RESEARCH ARTICLE

Mixed Methods Evaluation and Teaching with Guatemalan Lay Midwives about Obstetrical Emergencies

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Abstract

Guatemalan lay midwives are on the front lines of a crisis. The Maternal Mortality Rate (MMR) in Guatemala is 65th highest in the world at 120 deaths per 1,000 births. Part of the problems is not lay midwives attend the majority of births despite lacking knowledge about obstetrical emergencies. Government training programs established in 1955 have not changed lay midwives' knowledge, partially due to culturally insensitively. Government training programs are taught in Spanish with written material, even though most lay midwives are illiterate and speak Mayan dialects. The purpose of this mixed methods study was threefold: to explore lay midwives' knowledge, attitudes and practices about obstetrical emergencies, to evaluate the effect of a culturally sensitive oral teaching in the native language on lay midwives' knowledge of obstetrical emergencies, and to determine if lay midwives retained knowledge from a past, culturally sensitive oral teaching in the native. language about postpartum hemorrhage (PPH).
During two weeks in September 2016, 191 lay midwives from more than 30 villages participated in 11 trainings throughout the remote Peten. A one-group pretest posttest design was used for the quantitative evaluation. Focus groups were used for the qualitative evaluation. The Long Table Approach was used to develop a matrix of common themes from focus groups. A checklist from the American College of Nurse Midwives (ACNM) was used to evaluate knowledge of obstetrical emergencies and of PPH before and after the teaching. Results indicated lay midwives retained knowledge about obstetrical emergencies immediately after the culturally sensitive teaching, but not about PPH eight years later. Focus groups themes revealed lay midwives lack education, equipment, support and transportation for addressing obstetrical emergencies. Future teachings should use a similar format to address the needs of illiterate participants in resource-poor settings and should retest participants within a year

Key Words: Guatemalan lay midwives, obstetrical emergencies, PPH, resource-poor setting, culturally sensitive teaching

1.0 Introduction

Global Health Policy for the World Health Organization's (WHO) Safe Motherhood Initiative (SMI) launched in 1987, aims to improve maternal and child outcomes in the world's poorest countries, including Guatemala (1). Regardless of the WHO's intentions, Guatemala's MMR ranks 65 highest in the world at 120 deaths per 100,000 births (2). In fact, the country's MMR has not declined statistically in more than 20 years. (3) A contributing factor to Guatemala's MMR is lay midwives attend most births, an estimated 60 to 90 percent, at home (4, 5, 6) despite lacking knowledge about obstetrical emergencies (7, 8, 9).

Government training programs, established in 1955, have not changed lay midwives' knowledge, particularly due to culturally insensitivity (8, 9). Government training programs are taught in Spanish with written material even though most lay midwives are illiterate and speak indigenous dialects (8-11).

Government training programs also recommend hospital transfers for obstetrical emergencies, despite patients lacking resources, such as transportation (6, 7, (5, 6, 12-16) and resisting transfer due to distrust of hospital providers (9, 16, 17) Finally, government training programs condemn lay midwives' practices (11, 12, 18) even though lay midwives are well-respected community leaders (19, 20).

Discord among government officials and lay midwives stems from Guatemala's 36-year civil war. The European-dominated government and guerillas fought the civil war primarily over land use issues (21). Historically, Europeans have dominated indigenous Mayans since their arrival in Guatemala in the 16th century. The civil war, which lasted from 1960 to 1996, was the longest civil war in the history of Central America. The war claimed more than 200,000 lives. A disproportion share of the fatalities, or 83%, was indigenous (21).

Since lay midwives are on the front lines of addressing the MMR in Guatemala, this study investigated the effect of a culturally sensitive oral teaching in the native language on lay midwives' knowledge of obstetrical emergencies. Previous studies have shown success educating illiterate lay midwives orally in their native language (7, 8, 15).

