then marked her responses on a sheet of paper. Categories were designated by a symbol specific to that topic (for example, a picture of a baby for Care of the Newborn). Responses were illustrated as a Likert scale from 1-5, with a frowning face by 1 and a smiling face by 5 (**Figure 1**).

On the first day when the oral surveys were delivered, many of the *parteras* struggled with the Likert scale. It was quickly realized that some of the participants were innumerate as well as illiterate. The scales were adjusted to include faces that correlated with each number. he

parteras also had a difficult time with questions of “confidence.” We therefore changed the questions to read “how able are you” or “how much do you know” to facilitate understanding.

Data was collected from the *parteras*’ surveys and checked by two members of the research team for accuracy. Where 2 responses were marked, an average of the points was entered. Data were analyzed using a paired t-test to compare means of the pre and post-test questions for each category. Analyses were conducted in SAS version 9.2 (Cary, NC). Values of specific questions were calculated when a decrease in knowledge/ability was reported.

Results:

During the program, 32 *parteras* participated in the training and evaluation. 29 of the participants were female, 3 were male. This was the first training for some participants, while others had attended several trainings facilitated in the past. Participants traveled from across the state of Oaxaca to attend. While all could converse in Spanish, some were more comfortable using indigenous languages.

Data from the oral assessment is included below. Of note, participants showed statistically significant increases in their perceived knowledge/ability in 5 categories: normal pregnancy (4.39, 4.91 $p=0.01$), anatomy (3.78, 4.46 $p=0.0068$), complicated pregnancy (4.59, 4.94 $p=0.009$), prenatal care (4.2, 4.72 $p=0.0028$) and complicated delivery (4.2, 4.65 $p=0.016$). Participants demonstrated a non-statistically significant decrease in their reported knowledge/ability in two categories: postpartum care (4.7, 4.6 $p=0.8$), and nutrition (4.88, 4.65 $p=0.07$) (**Table 3**).

When a decrease was observed in a category, results were also broken down by question. In the postpartum care section, the responses to the questions “How able are you to manage excessive bleeding after delivery?” (4.85 vs. 4.7 $p=0.19$) and “How able are you to care for a woman with infection after delivery?” (4.91 vs. 4.79 $p=0.34$) were lower after the intervention; however, this difference was not significant. In the nutrition section, the responses to both “How able are you to recommend healthy foods to a pregnant mother?” (4.83 vs. 4.69, $p=0.33$) and “How able are you to identify foods to avoid in pregnancy?” (4.93 vs. 4.54, $p=0.039$) decreased, but only the latter was significant (**Table 4**).

Throughout the week, students made observations about the *parteras*’ knowledge base, learning style and scope of practice. These observations were shared during student meetings following each day of training administration.

1. Knowledge Base

Throughout the sessions, students were generally impressed by the breadth of the *parteras*’ knowledge. There were a few key areas that stood out as places for improvement. First, the *parteras* struggled with naming and identifying the function of both male and female anatomy. In one activity, a large image of first male and then female genitalia was projected, and volunteers were asked to identify anatomic landmarks. Even with help from the audience, many could not

complete the task. There was a similar inability to label parts of the reproductive cycle, fertilization and contraception, or to answer basic questions about these topics during sessions.

Parteras also had little awareness of nutrition, including basic food groups and sources of nutrients. Students tried to find culturally relevant examples of foods comprising a complete diet; however, still there seemed to be a disconnect with the participants on this topic. *Parteras* had strong opinions about the importance of “hot and cold” foods to give during pregnancy based on cultural practices related to traditional medicine in the area.

2. Learning Style

The staff in Puerto Escondido informed students that the *parteras* learned more effectively through activities than formal presentations. Through the week, this message was reinforced. The *parteras* enthusiastically joined in group activities, generating pictorial lists of risk factors or placing pictures of pregnancy symptoms on poster boards representing the three trimesters. In teaching physical exam skills, the *parteras* learned best by doing: for example, during the session on determining fetal lie, many of the *parteras* began teaching each other on the medical student models, accurately assessing the fetal position and demonstrating version maneuvers if the baby was malpositioned.

