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La Sante nan Pwòp Men Nou

The Development, Implementation and Evaluation of a Hand Hygiene Education Curriculum for Community Members in Cavaillon, Haiti:

A Special Studies Project

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Abstract

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The Development, Implementation and Evaluation of a Hand Hygiene Education Curriculum for Community Members in Cavaillon, Haiti:
A Special Studies Project

By: Cassandra Savino

Background: Haiti has the lowest rates of access to improved water sources and sanitation facilities in Latin America and the Caribbean, contributing to high diarrhea-related morbidity and mortality. Although interventions promoting handwashing with soap have been found to reduce the risk of diarrhea, proper hand hygiene with soap is not widely practiced, particularly in rural areas of Haiti.

Methods: This hand hygiene education project was conducted in the NOVA Hope for Haiti clinic in the rural town of Cavaillon, Haiti in the summer of 2017. A KAP survey was administered to 28 NOVA clinic patients, 18-35 years old. A hand hygiene education curriculum was developed using information from the KAP survey, literature and elements of the Health Belief Model and Community Based Participatory Action Research theoretical framework. The curriculum was implemented at the NOVA clinic among 23 patients, 18-35 years old and was evaluated.

Results: A culturally appropriate curriculum and evaluation plan were developed for a one-week hand hygiene education project. KAP survey results identified gaps in awareness of the perceived benefits of hand hygiene and inconsistencies with practicing hand hygiene at critical times. Data from the KAP survey was integrated with the literature review to develop the curriculum. An evaluation of the project demonstrated participant satisfaction of the project (9.84 out of 10) and facilitators (5 out of 5). A pre- and post-test was used to measure participant retention of knowledge at the conclusion of the intervention. Initial analysis of the pre- and post-test scores identified a trend towards improvement in test scores after the project implementation ($p=0.065$). However, after excluding two outliers in the data, the comparison of pre- and post-test scores showed a significant improvement in post-test scores, suggesting potential for positive behavior change ($p<0.05$).

Discussion: Hand hygiene is a known preventative method for diarrheal diseases. This hand hygiene education curriculum addresses gaps in knowledge and provides an opportunity for community participation, to educate and empower NOVA clinic patients in an effort to increase appropriate hand hygiene behaviors. Reinforcing hand hygiene knowledge among NOVA clinic patients by implementing this project yearly is important for sustained behavior change.

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Chapter 1: Background

1.1 Introduction and Significance

Burden of Waterborne Diseases

Waterborne diseases are responsible for 4 billion cases of diarrhea per year and cause about 2.2 million deaths globally each year (WHO, 2018b). Instances of disease are concentrated among children under the age of five in developing countries, where diarrhea-related mortality is responsible for 8.5% and 7.7% of all deaths in Southeast Asia and Africa, respectively (WHO, 2018b). Diarrhea-causing viral, bacterial and parasitic pathogens are transmitted through water, food, surfaces and unwashed hands, that are contaminated with fecal matter (Lanata et al., 2013; Mattioli et al., 2014). Typhoid, paratyphoid, cholera, and Hepatitis A and E are common bacterial and viral diseases endemic to low and middle-income countries, where poor water, sanitation and hygiene (WASH) infrastructure are the cause of 88% of deaths from diarrhea (Mattioli et al., 2014; WHO, 2009). Haiti, a low-income country located on the western third of the Caribbean island of Hispaniola, has the lowest rates of access to an improved water source and to improved sanitation facilities in Latin America and the Caribbean (Gelting, Bliss, Patrick, Lockhart, & Handzel, 2013).

In 2010, a devastating 7.0 magnitude earthquake weakened Haiti's already deficient water and sanitation infrastructure. Inadequate WASH contributed to the rapid spread of cholera throughout the country after its introduction by unsafe waste disposal from United Nation's peacekeeping troops into the country's longest river (UNICEF, 2016). Subsequent hurricanes, including Hurricane Matthew which devastated the southwest region of Haiti in 2016, created further damage to infrastructure and facilitated epidemic spread and transmission of cholera. To date, more than 10,000 Haitians have died from cholera infections (UNICEF, 2016). And while

surveillance efforts for typhoid and Hepatitis A and E are not as comprehensive as they have been for cholera, they also continue to cause endemic disease in Haiti, contributing to increased diarrhea-related morbidity and mortality (USAID, 2017). In specific, diarrhea related morbidity and mortality is high in children and young adults in Haiti. Fifty-four percent of adolescents and young adults (12-35 years old) reported experiencing diarrhea within two weeks of when responding to questions from the 2017 Demographic Health Survey (DHS) in Haiti (IHE/Haiti, 2018).

Hand Hygiene Education

Proper handwashing with soap and clean water at critical times has been found to have a protective effect for food and waterborne diseases (Taylor, Kahawita, Cairncross, & Ensink, 2015). On average, interventions promoting handwashing with soap were found to reduce the risk of diarrheal morbidity by 30% (Wolf et al., 2018). Handwashing, however, is not widely practiced in Haiti. Only about 25% of Haitian households have soap and water to wash their hands and in rural regions, the number of households with soap and water is only 19.8% (IHE/Haiti, 2018). In the South Department of Haiti where Hurricane Matthew hit in 2016, more than half of the population does not use water, soap or any other cleaning products at the critical times, leaving them at risk of cholera, typhoid, Hepatitis A and E and other potentially fatal diarrheal diseases (IHE/Haiti, 2018).

Additionally, the prevalence of diarrhea has been found to increase with lower maternal education level, suggesting the importance of caretaker knowledge of positive WASH behaviors (IHE/Haiti, 2018). During a cholera vaccine campaign in Petite Anse, Haiti, knowledge and practice survey results found that only 39% of individuals who did not participate in the vaccine campaign had adequate knowledge of food and waterborne disease prevention, including proper

hand washing (Childs et al., 2016). This is concerning when considering that survey respondents consisted of heads of households, including parents and caretakers of children at risk of diarrhea-related morbidity and mortality. However, organizations that work to promote hand hygiene in Haiti have been found to be successful in information dissemination (Eberle, 2018). Additionally, those that emphasize behavior change along with increased access to soap and clean water have been found to be correlated with positive hand hygiene behavior change (Childs et al., 2016; Williams et al., 2015).

NOVA Hope for Haiti, Inc.

NOVA Hope for Haiti, Inc (NOVA) is a US based organization that runs two permanent health clinics in the small, rural town of Cavaillon, Haiti. This researcher previously worked with NOVA board members, medical staff and volunteers during a mission trip in the winter of 2018. During my time with NOVA, seasoned board members reported that patients would travel miles on foot and motorcycle on unpaved roads seeking treatment for their malnourished babies or grandchildren suffering from diarrheal diseases. About twenty-eight percent of children under five and eighteen percent of all Haitians in the *Sud* or South department, where Cavaillon is located, had diarrhea within two weeks of the 2017 DHS data collection (IHE/Haiti, 2018). High rates of diarrhea among NOVA patients prompted board members to consider a hygiene health education program, in line with NOVA's mission for "sustained medical care in the southwest of Haiti."

