

Collaborative Learning Through Global Partnerships: Student-Led Community-Engaged Research

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Abstract

Public health research in an international setting demands a framework that encourages collaboration between investigators and their host country during the planning stages of the research project and throughout its execution phase. The aim of the current project was to develop a needs assessment with rural Nicaraguan communities. The Community Oriented Primary Care model, which promotes commitment to partnerships and sustainability, was used to guide the needs assessment and research process. A multidisciplinary team of students traveled to three rural communities in Nicaragua to conduct a comprehensive needs assessment, focused on risk factors for cardiovascular disease. In this paper, the authors highlight the experience, challenges, and facilitators experienced by this team of students during the global health research process. Findings indicate using the COPC model as a guide afforded the research team with the opportunity to assess community needs, from community member perspectives, as a first step toward partnering with the community to develop appropriate future intervention projects.

Keywords: community engagement, global health, interdisciplinary teams, student-led research

Abbreviations

AGH: Aspire Global Health

APUSAN: Association of Pediatricians United for the Health of the Children

CE: Community Engagement

COPC: Community-Oriented Primary Care

CVD: cardiovascular disease

DAIDS: Division of AIDS

H3Africa: Human Heredity and Health in Africa

ISLT: International service-learning trips

LMIC: Low- and middle-income countries

MOHR: My Own Health Report

MOSAFC: Modelo de Salud Familiar y Comunitaria

NIH: National Institute of Health

SAGH: Student Alliance for Global Health

SAHL-S: Short Assessment of Health Literacy in Spanish

UNMC: University of Nebraska Medical Center

1. Introduction

Public health research in an international setting demands a framework that encourages collaboration between investigators and their host country during the planning stages of the research project and throughout its execution phase. In the interest of creating research that is relevant and that minimizes any potential harm to its participants, many researchers have focused on community engagement (Tindana et al., 2011). The definition of community and, consequently community engagement, vary (Tindana et al., 2007; Lavery et al., 2010). However, some shared principles include building knowledge of a community, establishing relationships based on mutual respect and power sharing, and securing permission from the community (Jones & Wells 2007; Tindana et al., 2007; Lavery et al., 2010).

One example of community partnership that embodies some of these principles in the global setting is the project Human Heredity and Health in Africa (H3Africa; Mulderet et al., 2018). H3Africa has partnered with The Africa Society of Human Genetics along with many funding partners and faculty across continents to enable researchers in Africa to conduct large-scale studies on gene and environment interactions. Their research studies are used to help guide initiative and public health policies that address inequities across Africa. Another project that uses international partnerships and community engagement in its work is the Division of AIDS (DAIDS) from the National Institute of Health (National Institute of Health [NIH], 2015). Among its many objectives, DAIDS, works to support research and infrastructure for scientific and community partnerships that develop interventions and prevention methods for HIV/AIDS.

The purpose of the current project was to develop a needs assessment with rural Nicaraguan communities, modeled from the same approach to partnerships and commitment to sustainable international research as H3Africa and DAIDS, and to assess the feasibility of conducting this project as part of a student-led medical outreach trip. Furthermore, this project was developed to discern how public health involvement in student medical trips, alongside clinical care, has the potential to develop long-term, sustainable relationships that not only allows public health research students and students of clinical professions to gain pertinent knowledge, but also provide long-term benefits for the community. This paper provides an overview of the community engagement and research collaboration processes.

2. Material Studied

2.1 History Student Medical Trips

Historically, student medical trips to low- and middle-income countries have been focused on short-term medical care that provides unsustainable and short-lived benefits for the community and more profound benefits for the students involved. For example, several studies have been conducted to assess the mutual benefits of short-term, international medical trips for US students (Abedini, Gruppen, Kolars, & Kumagai, 2012). An assessment of the University of Michigan medical students after one-week international service-learning trips found that students were able to gain clinical and language skills, and knowledge of different healthcare systems, which allowed for improvements in their subsequent clinical practice in the USA (Abedini et al., 2012). However, there was not an easily identified way to measure community benefit, despite long-term partnerships in these communities. Another assessment found short term student medical trips do not address the most important sources of healthcare problems: poverty and healthcare infrastructure challenges (Sykes, 2014). Furthermore, this assessment found that very few medical trips incorporate research into the program, which would allow for a more thorough evaluation of programs' community impact.