Madeline Leininger's Cultural Care Theory suggests people are more likely to accept etic information from outside their culture after providing emic information from inside their culture (22). Therefore, each culturally sensitive training began with a focus group to better understand the lived experience of lay midwives' struggle with obstetrical emergencies. Focus groups investigated lay midwives' knowledge, practices and attitudes about obstetrical emergencies to facilitate future action research aimed at improving the country's MMR.

After lay midwives shared emic knowledge in focus groups, they attended a culturally sensitive training that presented etic knowledge about obstetrical emergencies. The training relied on the ACNM's Home Based Life Saving Skills (HBLSS) curriculum that has been field tested throughout the third world (23). The Women Problems curriculum includes a Six-Item Take Card about 1) bleeding, 2) preeclampsia, 3) breast, uterine or and urinary infections, 4) birth delay, 5) grand multiparas, and 6) malaria and vaginal infections. The curriculum was presented orally in the native language of participants. The purpose of the checklist was to evaluate lay midwives' knowledge about obstetrical emergencies before and after the teaching.

2.0 Methods

Ministry of Health workers in the remote Peten, the northernmost Guatemalan department, sought help from Refuge International in educating lay midwives

about obstetrical emergencies. Refuge International is a U.S. Non-Governmental Organization (NGO) that has run four clinics in Guatemala, including Sarstun, since 1997. Rotary International granted Refuge International $160,000 to address maternal and infant health in the Peten. Most of the grant paid to ship retired hospital equipment from the U.S. to the central referral hospital in San Benito. Some of the grant also paid to educate lay midwives about obstetrical emergencies.

Ministry of Health workers identified 10 locations throughout the Peten for the half-day trainings in September of 2017. An 11th training was held in Sarstun at Refuge International has a health clinic where a previous culturally sensitive training was held in 2009 about PPH. The Peten, is the largest department in Guatemala, comprising 21% of the population and a third of the landmass. The Peten, which is more remote than southern Guatemala, did not have its first paved road in 1982. The area which is home to Pre-Columbia Mayan settlements, such as Tikal and Mirador, is 55% urban, 45% rural, as well as 20% indigenous and 80% Ladino.

The department has three national hospitals, one southeast in Poptun, one northeast in Melchor de Menos near Belize, and one northwest in Naranjo near Mexico. Most of the trainings occurred near Melchor de Menos and San Benito. Sarstun, in the southeast, and Laguna del Tigre, a protected rainforest in the northwest, were the two most remote locations. In Laguna del Tigre, patients must travel several hours by motor vehicle on dirt roads that are not passable in the rainy season to reach a river where they need a boat to cross, and then travel several more hours by motor vehicle to the hospital. In Sarstun, all lay midwives were indigenous. Most are subsistence farmers who live in lean tos with dirt floors on the mountainside. Their patients must walk several hours down the mountain to reach a river and then travel several hours by boat to the nearest hospital in Livingston in the department of Izabal.

Trainings were held at health clinics and schools throughout the region. A total of 191 lay midwives from more than 50 villages participated. Inclusion criteria was self-identification as a Guatemalan lay midwife. Upon arrival, lay midwives were told about the purpose of the study and the training. An Internal Review Board granted the study an exempt status. Lay midwives were informed their participation was voluntary and would be seen as consent.

Next, lay midwives were individually asked demographic and background data. For the pre-test, lay midwives were asked reasons they would transfer patients to the hospital. Questions were posed in their native language. Answers were compared to the Six-Item Women-Problems Checklist. Then, lay midwives were invited to share on audiotape their lived experience of addressing obstetrical emergencies. Focus groups were moderated in Spanish, following an interview guide. The moderator posed open-ended questions about lay midwives' knowledge, attitudes and practices. In Sarstun and San Francisco, most participants spoke Kek Chi so questions were translated into Kek Chi. Responses were translated into Spanish so the moderator could follow along and seek clarification or probe deeper if necessary.

Participants were asked to share stories of obstetrical emergencies they experienced. Specifically, they were asked how they responded, if they accompanied patients to the hospital, distance traveled, means of transport, reactions from patients, families, communities and hospital providers, and assistance they need to better perform their duties.