During further conversations with NOVA staff, nurses expressed that while they attempted to educate their patients, there was never enough time or resources. Patients did not have access to health information in the region due to low literacy levels, the lack of available health information in the Creole language, and spotty internet and electricity. The NOVA board

explained that they needed assistance with developing a permanent health education project. This led to a collaboration between NOVA and this researcher to incorporate hand hygiene education and promotion as a part of their strategy to reduce diarrhea-related morbidity and mortality. The focus of the strategy was on adults, ages 18-35, because they are the parents and caretakers of those who are most at risk of diarrhea-related morbidity, children under 5.

1.2 Purpose Statement

This health education project was implemented in the community of Cavaillon, Haiti through NOVA. The project curriculum is based on the health belief model (HBM) and community based participatory action research theory (CBPAR) to address the specific needs of rural Haitian communities. A community needs assessment was administered to assess the community's hand hygiene knowledge, attitudes and practices to better tailor the curriculum to Cavaillon's particular needs.

Goal: The purpose of this thesis is to provide the results of the analysis of data from the knowledge, attitudes, and practices (KAPs) survey administered in Cavaillon, Haiti among NOVA patients 18-35 years old. This thesis will also describe the hand hygiene curriculum design process, delineate the implementation of the curriculum at the NOVA clinic among patients 18-35 years old during the summer of 2017 and to provide results from an evaluation of the implemented project.

Aim 1: To provide the results of a 34 question KAPs survey administered in Cavaillon, Haiti among NOVA patients 18-35 years old.

Aim 2: To describe the hand hygiene curriculum design process based on formative research and elements of the HBM and CBPAR behavioral theories.

Aim 3: To describe the implementation of the curriculum in Cavaillon, Haiti among NOVA clinic patients 18-35 years old between July 2nd and July 6th, 2018.

Aim 4: To provide results from an evaluation of the implementation of the project in Cavaillon, Haiti.

Chapter 2: Review of the Literature

2.1 The Republic of Haiti

The Caribbean island of Hispaniola was inhabited by the native Taino until it was settled by the Spanish following Christopher Columbus's arrival in 1492. Spain conceded the western third of the island to France in 1697, which later became known as "Haiti", the Taino name meaning "Land of Mountains" (CIA, 2018). Haiti was one of the wealthiest French colonies in the Caribbean and was even known as the "*Pearl of the Antilles"* (CIA, 2018). It's sugar and forestry-based economy was supported by almost half a million imported African slaves and their offspring. In 1804, the French lost control over the colony after Haiti's slaves lead by Toussaint L'Ouverture won their independence in a revolt against Napoleon's army. The Republic of Haiti became the first post-colonial black nation in the world (CIA, 2018).

Haiti's economy has been burdened from its independence. With the first successful revolution led by slaves, Haiti's freedom posed a threat to countries where slavery was legal (Sperling, 2017). In order to gain immunity from French military invasion and to be considered a legitimate country, Haiti was forced to pay the equivalent of $21 Billion in today's dollars in reparations to the French slaveowners they ousted (Sperling, 2017). The result was a crippling debt that took the country 122 years to pay off (Sperling, 2017). Despite this, the Haitian economy boomed in the 19th and early 20th centuries. However, immediately after a series of presidents were killed or forced out of power between 1911-1915 came a military occupation by

the United States which lasted nineteen years (Chin, Dunkel, Flounders, & Ives, 2004). This was followed by years of governmental coup d'états, revolts and dictatorships (Chin et al., 2004). In 1957, subsequent regimes of father-son dictators François Duvalier and Jean-Claude Duvalier, infamously known as "Papa Doc" and "Baby Doc," and their private militia, the *tonton makout*, raped, beat, imprisoned, tortured and killed upwards of 60,000 Haitians who dissented (Henley, 2010). The dictatorships also caused a massive "brain drain" in the country, where professionals, highly trained individuals and intelligent citizens emigrated en masse. The Duvaliers were reported to have embezzled up to 80% of Haiti's international aid, leaving behind a legacy of debt, governmental corruption and coups, crumbling infrastructure and Haiti's notorious label as the poorest country in the Western Hemisphere (Henley, 2010).

As aforementioned, Haiti's infrastructure was severely impacted during multiple points in the country's history. As early as 1900, public health officials reported on the relationship between disease and poor water quality, sanitation and hygiene in the country. Interventions focused on mending Haiti's water and sanitation access were initially carried out during the United States military occupation, and again under the Haitian government in the late 1940s (Gelting et al., 2013). A United Nations technical mission visited the country in 1948 to provide recommendations for improving water and sanitation services (Gelting et al., 2013). Haiti also received loans from the Inter-American Development Bank (IBD) to help fund water and sanitation projects. Under the Duvaliers, Haiti continued to receive loans and international aid to address their water, sanitation and hygiene (WASH) issues (Gelting et al., 2013). However, during their rule, the *tonton macoutes* contributed to decreased access to the water supply in some areas by controlling the water sources and the political turmoil following the collapse of the regime in 1986 led to delays and the cessation of developmental projects (Gelting et al.,

2013). Due to continued political instability between 1986 and 2002, foreign assistance to Haiti was sporadic and at two periods of time completely ceased (Gelting et al., 2013). It wasn't until the mid-2000s that Haiti began to receive uninterrupted foreign aid again and not until 2009 that the Haitian parliament unanimously voted into law a reform of the water and sanitation sector (Gelting et al., 2013).

Today, almost 10.8 million people live in Haiti (CIA, 2018). Haiti is a mountainous region consisting of ten communes, Artibonite, Centre, Grand'Anse, Nippes, Nord, Nord-Est, Nord-Ouest, Ouest, Sud-Est, and Sud. French and Haitian Creole are the official languages of the country, but Creole is more widely spoken by the populace. Only about 60% of the population is literate (CIA, 2018). Haiti has a high mortality rate of children under five, 71.7 per 1,000 live births, and an equally concerning maternal mortality ratio of 359 per 100,000 live births, compared to the neighboring Dominican Republic which has a children under five mortality rate of 29.9 per 1,000 live births and maternal mortality ratio of 92 per 100,000 live births (WHO, 2016). The life expectancy in Haiti is roughly 63 years old (The World Bank, 2018). Haiti spends about 2.56% of its GDP on health care, but the majority of healthcare expenditures (79.35%) in the country are in the private health sector. This is concerning when considering that approximately 60% of Haitians live below the national poverty line of $2.41 USD per day. Furthermore, 25.8% of Haitians fall below the national extreme poverty line of $1.23 USD per day (The World Bank, 2018). The economic growth rate increased in 2017-2018 to 1.6 due to a growing agricultural sector, but inflation in Haiti still remains high (The World Bank, 2018). About 32.6% of Haitians living in rural areas of Haiti are in the lowest quantile in terms of socioeconomic status whereas only 5.4% of rural Haitians are in the highest quantile (IHE/Haiti, 2018). Additionally, Haiti ranks 138 out of 160 countries in the World Health Organization

(WHO) gender inequality index suggesting economic inequality among rural and female populations (IHE/Haiti, 2018; WHO, 2016).