2.2 UNMC Partnership and Trip

Partnerships between the University of Nebraska Medical Center (UNMC) in Omaha, Nebraska and Nicaraguan collaborators began to develop in the mid-1990s between UNMC professionals and a group of Nicaraguan medical residents called the Association of Pediatricians United for the Health of the Children (APUSAN). This partnership led to the development of the Los Chavalitos medical clinic in Managua. UNMC's Student Alliance for Global Health (SAGH) began to support annual student medical mission trips to work with Los Chavalitos in 2000 and these trips have continued to grow in the number of students and variety of student disciplines each year. As these trips gained more popularity, the need to develop additional partnerships throughout Nicaragua grew. One of these partnerships is with a USA-based, non-profit organization, Aspire Global Health (AGH), who works with local physicians in Estelí, Nicaragua, to provide immersive medical and public health experiences for students interested in global health. Since 2015, UNMC has sent interdisciplinary student teams to Estelí, Nicaragua with

SAGH, under the guidance of local Nicaraguan physicians. While initial trips included medical community health aspects, UNMC's College of Public Health began incorporating public health research projects.

2.3 Current Project

The trip team in 2018 was comprised of students and professionals from various backgrounds. The US team that traveled to Nicaragua consisted of public health, nursing, and a medical family therapy student as well as a licensed family therapist. The team members from Nicaragua were two physicians from the public and private healthcare system who were familiar with the healthcare delivery system and with the communities in which the team worked. Within each of the communities visited, the team also partnered with local physicians, nurses, and community healthcare workers. In an attempt to begin a sustainable, community-focused partnership, the team focused on developing a community needs assessment. Because of the high cardiovascular disease occurrence/risk and concern about its increase in frequency in Nicaragua (Finegold, Asaria, & Francis, 2014), study team members decided to focus on assessing cardiovascular disease risk factors in three communities.

After deciding that a needs assessment was the most beneficial first step, the team consulted with several faculty members from the UNMC College of Public Health who were familiar with research in Latin American countries, including Nicaragua, to effectively culturally adapt and develop the study. One of the project's Nicaraguan physician collaborators also adapted the needs assessment to meet the cultural and linguistic norms in the communities with whom the team planned to collaborate.

3. Area Description

3.1 Nicaragua Healthcare System

Nicaragua has an integrated health system with its headquarters located in its capital, Managua, and local representation in the state departments or municipalities (Pan American Health Organization [PAHO], 2008). The resolution level, or the capacity to which the health system can resolve the problems of patients or diseases, varies by location. At the lowest level of resolution are communities with small, local health posts. The second level of resolution exists in the cities with larger health centers and hospitals. The third level of resolution is found in the major cities in Nicaragua, in which surgery and other specialty hospitals exist. Finally, the fourth level is found in the capital, at national referral hospitals where patients receive treatment after being transferred from lower levels of care.

Prior to 2007, Nicaragua's traditional healthcare model was disintegrated, with a focus solely on treatment, and without continuity of care. Vulnerable populations were given limited access to health benefits and services, which were centered on health problems. Financial resources for this model was managed at centralized government levels, and not locally. After 2007, the "Modelo de Salud Familiar y Comunitaria" (MOSAF) or the Family and Community Health Model was initiated which switched the focus from individual health to that of the family unit, the community, and the environment. MOSAF is a model that pays attention to the needs of a population with an emphasis on health promotion and preventative care. It guarantees free and universal access to care, especially for community members.

A typical Nicaraguan healthcare team is composed of a doctor, nurse, nursing assistant, and a hygienist. The team travels to health posts and health centers to work in communities. Every family in the community has a health report referred to as "Historia de Salud Familiar y Comunitaria" or Family and Community Health History, where family information, risk factors, and medical encounters are documented (Ministry of Health [MINSAL], 2007). This current health model has proven to be more appropriate for the country's needs than former models, but it faces budgetary difficulties due to its free-of-charge services and the need for a multi-provider health team for community visits. However, with this health model, Nicaragua has been able to prioritize work on more urgent challenges, such as infant health and maternal mortality.

The department of Estelí, which houses the communities with whom our team collaborated, has a population of 205,616 inhabitants with a population density of 92 inhabitants / Km². The urban population makes up 55 per cent (113,576) and rural residents account for 45 per cent. Estelí is considered a department with mid-level poverty, according to municipality statistics (Instituto Nacional de Información de Desarrollo [INIDE], 2005). It is made up of six municipalities: Pueblo Nuevo, Condega, Estelí, San Juan de Limay, La Trinidad, and San Nicolás (Instituto Nacional de Estadística [INEC], 2003).