Focus groups were an average of 34 minutes, ranging 18 to 51 minutes. Focus

group size varied from 12 to 29 participants. Despite 10 to 12 participants being ideal for focus groups, no lay midwives were denied an opportunity to share given the long distances they traveled and the unique opportunity to capture a large sample size of lay midwives about a crucial health topic.

After the focus groups, lay midwives were given a snack of cookies and sodas while participating in a culturally sensitive oral teaching in their native language. Nine groups consisted mainly of Spanish speakers. In Sarstun, all participants spoke Kek Chi. In San Francisco, most participants spoke indigenous languages. Trainings were provided in Spanish and translated into Kek Chi when necessary. Lay midwives were given three, double-sided, Take Action Cards from the HBLSS to remind them of the steps to take if they experienced obstetrical emergencies. The laminated cards were translated into Kek Chi and Spanish.

After the culturally sensitive teaching, lay midwives were again individually asked reasons they would transfer patients to the hospital for the post test. Answers were again compared to the Six-item Women-Problems Checklist. Lay midwives were then thanked for their participation and given birthing kits Zonta Club from Bradford, PA had donated. The kits were supplemented by Refuge international, and contained umbilical cord clamps and tape, razors, measure tape, plastic gloves, absorbent under pads, soap, and iodine.

Ministry of Health workers also distributed a Registration Book in all locations except Sarstun. The first three pages of the book list antepartum, intrapartum and postpartum "Signs of Danger." Lay midwives in all locations, except Sarstun, were also given a travel stipend from Rotary International depending on the distance they traveled.

Sarstun was not part of the Rotary International grant but was included in the study due to Refuge International's presence there. In 2009, 13 lay midwives participated in a similar, culturally sensitive teaching based on the HBLSS curriculum regarding PPH. Lay midwives from the 2009 study were retested during the 2017 study to see if they retained knowledge about PPH, and if they still had their Take Action Cards.

Five instruments were used to collect quantitative data, including a Women Problems Take Action Card, a PPH Take Action Card, a Demographic Data Sheet (DDS), a Background Data Sheet (BDS) for obstetrical emergencies and a BDS for PPH. For qualitative data, focus groups were transcribed and translated from Spanish or Kek Chi in English using Breslin's method of translation. In addition, focus group audiotapes were compared to field notes to emphasize voice inflection, significant statements and group agreement with individual comments. Field notes were compared to impressions from support staff for accuracy.

The Long Table approach was used to analyze English language transcriptions in consultation with a senior nurse researcher and a newspaper editor to develop a matrix of common themes. Prominent themes are reported with supporting quotes from lay midwives. The quantitative arm of the study relied on frequencies and measures of central tendency to evaluate demographic and background data. The DDS examined age, gender, language, literacy, years of formal education, and of lay midwifery experience. The BDS for obstetrical emergencies evaluated comfort making transfers, previous reasons for transfers, and distance from hospitals. The BDS for PPH examined if lay midwives still had their Take Action Cards, and if they valued the cards.

PPH Take Action Cards listed 10 steps, including 1) call for help 2) put the baby to breast 3) place the baby skin to skin 4) roll

the nipples 5) massage the uterus 6) hold the uterus with two hands 7) empty the bladder 8) put a pad between the patient's legs 9) place nothing in the vagina and 10) transfer the patient. Scores for both Take Action Cards were the total number of correct answers given on the pretest and posttest. Scores ranged from 0 to 10. Change in level of knowledge was measured by comparing the pretest and post test scores.