Haiti's geographic location make it susceptible to natural disasters such as hurricanes and earthquakes. In January of 2010, a catastrophic 7.0 magnitude earthquake struck about 15 miles west of the capital, Port-au-Prince (CIA, 2018). Over 300,000 people were killed and more than one million internally displaced persons (IDPs) were inhabiting IDP camps in and around Port-au-Prince (CIA, 2018; Gelting et al., 2013). Additionally, Haiti's already weak WASH infrastructure was further destabilized, giving way to a cholera epidemic after the *Vibrio cholerae* bacterium was introduced to Haiti by UN Peacekeeping troops from Nepal (Henley, 2010). Ensuing hurricanes devastated the country, ruining crops and infrastructure while killing more than 800 Haitians (Henley, 2010). These storms also contributed to subsequent cholera outbreaks. Almost 10,000 deaths from cholera have been reported since its introduction in the country, but the outbreak fueled a focus on WASH initiatives as a part of cholera prevention campaigns throughout Haiti (Gelting et al., 2013; UNICEF, 2016).

2.2 Cholera, Typhoid and Other Diarrheal Diseases in Haiti

WASH Coverage in Haiti

In low-income countries, up to 88% of deaths from diarrhea are attributable to unsafe water, insufficient sanitation infrastructure and poor hygiene practices (Mattioli et al., 2014). The Caribbean island nation of Haiti has the lowest rates of access to an improved water source (69%) and to improved sanitation facilities (17%) in Latin America and the Caribbean, where the regional averages of improved water and sanitation coverage are 95% and 83%, respectively (JMP, 2016). Even within the country, there are apparent disparities between access to water and sanitation services in rural and urban areas. The Haitian ministry of health reports that 95% of

urban households in Haiti use an improved source for their drinking water, while only 60% of rural Haitian households use an improved source (IHE/Haiti, 2018). However, these estimates of water coverage included households that use rain water (1.7%) and bottled water (32.9%), which are not considered improved sources according to the WHO standards of improved water sources (IHE/Haiti, 2018). The CIA offers a much lower estimate of water coverage; where 57.7% of Haitians, compared to only 47.6% in rural areas, have access to water from an improved source, although this number also includes those who collect rain water (CIA, 2018). Further, only 44% of Haitians use a method of water treatment that is appropriate for treating water (IHE/Haiti, 2018).

These numbers are alarming when considering that 68.9% of households in Haiti do not use improved sanitation and 25.4% of Haitian households practice open defecation (IHE/Haiti, 2018). In rural areas in Haiti, only 19.2% of people use an improved sanitation facility , 8.4% below the national average (CIA, 2018). The lack of sanitation infrastructure in Haiti allows water sources, such as rivers, streams, natural springs, and wells, to be contaminated with human waste (Hayden, 2012). Water from these sources are then used for drinking and food preparation, and when left untreated, can subject people to the pathogens that cause diarrheal diseases (Hayden, 2012). These viral, bacterial and parasitic pathogens, most notably rotavirus, adenovirus, *Vibrio cholerae, Salmonella, Shigella, Cryptosporidum spp* and *Giardia lambiia,* are transmitted via the fecal-oral route through food or water contaminated with fecal matter (Lanata et al., 2013; Mattioli et al., 2014). The Central Intelligence Agency World Factbook places Haiti at *very high* risk for food or waterborne diseases including hepatitis A and E and typhoid fever (CIA, 2018). Moreover, the low levels of water, sanitation and hygiene (WASH) coverage

contributed to the spread and gravity of the cholera epidemic that ensued in 2010 and continues to contribute to mortality and morbidity in Haiti today (Gelting et al., 2013).

Cholera

Cholera is an infection caused by *Vibrio cholerae*, a Gram-negative bacterium. While rare in industrialized countries, cholera cases are on the rise globally on the African continent, Southeast Asia and Haiti (CDC, 2018a). The pathogen is transmitted through the ingestion of food or water contaminated by fecal matter. Clinical symptoms can cause extensive diarrhea characterized by its 'rice water' consistency. Vomiting, rapid heart rate, and loss of skin elasticity, among other symptoms of dehydration, affect one in ten infected persons, while nine in ten remain asymptomatic but continue to spread the bacterium. The symptoms of moderate dehydration can be easily treated with oral rehydration solution (ORS) and more severe dehydration may require intravenous fluid replacement. If left untreated, the infection has a 50% mortality rate attributable to complications from severe dehydration (CDC, 2018a).

Historically, there were no reported cases of cholera in Haiti before 2010. However, Cholera has been a regional concern since its introduction following the earthquake that devastated Haiti in 2010. Two years after the cholera epidemic began in Haiti, cholera remained a major cause of diarrhea in the country's capital, Port-au-Prince (Charles et al., 2014). Cholera continued to pose a threat on the island when Hurricane Matthew hit the southwest region of Haiti in 2016 (Khan et al., 2017). In a national survey, 11.8% of households in Haiti's South Department had at least one member who had been infected with cholera and about 1.6% of surveyed households in this region had a family member die of cholera infection (IHE/Haiti, 2018). Almost 10,000 deaths from cholera have been reported since its introduction into the

country in 2010 and in 2016 there were more than 27,000 suspected cases of cholera (UNICEF, 2016).

Hepatitis A and E

Data show that typhoid, hepatitis A and E and other enteric diseases also contribute to morbidity and mortality in Haiti (USAID, 2017). Hepatitis A is a food and waterborne disease caused by the hepatitis A virus (HAV) (CDC, 2013a). The virus can be transmitted via the fecal-oral route and is specific to human feces, although infection through close contact with an infected person is another key mode of transmission (Aggarwal & Goel, 2015). Hepatitis A causes an acute inflammation of the liver and has been known to initiate symptoms including fever, malaise, loss of appetite, nausea, vomiting and diarrhea, stomach pain, and jaundice (CDC, 2013a). The hepatitis E Virus (HEV) is also spread by food and water contaminated by feces and causes hepatitis E, an acute, self-limiting liver disease. In developed countries like Haiti, hepatitis E can also spread via uncooked or undercooked meat (CDC, 2013b). Symptoms of hepatitis E mirror those of hepatitis A and can last from less than two months to up to 6 months. There is a vaccine for hepatitis A that is virtually 100% effective, however, there is no vaccine for HEV. The CDC promotes prevention for both viruses (CDC, 2013b).

While there is a lack of research on HAV in Haiti, it is well known that the virus is endemic in Latin America and the Caribbean (WHO, 2009). A 2015 study found that changes in the epidemiology of hepatitis A may lead to the disease becoming a greater public health problem in the future (Aggarwal & Goel). In 1995, four cases of acute HEV infection with jaundice were identified among Bangladeshi peacekeeping troops returning from Haiti (Alavian, 2010). The United Nations Mission in Haiti conducted an epidemiological serological investigation and found the only 3% of the Haitians they tested were confirmed positive for HEV

(Alavian, 2010). This suggested that HEV was not endemic to Haiti but had been introduced to the country by the peacekeeping troops, much like the introduction of cholera to Haiti by Nepalese peacekeeping troops in 2010. HEV most likely spread quickly in the country due to favorable conditions, including poor sanitation and contaminated water supplies (Alavian, 2010). Rates of transmission in low-resource countries characterized by a lack of sanitation are high, but socioeconomic progress and improvements in WASH conditions are being implemented to address this issue (Aggarwal & Goel, 2015).