3.2 Cardiovascular Disease (CVD)

Cardiovascular disease is the leading cause of death worldwide, representing approximately 31% of deaths globally (World Health Organization [WHO], 2017). Low- and middle-income countries are disproportionately

affected by cardiovascular disease and account for 80% of global cardiovascular disease deaths (PAHO, 2017). Cardiovascular disease includes a wide range of disorders including the heart and vascular system, including heart disease and stroke. Factors that affect heart disease and stroke are tobacco use, unhealthy diet and exercise, obesity, excessive use of alcohol, hypertension, diabetes, and hyperlipidemia (WHO, 2017). Additional risk factors include high cholesterol, high blood pressure, abdominal obesity, poor diet, diabetes, and psychosocial factors such as stress and depression (Fernando, Pamela, & Alejandra, 2014).

In Latin America, the burden and death rates of cardiovascular disease have been increasing steadily due to demographic, economic, and social changes in the last few decades (Fernando et al., 2014). As the epidemiologic transition occurs throughout the region from infectious to chronic diseases, and individuals adopt a more sedentary 'Western' lifestyle, the estimated cardiovascular disease mortality rate will increase by 60%, compared to 5% globally, by 2020 (Fernando et al., 2014).

In Nicaragua, cardiovascular disease and other disorders of the circulatory system account for 27% of total deaths followed by external causes (13%) and neoplasms (10%) (PAHO, 2017). While Nicaragua does not have the highest prevalence of cardiovascular disease or mortality in Latin America, there is a growing concern about an increase in cardiovascular disease risk factors in the country (Finegold et al., 2014). In 2016, the three main reasons for outpatient visits in Nicaragua included hypertension (31%), diabetes (28%), and rheumatoid arthritis (15%) (PAHO, 2017). Within the adult population, over 46% of individuals were overweight and 15.5% were obese. Other concerning risk factors to be noted were the prevalence of psychosocial stress due to violence and the increase in smoking among adolescent men. In the last available data for violence against women in 2012, nearly 70% of women between the age of 15 and 49 had been exposed to at least one instance of verbal or physical violence (PAHO, 2017). The rate of tobacco use overall is 14.2% in the adult population, with a projected increase in future generations due to an increase in tobacco use among adolescents (PAHO, 2017). This uptick in factors associated with cardiovascular disease may increase related mortality and increase the burden of disease in Nicaragua.

3. Method

To guide the current research project, the team utilized the Community-Oriented Primary Care (COPC) approach (S. Kark & E. Kark, 1999). This approach is designed to guide the integration of clinical care and public health and highlights community participation and collaboration. It also addresses health and illness determinants. The main principles of COPC include responsibility for the health of the defined population, health care based on identified community needs, prioritization of the most prevalent health problems, providing care to *all* community members, both healthy and ill, and working *with* the community rather than *in* the community. The terms health and illness in COPC are not solely thought of as biomedical states, but rather as physical, behavioral, social, and cultural (J. Gofin & R. Gofin, 2011).

COPC is carried out in a six-step process. While these steps are presented linearly, the steps may overlap, or the team may revisit previous steps throughout the process, as needed. The first step is to define the community and its characteristics. The second is to prioritize community challenges, such as health behaviors or health conditions that are most impacting the community. In the third step, detailed assessment, the purpose is to delineate the distribution and determinants of the health problem, with the intent of determining which variables can be modified through an intervention. Step four is the intervention. In this part of the COPC process, a feasible, evidence-based, and culturally relevant intervention is chosen that may best meet the needs of the community, determined during the detailed assessment. In the fifth step, evaluation, the team determines how well the intervention worked and, based on the data, which steps need to be taken to modify the program to best meet community needs. The sixth, and final step in the process focuses on addressing changed needs of the community that stem from the intervention or other happenings in the community, such as demographic changes (J. Gofin & R. Gofin, 2011).

4.1 Measures

4.1.1 MOHR

The My Own Health Report (MOHR) project was developed by the NIH, the Agency for Healthcare Research and Quality, and the NIH Office of Behavioral and Social Science Research, in collaboration with several academic institutions, in an attempt to collect and address patient reported measures using the principles of rapid, relevant pragmatic research (Glasgow et al., 2014). In the initial study, seven research centers partnered with 18 clinics to collect data from over 2,700 patients in an 18-month period between 2013 and 2014. A full description of the development of this survey tool and the initial randomized, assessment trial can be found from Krist and

colleagues (2013).

The MOHR assessment tool addresses ten domains of health behavior and psychosocial issues, including mental health, health behaviors, substance abuse, and quality of life questions (Glasgow et al., 2014). These domains, sources, and items can be found in Table 1. While traditionally used to assist in action plans between providers and patients, this tool allowed us to assess for key factors associated with cardiovascular disease across these domains, as well as obtain key demographic and self-reported health status among the study participants.