3.0 Results

The mean age of participants was 55.42 with a range of 20 to 84 years old. The mean number of years as a lay midwife was 23.62 years with a range of one to 55 years. Participants were 98% female and 2% male. Fifty-nine percent of lay midwives were illiterate with a range of no schooling to nine years of formal education. Language distribution was 65% Spanish, 18% Kek Chi, 12% Kek Chi and Spanish, and 5% other indigenous dialects, such as Mam, Achi, Chorti, and Kaqchiquel, and either Kek Chi or Spanish. The average distance traveled to hospitals was 79 kilometers with a range of one to 400 kilometers. In the most remote areas, lay midwives from Sarstun traveled an average of 213 kilometers with a range of 18 to 400 kilometers to the hospital, and lay midwives from Santa Marta traveled an average of 165 kilometers with a range of 20 to 400 kilometers to the hospital.

The BDS for Women Problems showed 83% of lay midwives were comfortable making transfers. Nearly 58% of the lay midwives who were not comfortable making transfers were indigenous. The largest concentrations of indigenous lay midwives coincided with the largest number of lay midwives who were not comfortable transferring patients. These two groups of lay midwives were in Sarstun and San Francisco. Nearly 25% of Sarstun lay midwives and 34% lay midwives from San Francisco were not comfortable making transfers. All lay midwives from Sarstun and 66% of lay midwives from San Francisco were indigenous

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Nearly 30% of lay midwives had never made transfers. The largest concentrations of lay midwives who denied transferring patients were in Macanche and Santa Marta. Nearly 59% of Santa Marta lay midwives and 57% Macanche lay midwives had never made transfers. Santa Marta is across the San Pedro River from Laguna del Tigre and closer to the referral hospital in San Benito than Santa Amelia in Laguna del Tigre. Santa Marta is 13 kilometers north, while Macanche is 37 kilometers east of the referral hospital in San Benito. A significant correlation did not exist between the distance lay midwives lived from hospitals and transferring patients. Nearly 72% of lay midwives who lived 320 or more kilometers from hospitals said they had made transfers.

Lay midwives related multiple reasons for transferring patients. Reasons and frequency of reasons were 52 for bleeding, 36 for poor fetal position, 33 for birth delay, 15 for headaches, 12 for primiparas, 11 for rupture of membranes without contractions, and 10 for fever. Other less common reasons for referrals and frequency of reasons were 7 for hypertension, 5 for abdominal pain, and 4 for placenta previa.

Lay midwives listed similar reasons when asked on the pretest and posttest why they would transfer patients. Reasons and frequency of reasons were 64 for fetus in poor position, 19 for weak patient, 16 for retained placenta, 16 for nausea and vomiting, 12 for primiparas, 12 for dizziness and 11 for anemia. Other less common reasons and frequencies of reasons included 7 for cord prolapse, 6 for placenta previa, and 5 for low blood pressure.

The BDS regarding PPH revealed 75% of

lay midwives who participated in the 2009 training no longer had their Take Action Cards, yet 92% said the cards were useful.

The mean score on the Women Problems pretest was 5.006 +/- SD 0.291 compared to the mean posttest score of 8.549 +/- SD 0.201. Change in knowledge was a *P* value of 0.00 which is statistically significant.

In 2009, the mean score on the PPH pretest was 1.385 +/- SD 0.870 (1-3) compared to the mean posttest score of 4.86 +/- 0.899 (3-6). The sample size was not large enough to determine if the difference was significant but the raw scores clearly indicated an increase in knowledge after the educational intervention (7, 15).

In 2016, the mean retest score for PPH was 1.718 +/- SD 0.930 which doesn't indicate knowledge retention. The BDS regarding PPH indicated 75% of Sarstun lay midwives who participated in the 2009 training no longer had their Take Action Cards, yet 92% said the cards were useful.

Qualitative results revealed five themes emerged from focus groups. Lay midwives lack training, equipment, transportation and community support for obstetrical emergencies. Lay midwives from the most remote areas feel fear and despair addressing obstetrical emergencies.

1) Lay midwives are eager to learn and lack consistent training. Government training programs are often sporadic, despite lay midwives' desire to learn. A San Benito lay midwife stated, “We need more studies so we can endure more experiences. Also, we need trainings that are more frequent. We need a lot, more trainings, more experiences so we don’t feel embarrassed to talk about our opinions.”