Typhoid

Typhoid fever, caused by the bacterium *Salmonella typhi*, is a food and waterborne illness common in parts of East and Southeast Asia, African, Central and South America and the Caribbean (CDC, 2018b). It can typically cause a sustained fever as high as 103°F-104°F. Other symptoms include stomach pain with diarrhea or constipation, loss of appetite, weakness, headache, cough, and occasionally a rash in the form of flat, rose colored spots (CDC, 2018b). Similarly, paratyphoid fever is a food and waterborne illness caused by the bacterium *Salmonella paratyphi* and is clinically identical to typhoid fever. Typhoid and paratyphoid fevers can be treated with antibiotics. If either typhoid fever or paratyphoid fever are left untreated, however, complications can arise (CDC, 2018b). Untreated infected individuals can experience encephalopathy, gastrointestinal bleeding, and intestinal perforation (Parry, Hien, Dougan, White, & Farrar, 2002). There is a 30% mortality rate from complications derived from untreated typhoid.

The global burden of typhoid fever is still high in low- and middle-income countries, such as Haiti, but the lack of a simple diagnostic test for typhoid infections may cause the number of cases to be underestimated (Mogasale et al., 2014; Parry et al., 2002). In 2003, the

Pan American Health Organization (PAHO) and Ministry of Public Health in Haiti (MSPP) reported 200 cases of typhoid and 40 deaths in remote villages lacking access to healthcare facilities and safe water (WHO, 2003). More recently, after the earthquake in 2010, 753 suspected typhoid cases and 4,549 cases of watery diarrhea were reported to the Internally Displaced Person Surveillance System, implemented by the Ministry of Public Health and Population, the Pan-American health Organization, and the Center for Disease Control and Prevention (CDC) (CDC, 2010). A study looking at 217 patients over 14 years old with typhoid fever in a rural Haitian hospital found that effective control would only be possible through educating the population about disease prevention and early treatment (Olle-Goig & Ruiz, 1993).

Diarrheal Diseases in Haiti

While enteric diseases affect the broader Haitian population, they have a much graver effect on children in particular. The leading cause of morbidity and mortality among infants and children under five in Haiti is contaminated water and diarrhea (UNICEF, 2016). Before the 2010 earthquake, it was reported that 16% of deaths of Haitian children under five were a result of waterborne diseases, and the numbers are thought to have increased since then (Hayden, 2012). Following the earthquake, diarrhea continued to be the second leading cause of mortality among children, responsible for about 10% of the under-five mortality rate (Lanata et al., 2013; Mattioli et al., 2014). Approximately 34% of hospitalizations and 62% of deaths in children under five-years old in four Haitian hospitals were attributed to diarrhea; the majority of those were children under two-years old (Derby et al., 2014). Additionally, a 2012 study found that co-infection with multiple pathogens, including *Escherichia coli,* rotavirus, and *shigella,* was common in diarrhea cases among children less than five years old (Charles et al.). These data

suggest the importance of interventions that emphasize enteric disease prevention among children and their families.

2.3 Hand Hygiene and Enteric Disease Prevention

Hand Hygiene Interventions

The literature indicates that mortality from diarrhea caused by enteric diseases is preventable with appropriate WASH interventions. Hand hygiene, specifically, has been found to be an effective method in reducing instances of diarrheal morbidity and mortality. Individual hand hygiene and sanitation interventions among mothers in rural Bangladesh were found to significantly reduce enteric protozoan infection caused by *G. lambiia* in 5,933 31 month-old children (Lin et al., 2018). The study did not observe any effects from nutritional improvements or chlorinated drinking water, suggesting the importance of hand hygiene and sanitation interventions in the reduction of *G. lambiia* infections (Lin et al., 2018). Similarly, a community-based cluster randomized control trial conducted in 24 clusters in Eastern Ethiopia found that incidence of diarrheal disease among children under five was reduced by 35% when primary caretakers received WASH education messages, including hand washing with soap and water at critical times (Hashi, Kumie, & Gasana, 2017).

A systematic review of eighteen studies conducted in 2015 reported a protective effect of hand washing with soap during cholera outbreaks (Taylor et al.). This effect was especially strong during foodborne outbreaks and outbreaks associated with poor hygiene practices of market vendors, compared to a household water disinfection intervention (Taylor et al., 2015). The study found that the promotion of hand washing with soap should be central to cholera control programs, but must include formative research, behavior change and soap distribution (Taylor et al., 2015). Hygiene behavior was found to be sustained following hand hygiene

promotion, especially when delivered in small groups and frequent face-to-face contact with a hygiene promoter (Taylor et al., 2015). Furthermore, a meta-analysis of 135 studies published between 1980 and February 2016 found that overall, interventions promoting handwashing with soap reduced the risk of diarrheal morbidity by 30% (Wolf et al., 2018).

Proper Hand Hygiene

With correct hand hygiene, that is washing hands properly and at critical times, one can stop the transmission of pathogens via the fecal-oral route by preventing the contamination of foods and water with fecal matter. According to the Centers for Disease Control and Prevention (CDC), the steps to proper hand washing include wetting hands with clean water, applying soap and lathering the hands by rubbing the palms, back of hands, between fingers and under fingernails for at least 20 seconds, then rinsing with clean water and drying with a clean towel or air drying (2018c). Clean water is defined by the WHO as water that is not contaminated with infectious agents, toxic chemicals, and radiological hazards (WHO, 2018a). Critical times for hand hygiene are defined as:

- Before, during and after food preparation,
- Before food consumption,
- Before and after caring for someone who is sick,
- After using the toilet,
- After changing diapers or cleaning a child who has used the toilet,
- After blowing your nose, coughing, or sneezing,
- After touching an animal, animal feed, or animal feces,
- After touching garbage (CDC, 2018c).

However, proper hand hygiene is not widely practiced in Haiti. About 25% of households have water and soap to wash their hands in Haiti (IHE/Haiti, 2018). In rural households, only about 19.8% have water and soap to practice proper hand hygiene (IHE/Haiti, 2018). From a survey sample of 518 participants living in a rural section of the city of St. Marc, 46.7% reported washing their hands more than four times a day (Aibana et al., 2013). Hand washing with soap was not assessed in this study and only 62% of respondents treated their water. The differences in rural and urban WASH coverage are apparent when comparing these numbers to a 2011 study, where 94.1% of respondents living in Port-au-Prince reported washing their hands with soap (De Rochars et al.). However, only 84.1% of these participants reported having access to soap (De Rochars et al., 2011). In the South Department of Haiti, 11.2% of people use only water to wash their hands, and 64% do not use water, soap, or any other cleansing products (IHE/Haiti, 2018). Washing one's hands with untreated water or without soap does not protect against enteric disease infections.

Behavior Change Elements

Successful WASH interventions not only improve or build infrastructure but also include additional behavior change elements, according to Contzen and Mosler (2015). Including educational and community participatory aspects in a program's strategy allow participants to receive education on how to use and maintain the infrastructure and services provided or built during the intervention. These aspects also provide an opportunity for changing social norms and behaviors related to hand hygiene and sustaining these norms and behaviors (N. Contzen & Mosler, 2015). Contzen and Mosler identified key elements for successful hand washing interventions and positive behavior change, which included:

- Create norms by referencing important others that wash their hands,

- Construct handwashing facilities at critical junctions, i.e. near kitchens or latrines,
- Practice community-based participation in identifying barriers to hand washing and creating solutions,
- Tailor interventions to the population and community-specific behaviors (2015).