The initial MOHR trial was conducted among a diverse population, including clinics in serving predominantly Spanish-speaking (or Latino) patients. The feedback and evaluation phases of this study allowed the questionnaire to be adapted culturally to different populations, and more specifically, a Spanish version was adapted to Latino communities. Using this Spanish version, we were able to adjust this survey culturally to rural Nicaraguan communities with the help of our local collaborators. Sample questions can be found in Table 1.

Table 1. Health Assessment Measures

Domain	Source of Questions	Number of Items	Sample Questions
Eating patterns	Stating the conversation	3	Over the past 7 days, how many times did you eat unhealthy fast food meals/snacks?
Physical activity	Exercise Vital Sign	2	Over the past 7 days, how many days did you get moderate to strenuous exercise, like a brisk walk?
Sleep	BRFSS/ Neuro-QOL	2	Do you snore or has anyone told you that you snore?
Smoking/tobacco use	Tobacco Use Screener from YBRSS	2	Have you used tobacco in the last 30 days?
Risky drinking	Alcohol Use Screener	1	How many times in the past year have you had X or more drinks in a day? (X altered by gender)
Substance abuse	NIDA Quick Screen	1	How many times in the past year have you used an illegal drug or prescription medication for non-medical reasons?
Stress	Distress Thermometer	1	Please choose the number that best describes how much stress you have been experiencing in the past 7 days using a scale.
Anxiety and depression	Patient Health Questionnaire—Depression and Anxiety	4	Over the past 2 weeks, how often have you been bothered by Feeling nervous, anxious, or on edge?
Overall health status	BRFSS	1	Self-reported health status
Demographics		7	Age

4.1.2 SAHL-S

The Short Assessment of Health Literacy in Spanish (SAHL-S) measurement tool contains a list comprised of 18 medical-related terms (e.g. miscarriage, loss, and matrimony), which are used to assess health literacy levels among Spanish-speaking adults. Medical terms are accompanied by two association words, one with a related meaning and one that works as a distractor. A participant receives a point for each medical term they are able to pronounce and correctly associate with the related word. A score of 14 and below indicates poor health literacy.

SAHL-S was included in the needs assessment because it has been shown to be reliable and valid in identifying adults with low health literacy (Lee, Stucky, Lee, Rozier, & Bender, 2010). The SAHL-S, along with the demographic questionnaire and the MOHR assessment tool, was reviewed and culturally adapted by our Nicaraguan collaborator to ensure it was suitable for the rural communities with whom we would be working in Nicaragua.

4.2 Procedures

For this project, we received IRB approval from our USA-based academic institution before beginning to collect data. Our primary Nicaraguan physician collaborator was included in the IRB process and the USA-based IRB determined that study approval from Nicaragua was not necessary. Data collection took place in three rural communities surrounding Estelí, Nicaragua. Our partner in Nicaragua chose these communities because she had ongoing working relationships with medical providers in the communities. Each day, for three consecutive days, our interdisciplinary team arrived in a community in the early morning and divided into two smaller teams, each composed of two researchers, one nursing student from the USA, either a nurse or community health worker from Nicaragua, and one Nicaraguan physician. We spent the morning and early afternoon providing medical testing, including blood pressure, blood sugar, and weight, and offering community members medical supplies, including oral care products, over-the-counter pain medications, and vitamins, while conducting our research project. We offered these supplies and testing regardless of community members' decision about participation in the research project.

In total, we spent approximately 6 hours each day in the communities and completed between 30-35 surveys per day. As mentioned previously, participants were asked to complete a demographic questionnaire, functional health literacy survey, and the MOHR tool after completing the informed consent process. Questions were read to all participants by members of the research team. Surveys did not include identifying information, other than general demographic questions. Surveys were stored in a portable locked file box.

We used an iterative process to modify survey delivery and our research strategy each day. Following the first day of data collection, all members of the team, including students and faculty from the USA and our Nicaraguan physician partners met as a group to discuss challenges and successes with participant interactions and also assessed for consistency in the way the research team was delivering the surveys. At this time, the team determined that the SAHL-S was not appropriate for this population because participants often reported that they were not able to understand the questions. We completed team meetings again each morning before working with the communities, during mid-day lunch breaks, and each afternoon after leaving the communities. We also elicited feedback from the nurses and community health workers, in each community, regarding input they had into how we could modify delivery and content of the surveys to increase acceptability and understandability. Changes that followed these debriefs included the determination that the flow of home visits was improved when surveys were completed at the end of the home visit rather than the beginning and the discovery that efficiency was improved when part of the team provided medical supplies and testing while another part focused solely on completing surveys. Following the third day of data collection, the team participated in an extended debriefing process to develop a comprehensive list of challenges and successes encountered during the three-day research process. Through the daily debriefs and the extended debrief at the end of day-three, the research team made modifications and identified strengths and challenges.