2) Lay midwives lack the most basic tools for their job. Duffle bags with supplies had previously been distributed at government training programs, but lately the bags have been in short supply. The bags included a fetoscope, flashlight, raincoat, nylon to place under the patient, umbilical cord tape, a tape measure, scissors, gloves, sheets, gauze, alcohol, hand sanitizer, and a metal container for sterilizing equipment. A Machance lay midwife said, “We need so much. Sometimes the little that we have, we develop and later, we are stuck only with what we have, for lack of training, for lack of equipment, for lack of instructions. We are left paralyzed.”

3) Lay midwives lack transportation for hospital transfers. Lay midwives from rural areas sometimes transport patients in a hammock or on a stretcher. Sometimes they walk or ride a horse to reach a road where they might not find a motor vehicle. Sometimes they need to a boat or to pay a bribe to cross a river. Sometimes they employ a combination of tactics. One Kek Chi lay midwife from Tikalito stated, "If we see a problem with the woman, we send her to the hospital. We look for a car. Sometimes there's not a car, we carry the woman in a hammock. We look for a hammock to carry the people. When we cross the river, we go in a canoe.”
Even lay midwives from urban areas face transportation challenges. A Melchor de Mencos lay midwife said, "I live four kilometers from the hospital. The problem with cars that people rent is there are none to take from here. One goes to look for a car, and there are none to bring people here. It happened to me not long ago. I went at six in the morning. I was there waiting almost two hours to rent a car, and I could not come. Therefore, when there are four more people it’s even harder to get a car. You can spend a lot of time waiting for a car to bring

you here."

4) Lay midwives encounter resistance to hospital transfers from a machismo culture that devalues women. Ministry of Health workers recalled several maternal deaths due to fathers who refused to send partners with obstetrical emergencies to hospitals. They also stated sometimes fathers abandon their partners and babies if a girl is born instead of a boy. And, they chastised lay midwives for supporting the machismo system by sometimes charging more to attend the births of males than females.

Lay midwives stated they encourage fathers antenatally to save money for emergencies. Lay midwives tell fathers they are responsible financially for hospital transport. A Mum lay midwife from San Francisco stated, "No one wants the baby or the mother to die. Therefore, the person who is at fault is the father because he has to save his money. We midwives have the obligation to go with the patient."

5) Lay midwives from remote areas feel fear and despair addressing obstetrical emergencies. Half the Kek Chi lay midwives from Sarstun expressed this sentiment, one stated, "When we know about a woman in pregnancy that is not healthy, if that woman does not get well, it's on the midwife's head if that woman dies, as far as we hear. That is what scares us."

Indeed, a Ministry of Health worker used a threatening tone with lay midwives in Laguna del Tigre, saying, "Look, midwives need to know the signs of danger in pregnant women. You have the obligation to take them to the doctor. You midwives yourselves don't have the experience that a doctor has. Not all the people are going to be grateful for your help but there is a God, and God is going to recompense you. We are saving lives, and God is going to give us satisfaction for everything we have endured. Do not expect people are going to reward you. We are waiting for God."

Two lay midwives cried when describing the isolation they feel. A San Jose lay midwife said, "It is not easy to send a woman to the hospital. It is sad. We are happy when a birth goes well. Some people come from far away and when they arrive at the hospital, they are dead. Therefore, to go to the hospital, they suffer."

A final, Laguna del Tigre lay midwife summed up the struggles of lay midwives who are well respected community leaders often left thankless, stating, "The midwife puts up with a lot. She puts up with hunger. She puts up with cold without being paid and without sleeping. Sometimes we don't even stop for water because we are saving the lives of our female companions."