2.4 Existing Hand Hygiene Interventions in Haiti

In 2010, more than 100 nongovernmental organizations (NGOs) were working in the WASH sector in Haiti (Gelting et al., 2013). This number does not include small faith-based groups working on smaller WASH projects through churches and schools (Gelting et al., 2013). DINEPA, Haiti's National Water and Sanitation Directorate under the Ministry of Health and Population (MSPP), was tasked with coordinating the WASH sector as a part of a ten-year National Plan to eliminate endemic cholera. This plan focuses efforts on water and sanitation infrastructure, improved health care services and management, epidemiology and surveillance, and hygiene education (Gelting et al., 2013). As a continuation of this plan, DINEPA, the World Bank and the State and Peace-Building Fund partnered to implement a sanitation intervention in 2010. The intervention focused on the provision of safe drinking water for 270,000 people and the construction and rehabilitation of sanitation and hygiene infrastructure such as latrines and hand-washing stations (The World Bank, 2014). In addition, the intervention included hygiene and sanitation promotion campaigns and training sessions in the Southeast, West, South and Central departments to ensure proper and sustained use of the infrastructure (The World Bank, 2014).

In the *Hygiene Promotion Strategy (draft): Cholera Response Haiti*, which was enacted shortly after the cholera epidemic struck Haiti in 2010, DINEPA explained that priority activities should focus on treatment and prevention, including identifying and addressing key risk

behaviors and misconceptions regarding proper handwashing at critical times (DINEPA, 2010). DINEPA and its partners worked with at-risk populations, parents and family members, children, caregivers and neighbors, educators and religious and political leaders in high risk areas. The strategy also indicated that in order to enable effective behavior change, health promotion activities needed to be supported by WASH services (DINEPA, 2010). In keeping with this, the current World Bank portfolio in Haiti is about $728.67 million USD and about 12% of this funding goes to water and sanitation (The World Bank, 2018).

After the 2010 earthquake, the United Nations Children's Fund (UNICEF) implemented UNICEF WASH in Schools (UNICEF WinS), a WASH program that tackled the problem of 198 schools in Port-au-Prince that lacked proper hygiene promotion practices or WASH facilities for their students (Steinlechner, 2012). The UNICEF WinS program has four main pillars: behavior change, support to service delivery, social mobilization, and capacity development (WASH in Schools, 2018). The program supported the Haitian government's back to school initiative by supplementing improvements in WASH infrastructure and hygiene kit distribution with hygiene promotion to reduce exposure to waterborne diseases at schools (Steinlechner, 2012; WASH in Schools, 2018). Other NGOs were implementing similar efforts in over 550 Haitian schools and UNICEF provided prevention kits and hygiene promotion to over 5,000 schools overall (WASH in Schools, 2018). Mark Henderson, the UNICEF Chief of WASH programs in Haiti explained that efforts to train students and school officials to properly use and maintain the facilities and other behavior change and capacity development components are key to the program. Another one of UNICEF's core strategies in this program is to promote behavior change among children in schools in the hopes that they will communicate these messages to their communities, making children, in this case, the main agents of change (Steinlechner, 2012; WASH in Schools, 2018).

On a smaller scale, World Water Relief (WWR) is an NGO that works in rural schools on the island of Hispaniola. They've committed ten years to implementing and maintaining WASH in several WWR projects schools in the southwestern region of the Dominican Republic, near Barahona, and the central and southern regions of Haiti. In Mirebalais, Haiti, field staff teach proper hand hygiene to students in six schools through weekly information sessions and hand washing demonstrations. They also developed a WASH youth group in the form of a summer club for the students in these schools. Part of their plan included training members of their WASH youth group to teach students from their schools about proper hand hygiene using soap and clean water, ensuring health information dissemination. Similar to the UNICEF WinS program, WWR's project goal was to "create a culture of hygiene-educated youth who [would] spread this knowledge to their families and friends" (Fields, n.d.). More recently WWR has expanded its program to incorporate a train-the-trainer methodology by training student leaders, increasing involvement with parent committees who give educational presentations to adults in the community, and increasing the involvement of school administrators (Fields, n.d.).

Inter Aide, an international organization that develops WASH, agriculture, health and school support programs, also has a WASH plan for Haiti. Inter Aide partnered with DINEPA to work in two rural and isolated communities, the communes of Petite Rivière de l'Artibonite, Boucan-Carré and Hinche, located in the Black Mountains of central Haiti (Inter Aide, 2018). Their goal is to sustainably improve hygiene practices and access to safe drinking water and sanitation through infrastructure and chlorination. Inter Aide also promotes access to safe water by supporting community members in building latrines for their homes and schools and fostering sustainable access to chlorine (Inter Aide, 2018). While their Haiti project is aimed towards improving WASH infrastructure, Inter Aide emphasizes the importance of promoting sustainable

improvements in hygiene and sanitation practices in the communities they work in. To do so, Inter Aide provides trainings and hygiene and sanitation education to community members and partners with the community to disseminate health messages (Inter Aide, 2018).

In the South, Southeast and Grand Anse departments of Haiti, the Healthy Schools, Successful Children project, also known as *Sante nan lekol, se Sikse Timoun yo* in Haitian Creole, improved WASH practices in 60 schools. The $1.96 million project, funded by Episcopal Relief and Development and implemented by IMA World Health, began in September 2015 and ended in March 2018 (Eberle, 2018). Healthy Schools, Successful Children project worked with partners to rebuild and expand schools and provide proper hand hygiene education and education on other hygiene practices (Episcopal Relief & Development, 2018). By training 879 teachers and school directors on WASH programming, the Healthy Schools, Successful Children project was able to reach 21,361 students (Eberle, 2018). Their long-term goals were that good hygiene practices would be spread by children into their communities, and according to IMA World Health, WASH information and behavior change messages reached 89,032 community members during their intervention (Eberle, 2018).

MSPP implemented its first oral cholera vaccine campaign in the urban setting of Petite Anse and the rural commune of Cerca Carvajal in 2013, targeting about 100,000 people above the age of one, excluding pregnant women (Childs et al., 2016). These regions were targeted due to high cholera attack rates and poor sanitation. During the campaign, MSPP placed messages at vaccine sites about cholera prevention, including good hand hygiene behaviors such as the critical times to wash hands and the importance of using soap and water. Pamphlets containing this information were also distributed to vaccinated individuals (Childs et al., 2016). A research team compared two knowledge and practice household surveys conducted before (N=297) and

after (N=302) the intervention. They found an increase in handwashing stations and availability of soap, but participants did not report any changes in handwashing practices (Childs et al., 2016). Only 30.1% of respondents had a handwashing station and 34.5% had soap at the handwashing station (Childs et al., 2016). Eighty-eight percent of respondents reported washing their hands before eating and after using the toilet, 82.6% used soap for handwashing and 66.9% had heard of washing hands with soap and water verbally, suggesting a need for hand hygiene interventions that emphasize behavior change along with increasing access to clean water and soap (Childs et al., 2016)

Conversely, a 2015 qualitative study evaluating the results of a WASH intervention in Gonaives, Haiti determined the population's response to WASH messages, their use and acceptability of water treatment and sanitation, and their attitudes and practices at the household level (Williams et al., 2015). Seventeen focus group discussions of about ten people each were held with community members in nine locations in the northern and southern areas of the Artibonite department including remote, rural areas, semi-rural areas and one peri-urban setting (Williams et al., 2015). A focus group discussion with community health workers was also held in the city of Gonaives. The researchers found that WASH education and heath messaging were widely received by the community, specifically relating to comprehending the necessity of proper hand hygiene, using latrines and proper food handling (Williams et al., 2015). This was attributable to in person communication from health workers, brigadiers, and health and sanitation agents as well as megaphones, the church and SMS and the radio as means of communicating health messages. Moreover, the study found that an increase in hand washing was the most commonly reported behavior change during focus group discussions, suggesting a

positive correlation between hand hygiene education and messaging and hand washing behavior change (Williams et al., 2015).