5. Results

5.1 Challenges

While the deeply-rooted relationship with our partners in Nicaragua made the research possible, there were several missteps to be mentioned. As previously discussed, each research team consisted of a local community worker or health care provider, Nicaraguan physician, student nurse, and at least one research team member. We found that the information sessions held at the beginning of each day with the community health workers and team members could have been more thorough and specific in order to enhance understanding of the research process for the whole team. In the initial visits with research participants each day, there was a lot of effort to explain the reason for the home visits and what we hoped to achieve; as the day progressed, this was more seamless.

Another challenge was to ensure the MOHR survey tool was utilized in a culturally appropriate manner. While we asked our partner in Nicaragua to review the survey during development of the research project, in the field, some cultural adaptation issues emerged. For example, the survey specifically asked about the amount of time one exercised per day but did not specify whether field work was considered exercise. There were a handful of instances such as this that we brought up and addressed in the field among the research collaborators.

Lastly, as mentioned above, the research team noticed that most participants were unable to understand the SAHL-S tool and a few participants appeared to be negatively impacted emotionally when they were unable to figure out how to answer the SAHL-S questions. Because of these challenges, we removed the tool after the first day of conducting the surveys. Although the team made the necessary steps to attempt to culturally adapt the SAHL-S, it was evident that participants were uncomfortable with this portion and unsure of how to give an answer.

As a result, the team decided to forgo collecting information on health literacy levels.

5.2 Facilitators

The research team had an established relationship with community stakeholders prior to constructing the research project. This allowed the team to develop a project that was largely relevant, feasible, and respectful of the local communities. Our community partners were Nicaraguan physicians and nurses with experience working in rural regions and with knowledge of the unique challenges and health concerns in these areas. The trust they have built with community members facilitated the team's introduction into the communities and set a welcoming environment for the research project.

Our assessment of the biopsychosocial needs of rural Nicaraguan communities used validated and reliable tools. These tools were incorporated into a larger survey which went through multiple revisions by team members in the U.S. and Nicaragua. Our primary Nicaraguan physician collaborator, who has worked extensively with the communities and their clinicians, culturally and linguistically adapted all research related materials. The finalized product, other than the previously mentioned challenges with the SAHL-S tool, was overall well received and understood by participants. Furthermore, relationships built with the community afforded us the insight to understand that the SAHL-S was creating distress for participants, which allowed us the opportunity to stop using this assessment within the first day of data collection.

Despite some challenges during the data collection portion of the research project, the team was able to collect sufficient data to analyze and interpret. Moving forward, this data, which comes directly from community members, will function as the foundation for more specific research projects and for the development of intervention programs.

6. Discussion

Per the COPC cycle, the next step in our research project is to develop an evidence-based and culturally relevant intervention to meet the health needs of the community, determined during our detailed needs assessment. We will use the data from participant responses to develop an intervention with the community that targets specific CVD risk factors. For example, if alcohol use is one of the most prominent risk factors for a community, we would work with community stakeholders to develop a targeted intervention that can assist community members in reducing this particular risk. To develop an effective intervention with each community, we also plan to work with our partners to gather additional information on community-specific access to resources, such as education opportunities and medical care.

At the outset of this project and trip, our group's plan was to visit the same communities again in one year to continue gathering information and begin to develop appropriate community-based interventions to address CVD risk-factors. However, the current violence in Nicaragua will preclude us from continuing our in-person relationships with these communities and our collaborators in Nicaragua, at present. We are continuing to work with our primary partner in Nicaragua via telephone and email, as we all work together to consider appropriate next steps.

7. Conclusion

In brief, we purposefully and mindfully established and built on existing collaborative relationships with community stakeholders and Nicaraguan physician project partners. This was instrumental for the successful development and conduction of an international research project. Student leadership and participation was very feasible and was also instrumental in the project's success. Furthermore, using the COPC model as a guide afforded the research team with the opportunity to assess community needs, from community member perspectives, as a first step toward partnering with the community to develop appropriate future intervention projects. Finally, we discovered that flexibility in the field and using an iterative process to modify the research protocol, as needed, was crucial for success.

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Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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