3. Scope of Practice

We attempted a diagnostic exercise with the women to help with the evaluation of and early intervention for postpartum hemorrhage (PPH). The exercise began with a description of the three main causes of PPH and the examinations necessary to determine the source of bleeding (palpating the uterus, examining the perineum, and checking the placenta to ensure it is complete). After a call and response-style review, the participants broke into small groups to evaluate a hypothetical patient who was bleeding after delivery. A brief description of the delivery was given, and the *parteras* were asked what to do next. Inevitably the participants would respond “take her to the hospital,” rather than check for the source of bleeding. Even when walked through the steps again and shown pictures representing uterine atony, retained placenta and perineal lacerations, the participants remained firm in their response. Through discussions with the physician and nurse supervising the program we learned that the Mexican Ministry of Health has emphasized rapid referral, and that the *parteras* worry there will be repercussions for delaying transport for any reason. We were therefore unable to determine if the *parteras* have difficulty with clinical reasoning, if our lesson was unclear, or if their responses were due to a prioritization of referral resulting from government’s recommendations for prompt hospital transfer.

4. Miscellaneous:

The *parteras* appeared to truly enjoy working with the students. *Parteras* would seek out students on breaks and at lunch, excited to share experiences. One interesting connection came on the first day of training. The leaders began the session with an icebreaker where participants passed string throughout the circle and allowed each person to share a few lines about themselves. The participants told stories from their communities, and had to be prompted to move on to the next participant. Some of the most joyous moments of the training occurred

during breaks, when the students would lead line dances. The *parteras* were grateful for these “exercise classes” and requested them each day. The *parteras* were similarly excited to teach the students, and would frequently share an herbal remedy or a different obstetric method to broaden the students’ knowledge. At the end of the training, many of the *parteras* shared their gratitude for the teaching. Some requested students’ e-mail addresses so they could use their daughter or cousin’s e-mail account to stay in touch (few of the *parteras* had personal access to a computer).

Discussion:

Participants in a four-day training program led by local physicians, public health officials, and visiting medical students, under the auspices of a longitudinally-engaged global health partnership between an entity in the US and local stakeholders, demonstrated statistically significant improvements in their self-reported knowledge of and ability to perform certain obstetric tasks in 5 of 12 topics outlined by the Mexican Ministry of Health. Participants demonstrated a non-statistically significant improvement in an additional 5 of 12 topics, with a not statistically significant decrease in 2 of 12 topics.

Several conclusions could be drawn about the topics where participant knowledge and ability decreased during training. First, trainings could have increased confusion, causing the *parteras* to muddle rather than clarify understanding. Participants may have overrated their knowledge of the topic prior to the lesson, and after learning more, realized their overestimation. Similarly, upon realizing the scope of a topic, participants may have felt less confidence in their mastery.

We suspect the decreased post-intervention knowledge of postpartum care and nutrition is due to the latter two explanations. With regards to the postpartum period, and particularly postpartum hemorrhage and infection, *parteras* have been taught to immediately refer any bleeding patient to a health center. Prompt referral is certainly appropriate, especially because many of the *parteras* live hours from established medical facilities, and transport time may be great. Still, if *parteras* can make basic assessments and engage in cause-specific treatments while awaiting/ during transport, mortality rates may be improved. With regards to nutrition, *parteras* were unaware of the categorization of foods and many of the specific needs during pregnancy, in spite of being quite knowledgeable of traditional foods and taboos. It is possible that by sharing more information, the *parteras* realized nutrition is a much broader topic than they originally thought.

Student observations suggest that *parteras* are both accepting of and enthusiastic about partnering with medical students as instructors, and that they are willing to both teach and learn in a reciprocal model. Participants were dedicated to improving their skills throughout the session and were receptive to new information. Furthermore, *parteras* recognized the connections with students as longer lasting than one training period and tried to maintain global connections at the training’s conclusion.

Medical students are increasingly seeking opportunities abroad to hone their diagnostic skills in low resource settings, observe cultural differences in administration of care, and provide

sustainable impacts in communities with fewer resources than their own (AAMC 2013, Crump and Sugarman, 2010). Students who participate in clinical rotations may fulfill the first two of these three goals but miss the final one. Expanding medical student experiences abroad to include training programs for local health professions, when done in concert with local health experts and facilitating organizations, may be an important step in improving student experience, improving relationships with the community while also providing meaningful impacts. Our reflections further support the integration of US medical student global health education and service into existing health systems clinical and training efforts.¹²

This program assessment is limited by several factors. First, self-reported knowledge and ability are not necessarily reflections of true capacity. More extensive measures such as those listed above with role-plays and checklists, simulations and interviewer-administered tools will be needed to draw firm conclusions. Furthermore, the study looks only at two time points, both within training, and cannot be extrapolated to draw conclusions about the *parteras* once they return to their villages. Finally, several difficulties arose with even the most basic assessment due to illiteracy and innumeracy. Any study in this population will continue to face similar barriers to capturing participants' perspectives, and we believe we have accurately captured *parteras*' experiences.

