



EDUCATION & TRAINING

Using Village Health Teams for Effective Ultrasound Education in Rural Uganda

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Abstract

Maternal and child health conditions, many of which can be detected by ultrasound, represent the highest burden of disease in Uganda. Imaging the World (ITW) is a not-for-profit organization which integrates high quality, affordable ultrasound services into rural health facilities. Of all the challenges faced with implementation of ITW programs in Uganda, lack of sensitization to ultrasound represented the greatest barrier. The Village Health Team (VHT) is an existing public health “train the trainer” model, sponsored by the Uganda Ministry of Health, that provides public health training to community volunteers. Trained VHT members were recruited to help with ultrasound community outreach and education. These VHT members were successful in achieving dramatic community acceptance and increased utilization of ultrasound services in rural communities. This has led to significant contributions in improving population health in low-resource settings.

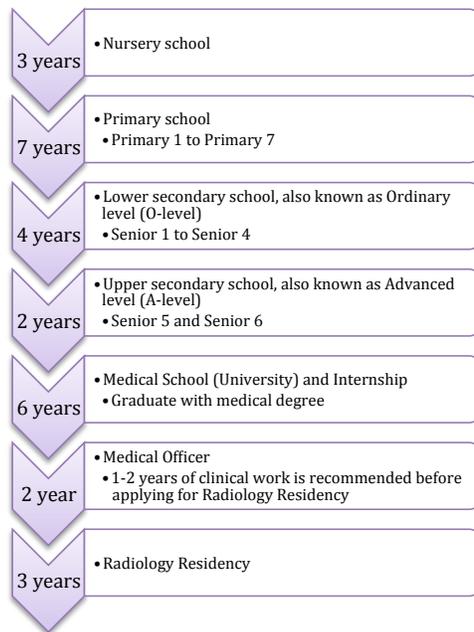
Introduction

UGANDA is a landlocked country located in East-Central Africa, bordered by Kenya, South Sudan, Democratic Republic of the Congo, Rwanda and Tanzania. With a population of 38 million, the proportion of people living below the poverty line in Uganda has significantly declined over the last few decades. However, the country remains one of the poorest, ranking 164 on the global Human Development Index (1). Agriculture employs over 80% of the work force, with coffee being the major export. Ninety percent of inhabitants live in rural areas with limited access to resources, including water, electricity and healthcare (2). The overall health status of Ugandans is poor, with a low life expectancy (55 years) and high level of mortality. The health sector is plagued by poor quality healthcare, compounded by a lack of human resources, which has led to an inefficient delivery system (3). Healthcare issues that are typically seen in low-income countries in sub-Saharan Africa prevail in Uganda. The present ratio of available health staff (doctors, nurses, midwives) to people is 1 to 1,818, far below the World Health Organization (WHO) recommended minimum standard. The WHO considers countries with less than one health worker per 439 people to have a critical shortage (4). Furthermore, nearly

70% of medical doctors and 40% of nurses and midwives work in urban areas, serving 13% of the population (5). In Uganda there is one radiologist for every 1.2 million people. Radiology specialty training is available in the country, but is relatively difficult to achieve due to the length of training (Figure 1), and tuition fees in excess of 27 million Ugandan shillings (approximately \$7,500 USD) per year.

Maternal and child health conditions carry the highest total burden of illness in the country, with perinatal and maternal illness accounting for 20.4% of the total disease burden (6, 7). Strategies to improve morbidity and mortality have made some progress over the last decade, but have failed to fully achieve the targets for the United Nations Millennium Development Goals 4 and 5 by 2015 (8). The leading cause of death for girls under age 18 is complications from pregnancy. Many of the common complications - multiple gestations, malpresentation, and abnormal placentation - can be detected by ultrasound.

To close the gap in imaging services in low-resource geographies like Uganda, Imaging the World (ITW) was founded by two American radiologists in 2007 (www.imagingtheworld.org). The mission of this not-for-profit organization is to integrate high quality, affordable ultrasound services into lower level health facilities (9). Since its inception, ITW

Figure 1. Education of a radiologist in Uganda.

has operated at facilities serving rural communities throughout Uganda (Figure 2). The ITW program initially focused on obstetrical and gynecological ultrasound, but has expanded to include ultrasound for many other disease conditions. Since 2010, a team of Ugandan professionals, including physicians, sonographers, nurse midwives, and technical support staff, has been conducting ITW operations in the field (Imaging the World Africa, with a central office in Kampala).