2.5 Behavioral Theory: Health Belief Model

Health Belief Model

The health behavior model (HBM) was developed to identify and explain the motivation behind health seeking action and behavior to help inform public health interventions and programs. The theory states that health seeking and other health behavior is motivated by six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy (Edberg, 2015). Perceived susceptibility and severity are almost self-explicatory, referring to one's perception of risk for a health problem and the degree of severity one perceives the consequences of a health problem to be, respectively. Similarly, perceived benefits are defined as the positive outcomes one believes will occur as a result of a health seeking action or behavior. A perceived barrier is any negative outcome a person believes will result from taking an action. Any external events that can motivate a person to act are cues to action while self-efficacy is one's belief in his or her own ability to do a health seeking action or behavior (Edberg, 2015).

HBM in the Haitian Context

The HBM can be applied and integrated into a variety of interventions in differing communities. In Haiti, the HBM constructs can be easily applied in the WASH sector, especially in light of the cholera outbreaks that have been plaguing the country since the bacterium was introduced after the 2010 earthquake. Typhoid fever, hepatitis A and E and cholera are common diseases in low- and middle-income countries lacking water and sanitation infrastructure. The southwest of Haiti is no exception to this rule and conditions following heavy rains or hurricanes

exasperate mortality and morbidity rates related to enteric diseases (IHE/Haiti, 2018). Childhood diarrhea is also a major concern for the Haitian government, UNICEF and their partner organizations working in Haiti and is a major contributor to high child morbidity and mortality rates in the country (UNICEF, 2016).

However, in a study of 118 caregivers living in rural and urban areas where a distinguished organization implemented hygiene promotions in post-earthquake Haiti, perceived susceptibility of acquiring a food or water-borne illness was low despite a high self-reported instance of handwashing (N. Contzen, & Mosler, H-J. , 2013; N. Contzen & Mosler, 2015). Contzen and Mosler explain that low levels of perceived susceptibility in their sample populations may be due to more educated participants reporting hand washing more accurately because they were more aware of the proper times and opportunities for hand hygiene (2015). Perceived severity of cholera infection was associated with food related handwashing, but not fecal related handwashing (N. Contzen, & Mosler, H-J. , 2013). Health knowledge was also found to be negatively associated with hand washing (N. Contzen, & Mosler, H-J. , 2013). A 2015 study found that the perceptions of the threat of cholera were tied to seasonality as participants assumed that cholera returned with the rainy season (Williams et al.). Perceived susceptibility to cholera was therefore reduced during the dry season, suggesting that perceived susceptibility and severity interacted with personal health knowledge and education levels as well as other constructs identified in the HBM (Williams et al., 2015).

Perceived barriers to hand hygiene in Haiti, such as handwashing stations being out of water, not having access to soap or water and other general hindrances were negatively associated with handwashing, although the association was not found to be significant (N. Contzen, & Mosler, H-J. , 2013). The study found that, overall, those who felt hindered in

handwashing washed their hands less than those who did not (N. Contzen, & Mosler, H-J. , 2013). Participants in another study conducted in Haiti cited poverty as a barrier to building latrines (Williams et al., 2015). Overall, Haitian participants who believed that they experienced barriers to engaging in positive WASH behaviors were less likely to engage in them. However, in keeping with the HBM, respondents reported an increase in hand washing when there were perceived benefits. Participants who washed their hands to keep their children healthy and to attempt to educate their children in proper hand hygiene behavior were more likely to wash their hands than those who did not report this nurturing motivation (N. Contzen & Mosler, 2015).

Cues to action reported in the Haitian community related to community and familial norms. Norms in the community and within familial groups were significantly associated with feces and food related hand washing, particularly with the notion of disgust (N. Contzen, & Mosler, H-J. , 2013). Participants who believed that the people in their surroundings often washed their hands or who believed that significant others expected them to wash their hands were more likely to engage in positive hand hygiene behaviors than others (N. Contzen & Mosler, 2015). In addition to external motivations to hand washing, one's belief in his or her own ability to engage in the behavior, or self-efficacy, was strongly related to positive hand hygiene behavior. Participants who believed that they could wash their hands at the critical times and those who had detailed plans to deal with barriers to hand washing were more likely to wash their hands than those that did not (N. Contzen & Mosler, 2015).

Strengths and Limitations

HBM is the oldest and one of the most widely used individual behavioral theories in public health (Edberg, 2015). The theory addresses the motivations for health behaviors and emphasizes that people will engage in a healthy behavior if they value the outcome related to the

behavior and they believe that the behavior is likely to result in that outcome (Edberg, 2015). However, there are a few disadvantages to the theory. Because HBM is an individual behavioral theory, it does not address social and environmental factors. In the Haiti context, for example, poverty was a socioeconomic environmental factor participants identified as a barrier that would not be mitigated during an intervention using only the HBM (Williams et al.). Also, the function of all six HBM constructs in changing behavior is unclear. Not all programs use all of the HBM constructs together and the HBM constructs that seem to push behavior change have been intervention specific (Edberg, 2015). A 1984 critical review of all 46 HBM-related studies published at the time found that perceived barriers and perceived susceptibility were the most powerful of the HBM constructs across studies (Janz & Becker). However in the Haiti context, perceived benefits and barriers, cues to action and self-efficacy were more important drivers of behavior change during hand hygiene interventions in Haiti while perceived susceptibility and severity were less important or had negative effects (N. Contzen & Mosler, 2015). This could be because the HBM is a framework that cannot always explain complex human behavior (Edberg, 2015).

Nevertheless, researchers established empirical support for the use of the HBM and recommended that HBM constructs be considered when designing and implementing health education programming (Janz & Becker, 1984). Disadvantages of HBM caused by the intervention-specific factors that promote behavior change can be overcome by addressing all of the HBM constructs when designing an intervention. There is also a need to understand and address the HBM constructs that cause humans to adhere or not adhere to a health behavior, which can be done through community needs assessments, or community involvement and buy

in with the intervention. Furthermore, deficits in the model can be addressed when the HBM is used in combination with another behavioral theory (Edberg, 2015).

2.6 Behavioral Theory: Community-Based Participatory Action Research

Community-Based Participatory Action Research

Community-based participatory action research (CBPAR), also known as community-based participatory research (CBPR), is a collaborative framework that involves all stakeholders in the research process, including developing data collection tools, analyzing and disseminating any findings. CBPAR aims to address the pragmatic concerns of community members by making fluid the roles of the researcher and the researched (Eftekhari et al., 2013). The CBPAR framework does so by beginning with a community's self-identified issue or proposed action and then supporting the community's efforts with community-based research. The objective of using a CBPAR framework is to empower communities, particularly low and middle income communities, by ensuring community member participation in the research and outcomes so that they can be the drivers of change in their own communities (Eftekhari et al., 2013).