4.0 Discussion

Significantly, quantitative data from this study demonstrates a culturally sensitive oral teaching in the native language positively affects lay midwives' knowledge about obstetrical emergencies, which is consistent with literature findings (7, 8, 15). This study contrasts with literature reports that government training programs have not changed lay midwives knowledge (8, 9). Participants in this study recalled many of the "Signs of Danger" listed in the front of the Registration Book distributed by the Ministry of Health. The Registration book was published in 2014 so the literature may be out of date with current practice.

In addition, pictures in the Registration Book may be easier for illiterate audiences to understand. The Registration Book pictures are in color and depict just one "sign of danger" per picture while the ACNM Take Action Cards are in black and white, and are busier. Some Take Action Cards show as many as four Woman Problems on one picture.

Lay midwives who participated in the culturally sensitive training program occasionally struggled with interpreting the Take Action Cards, providing evidence that interpreting pictures requires literacy. One participant was holding a Take Action Card upside down. Also, lay midwives were told they could refer to the Take Action Cards when taking the posttest, but some lay midwives did not refer to their Take Action Cards, even when reminded. Finally, some lay midwives did not appropriately interpret the pictures when asked for their meanings.

Further evidence that lay midwives without formal education may not find useful picture reminders of obstetrical emergencies is that most lay midwives from Sarstun no longer had their Take Action Cards about PPH, despite saying they valued the cards. Had resources been available lay midwives should have been revisited a year after the first teaching. Several ACNM studies have demonstrated knowledge retention among lay midwives a year after the initial HBLSS training in Ethiopia, Bangladesh and Liberia (24, 25).

Equally critical to lay midwives recognizing signs of danger are the tremendous hurdles lay midwives face when transferring patients. Lay midwives lack consistent training, equipment, transportation and community support when making transfers. The delays patients encounter receiving treatment account for 23% of maternal deaths in Guatemala (26).

To address this shortfall, the government should consider developing a Centers of Integral Attention for Mothers and Infants (CAIMI). CAIMIs are supposed to be birthing centers in health care clinics located throughout the country. Health care clinics are closer to outlying towns and rural village than hospitals, and therefore more accessible for patients.

If lay midwives could bring patients with obstetrical issues to CAIMIs, health care workers could triage patients at the clinic and either treat patients there or send them by ambulance to the hospital. A CAIMI system would relieve pressure on the over-burdened, national hospital system. Such a CAIMI was set up in the health clinic in San Jose where one of the culturally sensitive trainings was held. However, the birthing center has never been staffed.

Two Maternity Waiting Homes (MWH) exist in Huehuetenango and Cuilco in the Department of Huehuetenango. Both are staffed, however, an analysis of the effect of the MWHs on obstetrical outcomes has not been published. Furthermore, the following issues have been identified with the MWHs. Patients who are most in need, such as indigenous women from remote areas, underutilize the MWHs. Many pregnant women who used the MWH's did not have high risk pregnancies. Personnel at the MWHs were not culturally sensitive to pregnant women. Finally, the MWHs lacked sustained funding (27).

5.0 Conclusion

Future studies for illiterate audiences in low-resource settings should provide educational offerings orally in the native language of participants. Pictorial reminders of educational content should be simple and bear in mind culturally considerations. If participants live in lean tos on the mountainside, educational material should be laminated. Also, interpreting pictures is literacy. Participants in educational offerings should be revisited at least once a year for retraining and retesting of knowledge retention.

Besides shoring up training for lay

midwives, the brunt of responsibility for Guatemala's MMR should be spread out more evenly among lay midwives, communities and the government. Communities are encouraged to have emergency committees to mobilize for health concerns, such as obstetrical issues, but most lay midwives stated such committees did not exist in their communities. In addition, the government should consider developing a CAMI system to relieve pressure on the over-burdened hospital system.

Regardless of improving emergency committees and birthing centers, leaving Guatemalan lay midwives on the front lines of obstetrical emergencies without equipment, training, transportation and support is a woefully inadequate means of addressing the country's MMR, especially when these well-respected community leaders often lack sleep and payment for the sacrifices they make to support pregnant women. who often work for free in the middle of the night.

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