The Village Health Teams strategy

Successful implementation of the ITW program in Uganda required addressing many logistical issues, including local capacity building, unstable electrical power, poor telecommunications networks, scarcity of supplies such as ultrasound gel, absent service contracts for ultrasound systems, and secure data transmission. These challenges were overcome with locally tailored solutions. However, the greatest barrier to implementation was that the community had never been sensitized to ultrasound. Although ultrasound is widely used in urban areas, most people in the villages where ITW worked had not heard of ultrasound. When the program began, myths abounded that the scan could cause burning of the skin, fetal or maternal death, and even infertility. In order to debunk these myths, ITW turned to partnering with the Village Health Teams (VHT), a public health model already used by the lower level health centers (HC IIIs), to educate members of the community about such topics as good sanitation and hygiene, mosquito nets, HIV, and immunizations.

In 2001, the Uganda Ministry of Health adopted a VHT strategy to bridge health service delivery between communities and health facilities (10). Currently, the majority of districts in the country have VHTs. The VHT program is comprised of volunteers chosen by their community to receive training provided from the Ministry of Health (“train the trainer” programs). This training typically covers basic communicable disease and environmental hygiene topics (11). Subsequently, VHT members are expected to perform a wide range of tasks, including “health education, outreach to adolescents, providing information to health units, and planning with community leaders” (12). Outreach by VHT members to educate and mobilize members of their community is typically done on a household-to-household or even individual-to-individual basis.

The train the trainer (TTT) model has several benefits over other education schemes. These benefits include improvements in adherence and competence as well as long-term sustainability and harnessing of social capital (13, 14). The TTT model allows organizations to provide expertise-level education to trainers who already have ties to the targeted audience. This model has been successfully implemented in several public health arenas, including motivational interviewing, disaster preparedness, smoking cessation, and nutrition education (13-16).

While there are no specific prerequisites or educational requirements to become a VHT member, the Uganda Ministry of Health reports that over 50% of community-chosen VHT members have at least four years of schooling and are able to read and write. Training for VHT personnel includes a government-sponsored five-day course followed by a written or verbal assessment of knowledge. Occasionally, additional specific public health training is provided on an ad hoc basis, primarily by implementing partner organizations such as USAID, UNICEF, Pathfinder International, etc. (10).

