

## **Sigma's 30th International Nursing Research Congress**

### **A Collaboration for Clean Water in Guatemala**

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#### **Purpose:**

The need for clean water is a basic and essential human right, however many places in the world do not enjoy this necessity for sanitation, food production, and life itself. Endangerment to the health of millions of people around the world, most particularly in developing countries, is affected by water scarcity and contamination. The United Nations estimates that as much as one tenth of the global disease burden is related to lack of access to sanitary water (United Nations, 2014). The World Health Organization (WHO) has specifically linked diseases such as cholera, diarrhea, and typhoid (as well as others) to the use of contaminated water (2016).

The United Nations outlined in their Development Programme a specific goal to ensure “universal access to safe and affordable drinking water for all” by the year 2030 (2015). While there are many global initiatives for increasing access to clean water, the value of smaller scale programs, has also been recognized, yet not extensively studied (Portman and Martin, 2015). Collaborative strategies for projects that are inexpensive, easily understood, acceptable, and community oriented can also be quite effective in developing countries.

#### **Methods:**

This project involved one such small-scale collaboration between a medical mission team, a university researcher, and a service organization in the country of Guatemala. Clean water filters were installed in two rural Guatemalan villages coupled with hygiene teaching. Then the resulting effect on the incidence of infection was assessed. The value of community participation and collaboration with this project was appreciated in helping to encourage acceptance of this particular strategy for clean water and access.

The Give and Teach Organization is a non-profit organization with the objective of making a difference to needy persons in the world through “education, training, and resourcing” (2018). In December of 2015 a team of volunteer health care professionals collaborated with this organization to provide medical clinics in three small villages outside of Guatemala City, Guatemala. Residents who utilized these clinic services were each assessed by one of the volunteer medical professional providers and treated. Practitioners appreciated a high prevalence of infectious diseases among clients, for example urinary tract infections, which can be prevented by personal hygiene with clean water. Respiratory tract infections and parasitic infections were also common, which can be reduced by using proper hand-washing with clean water. Observations and anecdotal conversations with villagers also suggested that residents were not aware of the importance of clean water, sanitation, and basic hygiene principles.

An idea to decrease the incidence of infections in the Guatemalan communities served by the medical team was proposed to the Give and Teach Organization by two researchers on the medical team after the first few days of clinic work. The proposed intervention would involve the installation of water filters in two rural Guatemalan villages, El Amate and Bijagues, and the teaching of basic hygiene principles to the residents of the villages. The co-CEOs of The Give and Teach Organization were enthusiastic to collaborate.

Through this collaboration it was arranged for all households in two villages to be offered the opportunity to receive water filters free of charge. In the past this organization had installed clean water filters in other villages in Guatemala using donated funds, so they already had connections with a vendor and experience with a protocol. They arranged for funding through their organization, and they assumed

charge of presenting residents (by way of village forums) with the opportunity to receive a water filter and the health teaching that accompanied the installations. In order to increase sense of ownership and compliance with use of the filters, residents desiring a filter were requested to make a commitment to pay for the replacement filters, which would be required in two years. This fee would amount to less than the equivalent to a US dollar per month.

Installation of the water filters took place six months after the short-term medical team left the country. The water filters installed were Ecofiltro brand, produced sustainably by a Guatemalan based social business with the objective of providing clean water to one million rural Guatemalans by the year 2020. The filtering mechanism uses natural elements. The clay in the inner walls filters contaminants in the water, sawdust improves taste and smell, and colloidal silver purifies the water (Ecofiltro, 2017).

The Give and Teach Organization also hired a local part-time physician to follow-up with monthly visits to these villages following the departure of the volunteer medical team. This physician reinforced hygiene teaching during his visits to the villages, performed repeat assessments, and continued treatments as indicated.

The post-intervention assessments took place during a second medical mission trip when the team traveled back to the same villages in Guatemala six months after the water filters were installed. Group demographics were assessed, and incidences of infections were recorded. The percentages of infections noted in the two groups (before and after water filter installations) were then compared.

### **Results:**

The percentage of infection in the group following installation of the water filters was distinctly lower (27%) as compared to the pre-intervention group (34%). Types of infections included urinary tract, vaginal, venereal, skin, respiratory, eye, and gastrointestinal. Other less common complaints included problems such as itchy eyes or vision disturbances, tooth decay, skin rashes, hypertension, diabetes, neuropathies, and feelings of depression.

There was a lower percentage of infection in the group of residents following the installation of water filters in the Guatemalan villages studied, and although with further analysis using Chi-square this difference did not show statistical significance, it was considered to represent a trend. The Give and Teach Organization began to collect informal reports by the physician hired to follow up on patients in the villages following the departure of the second team visit. In notes prior to the installation of the water filters the physician commented in his notes that urinary tract infections and respiratory infections were common, and he assessed that hygiene was a very important need. After the installation of the water filters the follow-up physician for the Give and Teach Organization began to file more formal and detailed notes about client visits, including data regarding specific diagnoses, demographics, and treatments. In the six months following installation of the water filters in the village of Bijagues the average number of infections of any type seen in adult patients was only 3.5 per month as compared to 54 per month prior to installation.

### **Conclusion:**

The project was significant in bringing safe drinking water to 213 homes in the two rural Guatemalan villages of El Amate and Bijagues and contributing to a decrease in the incidence of infections. Many residents in these communities not only gained access to clean water, but learned about safety, health, and the importance of this resource as well. Collaboration with a local organization helped to build strong working relationships for future outreach and community projects in this region. Analyzing pre- and post-installation health assessment data helped to provide a greater understanding of the impact that these water filters, teaching, and follow-up care had on the health of residents in these communities, and it could help others to better serve these populations in the future.

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**Title:**

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**Keywords:**

Guatemala, clean water and collaboration

**References:**

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**Abstract Summary:**

This collaboration between a medical mission team and a community service organization in the country of Guatemala addressed a United Nations developmental goal concerning safe drinking water. After the installation of clean water filters in two rural Guatemalan villages the percentage of infections was found to have decreased.

**Content Outline:**

1. Introduction
  1. The right to clean water
  2. Global initiatives that currently exist
2. Related literature
  1. Behavioral factors
  2. Types of water treatment and effects
  3. Community participation
3. Background for the project
  1. Collaboration with local organization
  2. Emergence of need and strategy
4. Methodology
  1. Pre-intervention data collection and analysis (infection rates)
  2. Installation of filters
  3. Health teaching endeavors
  4. Post-intervention data collection and analysis (infection rates)
5. Outcome of the project
  1. Comparison of pre and post intervention infection rates
  2. Chi-squared analysis
6. Discussion
  1. Significance of the project
  2. Limitations
  3. Recommendations

First Primary Presenting Author

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**Author Summary:** Linda Johanson has been a nurse educator since 1980 and is currently an Associate Professor at Appalachian State University in Boone, NC. She has a passion for service and has participated in approximately 30 medical mission trips to developing countries throughout the world. Her research interests are education and global health. She has taken student nurses on a service-learning trip to Mexico every year for the past 13 years.