CBPAR in the Haitian Diaspora Context

One of the key assets of CBPAR in the Haiti context is that the framework is able to address complex social issues such as socioeconomic and cultural barriers by utilizing community knowledge. *Patnè en Aksyon*, or Partners in Action, is a campus-community collaborative founded in 2004 that works in Little Haiti (Florida, USA) to address the excess burden of cancer experienced by Haitian women compared to other women in South Florida. Located in Miami Florida, Little Haiti is the largest ethnic enclave of Haitian immigrants in the United States, housing more than 250,000 Haitian immigrants, including ~150,000 undocumented Haitians not included in the U.S. census (Kobetz et al., 2009). Haitians in Miami

are the poorest and most disenfranchised ethnic minority in Miami. In the midst of the AIDS epidemic, the CDC labeled having a Haitian ethnicity as a factor for HIV/AIDS and current immigration policies deny Haitians seeking political refuge in the country despite Haiti's long history of turbulent and unstable politics (Kobetz et al., 2009).

A history of high levels of stigmatization and violence against Haitians legitimized and perpetuated by U.S. government policies has led to mistrust of formal healthcare systems, researchers and government agencies and officials. Because of this, Haitians in the United States are weary of disclosing their health status, especially since infectious disease may be grounds for deportation (Kobetz et al., 2009). To address this, researchers in *Patnè en Aksyon* work with community leaders from little Haiti to identify the scope and focus of research and to frame research to be culturally appropriate. The organization houses their projects in local organizations and businesses. To further address issues of skepticism in the community, *Patnè en Aksyon* uses community health workers of Haitian descent and who are fluent in Haitian Creole and English to provide medical care and community-based interventions to the community of Little Haiti. (Kobetz et al., 2009).

CBPAR in the Haitian Context

Leögane, Haiti was the epicenter of the 2010 earthquake that devastated much of Haiti. The international community promised millions for rebuilding Haiti, yet the majority of the funding was not dispersed due to local political instability and the bureaucratic inactivity of multiple non-profits and NGOs (McRiley, 2012). Haiti is home to more than 300 officially recognized NGOs and has the most NGOs per capita in the world. Most of these organizations are foreign and those that leave, lose funding or fail to fulfill their goals results in disappointment and mistrust from Haitian communities (Schuller, 2007). Using the CBPAR framework,

however, promotes critical dialogues and sparks action within the community by including community members in each step of the research process (Eftekhari et al., 2013). In Leögane Haiti, a photovoice CBPAR project was used to determine the root causes of illness through the lens of twenty-three nursing students residing in the area. The participants took 500 photographs related to housing conditions and health (McRiley, 2012). The photos helped to identify important issues in their communities, which prompted critical dialogue and a path to reach policy makers to improve conditions in the community. While the study results were only specific to the homes of the twenty-three participants and assumptions could not be generalized to the entire community or to Haiti, the study identified issues that were important to community members which could be used to guide future interventions (McRiley, 2012).

CBPAR in WASH

While there is little research on WASH-related CBPAR interventions in Haiti, CBPAR methodologies have been used to address WASH in other low- and middle-income regions. A WASH intervention in Banco de Sikia, a rural community in Nicaragua, educated community health workers and empowered them to promote WASH behaviors in their community (Jafarian, 2018). They went door to door, using knowledge, aptitude, and practices (KAP) surveys to identify WASH practices in the community. Six members of the community volunteered to deliver monthly WASH education and counseling to between eight and twelve households each. The project was found to be successful as WASH education reached a majority of rural community members and positive WASH behavior changes were discovered to be attributable to the project (Jafarian, 2018). Additionally, the intervention relied on capacity building which has been linked to sustainability within CBPAR interventions (Hacker et al., 2012; Jafarian, 2018).

The program's success allowed it to be expanded to another community in Nicaragua (Jafarian, 2018).

Similarly, photovoice was used to study the perceptions and practices of water and health and the influences of the ecological and sociopolitical environment on these perceptions and practices of eight women in a lakeshore community in Western Kenya (Bisung, Elliott, Abudho, Karanja, & Schuster-Wallace, 2015). Overall, participants reported that the photos helped them to understand WASH behaviors in their communities. Some explained that the photos made them more aware of certain behaviors and practices in their communities and the influence that some of these practices had on their health. Other participants were not surprised that these harmful behaviors and practices were occurring but were not aware of how widespread they were in their community until they participated in the photovoice intervention (Bisung et al., 2015). In addition to creating awareness among the participants, the intervention lead to positive changes in behavior in the community. Participants reported advising children about WASH behaviors and practices during the one-week photo taking period. Some even stopped children from doing certain practices. Passing knowledge from one generation to another within communities has been linked to sustainability (Hacker et al., 2012). Participants also emphasized the need for a collective effort in the community to improve WASH-related behaviors and practices. This study found photovoice to be an effective CBPR methodology not only for identifying and understanding behaviors in a community, but also for facilitating collective action and engaging local communities and governments (Bisung et al., 2015).

Strengths and Limitations

The characteristics of CBPAR that allow this theory to work well in disenfranchised communities also can be disadvantages in certain communities. Because CBPAR is community

based, it requires community buy in and trust, which can be time consuming and resource demanding. A historical distrust of research in some racial, ethnic and low-income communities can further limit community participation (Eftekhari et al., 2013). There are additional cultural and economic barriers such as constructs of health and illness and illiteracy, which are seen in Haitian populations as well as in other marginalized communities (Kobetz et al., 2009).

While partnership is a facilitator of CBPAR, it can also be an outcome of working in a community (Hacker et al., 2012). Distrust and skepticism are barriers to gaining mutual trust with community members, which is why allocating time and resources for collaboration and partnership with community leaders is vital to any CBPAR intervention. Working through an organization that already operates in a community, is staffed by local residents and that has already gained the trust of the community members can help to curtail some of these issues (Eftekhari et al., 2013). For the aforementioned WASH-related CBPAR project in Western Kenya, researchers spent about ten years building mutual trust and partnerships with local research institutions and community members before implementing their intervention (Bisung et al., 2015).

CBPAR is community based, meaning it is centered on the needs of the communities and the community-based organizations that serve them. This framework is also participatory. Communities are involved in all aspects of CBPAR, ensuring that community knowledge is utilized and during the research process its outcomes. Lastly, CBPAR is action-based, wherein the participants actions that lead to positive behavioral and social change are supported (Eftekhari et al., 2013). Within the CBPAR framework, goals are shared by researchers and community members and the desired health outcomes are the result of a collaboration and

partnership. This has been found to enhance the capacity building and sustainability of interventions that utilize the CBPAR framework (Hacker et al., 2012).