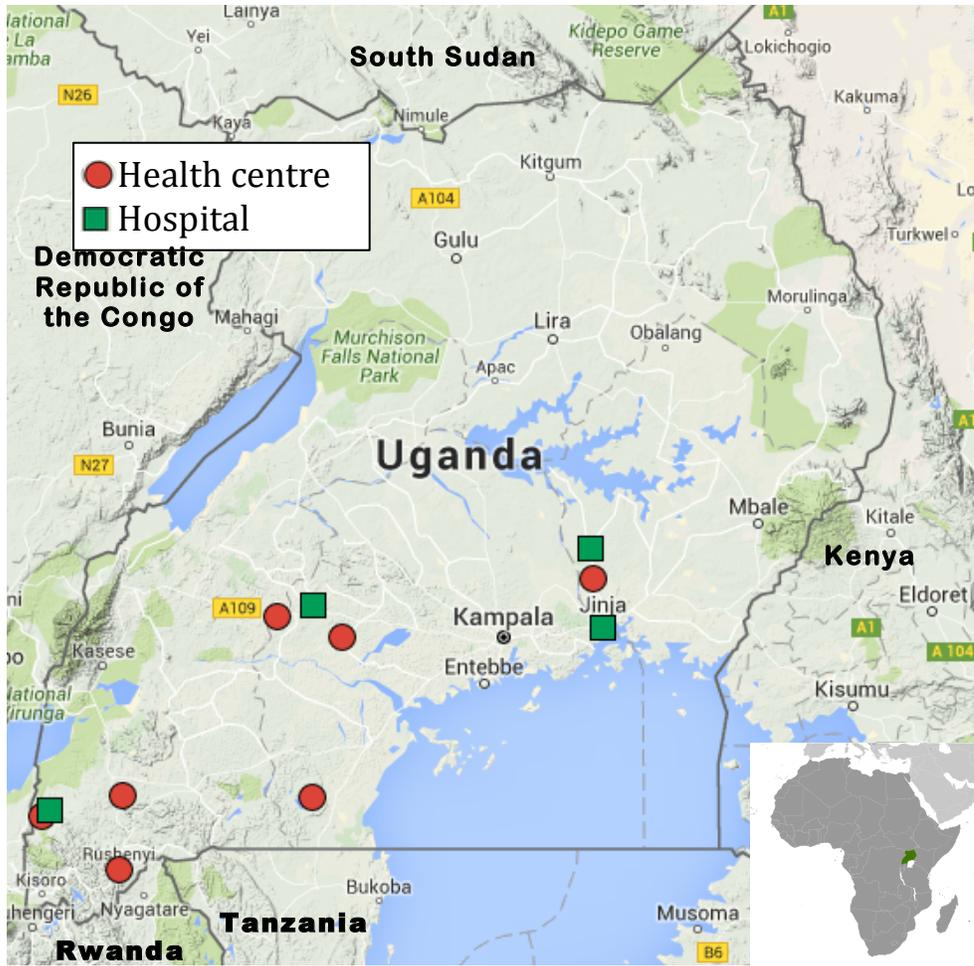
Initially envisioned to be a volunteer, non-salaried program, the Uganda Ministry of Health has more recently encouraged districts and implementing partners to provide monetary and non-monetary incentives for VHT members. These incentives vary widely from district to district. VHT members that do receive monetary incentives can earn up to 25,000 Ugandan shillings per month (\$7 US). Non-monetary incentives include logistical support, such as: uniforms, bicycles, umbrellas, and boots; access to government finance and social programs; and status/authority within the community (10).

As a registered non-governmental organization (NGO) and an implementation partner with the local district health offices, ITW recruited trained VHTs that were already in service to help with ultrasound community outreach and education. Our experience with VHTs as a means of disseminating information has involved a variety of rural sites throughout Uganda with an average sub county population of 22,000-30,000 people. We have focused on specific ultrasound projects, such as routine obstetrical/gynecological sonography, diagnostic breast sonography, and rheumatic heart disease screening with echocardiography. For each of these programs, VHT member training was held in the months leading up to implementation of the ultrasound service provided. VHT members were expected to educate members of their community in accordance with the specific training they received for each program. They also identified and mobilized people who might benefit from ultrasound or other health services to travel to the health centers. They were not responsible for data collection. Supervision was provided by ITW, the HC III person in-charge, district leaders, and the District Health Officer.

ITW coordinated and funded the VHT activities related to ultrasound outreach. Initially, streamlined training was provided by teams of people from Uganda and the US, including radiologists, radiology residents and medical students. Training included general principles of ultrasound, as well as specific information about good antenatal care to prevent pregnancy complications, breast cancer detection and treatment, and rheumatic heart disease. Training duration was approximately 3-5 days, but refresher courses were given at least twice yearly. Pictorial and written materials, such as flashcards and pamphlets, were translated into local languages and given to VHTs to use in the community (Figure 3). Interactive ultrasound workshops allowed VHTs to see the performance of an ultrasound examination.

Approximately 30-40 VHT members, with a relatively equal male to female distribution, were trained for each ultrasound program. Many of these trainees had eagerly returned from prior ITW trainings. ITW provided transport of VHT personnel into the communities by public transportation or bicycle, meals and transportation for the trainings, and name badges and t-shirts to enhance their image and credibility. ITW employed a cost-sharing model with the local health centers, jointly giving VHT members a small honorarium for both the ultrasound outreach and other

Figure 2. Terrain map of Uganda, ITW sites at rural health centers with their corresponding referral hospitals.



Adapted from Google Maps. Retrieved October 2015. Available from: <https://www.google.com/maps/@1.3806652,32.4973529,7z/data=!4m2!6m1!1szF5ggodMQpq0.k06xWqbuHQ88>

community mobilization activities.