In spite of these challenges, this program assessment provides valuable insights into teaching TBAs and assessing these interventions. Medical students traveling abroad can provide valuable services through training programs such as these. Programs should rely heavily on interactive activities with visual representations, models and role-plays wherever possible. Partnering with local health officials and organizations to facilitate logistics and ongoing North-South relationships is crucial for ensuring that training reflects local recommendations and is sustained. Assessments of confidence may be difficult with certain populations; however, self-reported knowledge and ability were tangible concepts for the studied population. Assessments should be targeted for populations that are both illiterate and innumerate. Hopefully future programs will be able to utilize more extensive measures of impact.

In sum, we believe training programs for TBAs led by medical students, with oversight from local health professionals, are both welcome and impactful. Interventions such as these may bring developing nations closer to the Millennium Development Goals of birth attendance, address maternal mortality, and create lasting ties between institutions and communities.

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Conflict of Interest:

The authors have no conflict of interest to disclose.

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Tables and Figures:

Table 1: Topics Outlined by the Mexican Ministry of Health for *Partera* Training

Topic	Subtopics
Risk Factors	Personal risk factors (substance use, STIs) Environmental Risk Factors Domestic Violence
Anatomy and Physiology	Names and function of male/female reproductive parts Conception Reproductive cycle
Normal Pregnancy	Normal signs and symptoms of pregnancy by trimester Concerning signs and symptoms of pregnancy
Complicated Pregnancy	Symptoms and management of Preeclampsia,

	<p>hyperemesis gravidum, ectopic pregnancy/abortion, vaginal bleeding in pregnancy</p> <p>Management of risk factors for complications</p> <p>Know when to refer patient to hospital</p>
Prenatal Care	<p>Basic recommendations for prenatal appointments by trimester</p> <p>Proper history, exam and tests for pregnant women</p> <p>Nutrition in pregnancy</p> <p>Lifestyle modifications in pregnancy</p>
Normal Labor	<p>Stages of labor and fetal movements</p> <p>History and exam of patient in labor</p> <p>Management of labor</p> <p>Delivery maneuvers</p>
Complicated Labor	<p>Preterm labor</p> <p>(Preterm) Premature Rupture of Membranes</p> <p>Prolonged labor</p>
Neonatal Care	<p>Immediate care of newborn</p> <p>Determining need for referral</p> <p>Alarm signs for the newborn</p>
Postpartum Care	<p>Delivery of the placenta</p> <p>Care in the postpartum period</p> <p>Management of postpartum hemorrhage</p> <p>Prevention and management of infection postpartum</p>
Lactation	<p>Benefits of breastfeeding</p> <p>Steps for successful breastfeeding</p> <p>Complications of breastfeeding</p>
Contraception	<p>Forms of birth control</p> <p>Use of emergency contraception</p> <p>Methods of permanent birth control</p>
Nutrition	<p>Basic food groups, vitamins and minerals</p> <p>Foods to avoid in pregnancy</p> <p>Proper weight gain</p>