Utilization of VHTs resulted in dramatic community acceptance and increased utilization of ultrasound services at the health centers. The VHT sensitization and ultrasound scan availability resulted in a phenomenon not seen in Uganda before – husbands, largely responsible for making family healthcare decisions, began attending antenatal clinic visits with their wives, enabling further targeted education. We demonstrated a statistically significant increase (70%) in the number of antenatal clinic visits and the number of births attended by a healthcare professional (17). Furthermore, as a result of this “magnet effect” of ultrasound at the facilities, the program demonstrated a number of ancillary benefits for pregnant women, including improved rates of HIV testing, malaria prophylaxis, anti-parasite treatment and iron and folate therapy for anemia (18). We attribute these successes to the VHT-driven educational component of the program.

VHTs were critical to the success of the ITW diagnostic breast ultrasound program. In a prospective study to be reported at a later date, women with palpable breast lumps were identified and mobilized to come to the health center. They were then evaluated with a clinical exam and ultrasound, and were followed clinically over a two-year period. The VHTs played a vital role in community information management regarding breast self-exam, cancer detection, treatment, rehabilitation, and case management. This extent of VHT participation has persisted, and a quantitative evaluation is part of a larger prospective study.

In July 2015, the ITW program evaluated the effectiveness of the VHT “train the trainer” program. In conjunction with the rollout of an echocardiography program at the health centers to detect rheumatic heart disease in pregnancy, 30 VHT members were tested on their knowledge of streptococcal infection, acute

Figure 3. Tools for VHT training.



rheumatic fever and rheumatic heart disease. These tests were conducted before training, immediately after training, and at three weeks post-training. Interactive lectures using an Audience Response System (Turning Technologies, Youngstown, OH, USA) were given, with significant improvement on the immediate post-test exam and 75% retention on the follow-up exam. Further studies are being conducted to evaluate the communication of information and retention in the community.

Misinformation and unfounded fears surrounding ultrasound services are rampant. The ITW experience suggests that implementation of any ultrasound service in a rural and/or naive community should be accompanied by robust sensitization of the target population. In Uganda, ITW has accomplished this sensitization with extensive community outreach, including planned events, radio, television and the VHT “train-the trainer” program that provides directed training and educational resources to existing VHTs. The cost of the VHT program is relatively low. ITW budgets \$10,000 USD per site per year for community outreach (Table 1).

Table 1. ITW budget for VHT program per health center site per year.

ITW budget for VHT program per health center site per year ¹		
Item	Detail	Cost
VHT training (initial and refresher x 2) for 25-30 pp.		
Travel expenses - ITW team (up to 6 pp. per training)	Travel from/to Kampala ² and travel/lodging as needed locally, varies by site	\$2800 USD
VHT expenses for training days	Food, local travel, etc.	\$500 USD
Supplies	Training and community outreach supplies ³	\$1600 USD
VHT outreach expenses		
Travel to local villages, incentives	Cost-sharing with local health center programs	\$1400 USD
VHT supervision		
ITW monitoring and on-site meetings once per month (ITWA team ⁴)	Lodging/travel from Kampala	\$3200 USD
Other/Contingency	Unexpected expenses	\$500 USD
TOTAL		\$10000 USD

¹ Excluding volunteer travel expenses

² Volunteers from outside Uganda pay for their own airfare and lodging

³ Handouts, flashcards, t-shirts, etc. are printed in Uganda

⁴ Imaging the World's Africa office is based in Kampala

With regards to community outreach, the ITW program has performed over 30,000 ultrasound scans in Uganda since 2010, impacting countless lives. Over 75 trainees have been taught to perform ultrasound. There have been at least 10 new full-time jobs created in Uganda as a result of the program, further increasing the number of lives touched. The VHT program is particularly suited for involvement by volunteers. Transdisciplinary medical teams, including 30 medical students and residents, as well as many undergraduate and high school students, have worked with VHTs in the ITW program.

Conclusion

Partnerships with VHTs in rural Uganda have contributed to increased health awareness, demand and utilization of health services, and community participation in local health programs. The Imaging the World – Village Health Team model contributes significantly to improving population health, particularly in low-resource settings that are punctuated by shortages of capable, trained health professionals.

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Conflict of interest

Imaging the World has research collaboration agreements with Phillips Healthcare and McKesson Corporation.

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