Figure 1: Sample section of questions from orally administered survey



Figure 2: Revised survey form for orally administered survey

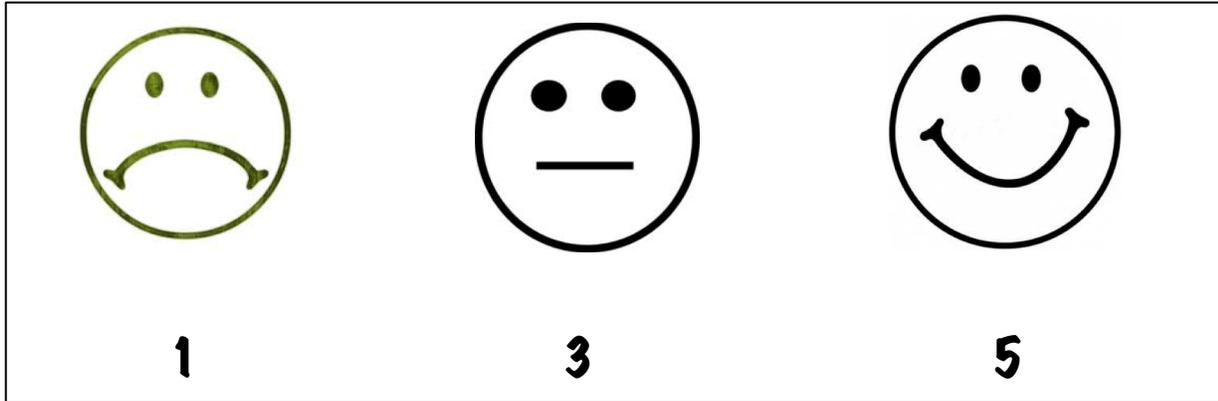


Table 2: Pre/Post-Test Questions by topic

Topic	Subtopics
Risk Factors	How able are you to explain the consequences of smoking/drinking during pregnancy? How able are you to identify common symptoms of STIs? How much do you know about identifying risk factors in the home?
Anatomy and Physiology	How much do you think you know about the reproductive organs? How able are you to explain a woman's menstruation and fertility to her?
Normal Pregnancy	How much do you know about when to send a woman to the hospital How able are you to recognize the normal and abnormal signs and symptoms of pregnancy?
Complicated Pregnancy	How able are you to recognize the symptoms of pregnancy complications?

	How able are you to identify when a woman needs to go to the hospital? How able are you to manage risk factors for complications in pregnancy?
Prenatal Care	How able are you to provide basic recommendations for prenatal care? How able are you to ask the right questions in a prenatal visit? How much do you know about what nutritional supplementation women need? How much do you know about the lifestyle modifications women should follow while pregnant?
Normal Labor	How able are you to determine where a woman is in the course of normal labor? How able are you to evaluate the fetus during normal labor? How able are you to manage maternal wellbeing during the course of labor?
Complicated Labor	How able are you to take care of a women who comes to you in preterm labor? How able are you to take care of a women who comes to you with premature rupture of membranes? How able are you to take care of a women with prolonged labor?
Neonatal Care	How able are you to care for the newborn? How able are you to decide when a baby needs to go to the health center (Centro de Salud)? How able are you to explain alarm symptoms to the mother?
Postpartum Care	How able are you to remove the placenta? How able are you to care for the women after delivery? How able are you to manage excessive bleeding after delivery? How able are you to care for a woman with infection after delivery?
Lactation	How able are you to explain breastfeeding to a mother? How able are you to explain the complications of breastfeeding to a mother?
Contraception	How able are you to counsel a woman about contraception? How able are you to counsel men on vasectomies?
Nutrition	How able are you to recommend healthy foods to a pregnant mother? How able are you to identify foods to avoid in pregnancy?

Table 3: Pre and post-test average response by topic

Education Topic	Pre-test	Post-test	t-score	p-value	N
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	Average	Average			
Risk Factors	4.06	4.54	-0.7	0.5	12
Normal Pregnancy	4.39	4.91	-2.75	0.01*	28
Anatomy	3.78	4.46	-2.96	0.0068*	25
Complicated Pregnancy	4.59	4.94	-2.79	0.009*	31
Prenatal Care	4.2	4.72	-3.28	0.0028*	29
Healthy Delivery	4.57	4.63	-0.66	0.52	31
Complicated Delivery	4.2	4.65	-2.59	0.016*	27
Neonatal Care	4.73	4.75	-0.27	0.79	31
Postpartum Care	4.7	4.66	0.25	0.8	32
Nutrition	4.88	4.65	1.89	0.07	29
Lactation	4.61	4.75	-0.78	0.44	30
Contraception	4.84	4.85	-1.81	0.083	26

*p<0.05

Participants were asked to report their knowledge of/ability to perform basic obstetric topics before and after lessons. Responses were pooled by topic, with means displayed above.

Table 4: Sections demonstrating decrease in knowledge by question

	Pre-test Average	Post-test Average	t-score	p-value	N
Postpartum Care					
Q1	4.63	4.8	-0.89	0.38	30
Q2	4.59	4.67	0	1	30
Q3	4.85	4.7	1.37	0.19	19
Q4	4.91	4.79	1	0.34	14
Nutrition					
Q1	4.83	4.69	1	0.33	25
Q2	4.93	4.54	2.18	0.039*	27

*p<0.05