2.7 Nuances of Health Education Projects in Rural Communities

Barriers to disease prevention and health promotion exist in both urban and rural areas, however health interventions in rural areas in both developed and developing countries face additional challenges. Rural areas in the United States are characterized by higher poverty rates, and cultural and social norms that can influence health-related behaviors, educational disparities and health literacy levels (Bolin J., 2012). In addition to this, resources tend to be concentrated in urban areas and difficulties with transportation reduce rural inhabitants' access to healthcare in countries worldwide (Strasser, 2003). Rural inhabitants in developing countries bear the brunt of the burden, however, and can be caught in a spiral of low productivity due to ill health (Strasser, 2003). However, rural communities also have assets that can help overcome these barriers and encourage health promotion activities.

Supportive communities with strong social networks and connections can be employed to reach shared goals of community health and wellness (Bolin J., 2012). Public health officials can take advantage of centralized communication channels, such as churches, clinics or market places to promote their interventions and gather community support. Also, the smaller scale scope of programs and the community's willingness to face health challenges can accelerate positive health results (Bolin J., 2012). This is important in public health programming, as research has shown that reaching desired health outcomes during community based interventions can promote the sustainability of interventions (Hacker et al., 2012).

To better inform researchers and public health officials of the community's needs, community needs assessments have been employed. These include surveys, focus group

discussions and interviews. Knowledge, Attitude and Practice (KAP) surveys have been used to assess WASH knowledge and behavior for multiple WASH interventions in rural communities (Aibana et al., 2013; Jafarian, 2018). In rural Haiti, KAP surveys were employed to assess existing knowledge and hygiene practices pertinent to the prevention and transmission of diarrheal diseases (Aibana et al., 2013). They also have been used during cholera outbreaks to measure changes in uptake after educational cholera control activities (Aibana et al., 2013). One study addressed the issues of transportation in rural areas by training local Haitians to identify heads of household and administer KAP surveys door-to-door (Aibana et al., 2013). While KAP surveys do not address the social and economic context that influence the translation of knowledge into practice, working and interacting with local community members to administer these surveys allows these nuances to be discussed in greater detail outside of the survey (Aibana et al., 2013; Jafarian, 2018).

Transportation

Transportation issues, be it affordability of transportation services, distance or road conditions, can affect accessibility to public health interventions in rural areas. The physical topography of a rural community and climatic conditions, such as Haiti's mountainous regions and season hurricanes, can contribute to absenteeism with regards to health education projects and programs (Strasser, 2003). Other than geographic accessibility, access to health care and health promotion in rural areas can be limited by associated costs, such as travel expenses, the availability of health resources in remote areas, and cultural or societal acceptability of these programs (Bright, Felix, Kuper, & Polack, 2017). An article reviewing interventions addressing access to health services in low and middle-income countries found that those that were more

successful in improving health outcomes delivered services near or at homes in remote and rural areas and utilized text messages (Bright et al., 2017).

Language and Literacy

Language and literacy pose an additional barrier to accessing public health interventions in rural regions. While Haiti has two national languages, French and Haitian Creole, language is tied to social class and education. While Haitian Creole, based on African and indigenous dialects and French and Spanish components, is spoken by everyone in the country, French is the language of the elite and educated. Until recently, Haitian Creole was not a standardized written language, therefore French is still used for official government documents and some health educational materials. Furthermore, many Haitians are not literate in Haitian Creole and have a limited proficiency of the French language (Kobetz et al., 2009). The Central Intelligence Agency World Factbook estimates that only about 60.7% of the Haitian population over the age of fifteen can read and write (CIA, 2018). To address additional challenge that literacy poses on preventative healthcare intervention, a program working in Little Haiti in Miami Florida trained Haitian Creole speaking-community health workers to read informed consent statements to potential participants and explained concepts that were not culturally equivalent in the Haitian culture (Kobetz et al., 2009). Studies have also revised recruitment and educational materials to include more visuals to address low literacy levels among their target populations (Jafarian, 2018; Kobetz et al., 2009).

Addressing Challenges in Rural Communities

Despite addressing barriers to community participation in health promotion and prevention interventions, ensuring program uptake can still be a challenge for researchers and public health officials. Community approaches have been used to encourage the participation of

local residents (Feuerstein, 1976). Health programs that engage rural communities tend to emphasize community assets, human resources and culturally appropriate technologies are more effective in achieving short and long term objectives (Feuerstein, 1976). A WASH intervention in Nicaragua empowered community health workers through education to promote positive WASH behaviors in their rural community. The intervention also trained six volunteers from the community to continue monthly WASH education and counseling and was found to be successful (Jafarian, 2018). Additionally, inclusion of and collaboration with local health providers in rural settings was found to integrate disease prevention and treatment and contribute to improved health outcomes (Strasser, 2003). Evaluators of a nutrition education program in Nepal found that the inclusion of curative activities increased community participation and acceptance which contributed to the program's success (Strasser, 2003).

Chapter 3: Methods

3.1 Introduction

Context of the Project

NOVA is a US based organization that runs two permanent health clinics in the small, rural town of Cavaillon, Haiti. Medical staff and members of the NOVA board requested a hand hygiene education project due to high rates of enteric diseases and diarrhea among patients. The research team worked closely with the head physician to prepare and implement a hand hygiene education project. The support of the clinic staff assisted with community buy-in and participation.

The hand hygiene project can be separated into the following four phases: community needs assessment, curriculum development and implementation, train the trainer, and evaluation. The community needs assessment involved the piloting and implementation of a knowledge, attitude and practices (KAPs) survey aimed at understanding the information and knowledge present in the patient population as they pertain to hand hygiene. The curriculum development involved combining the analysis of the aforementioned survey with elements from the WHO Participatory Hygiene and Sanitation Transformation Series (PHAST) step-by-step guide and activities from the International HIV/AIDS Alliance Tools Together Now. The curriculum implementation and evaluation involved assessment of knowledge and information retention after teaching the curriculum to 23 adult NOVA patients, 18-35 years old.

Research Team

The research team comprised of this researcher and a co-researcher from the Rollins School of Public Health (RSPH) at Emory University. A faculty advisor from RSPH provided expertise and mentorship during project development and NOVA's head physician acted as a field supervisor during project implementation. NOVA staff also provided support during the data collection and project implementation phases. Board approval was attained prior to project development and implementation.

3.2 Study Setting

Geographic Setting

NOVA Hope for Haiti, Inc. (NOVA) is a US based organization that runs two permanent health clinics with onsite pharmacies in Cavaillon, Haiti. Cavaillon is a small rural town located on the National Road #2, about 112 miles southwest of Haiti's capital and 12 miles northeast of Les Cayes, the capital of Sud, one of the Haiti's ten departments. The town is about 244 km2

with an estimated population of 46,687 people. Of the population, only about 2,274 residents live in the town itself, while the remaining inhabitants live in surrounding rural and mountainous areas, including Martineau and Boileau where NOVA runs its clinics (IHSI, 2015). There are two hospitals located 30-45 minutes away from Cavaillon, in the city of Les Cayes to the west and the town of Bonne Fin to the north. However due to limited resources, the hospitals can only provide emergency care, leaving NOVA as the town's only reliable primary care provider.

The project was implemented at the Martineau location, named after the main unpaved street that leads into town. The clinic is adjacent to the Cavaillon River, where people and their cattle, goats, sheep and horses alike use water for drinking. Community members also swim, bathe, wash clothing, and cars in the river. The clinic provides improved water to community members through a pump that distributes well water, which is also used for clinic functions. Water quality is monitored and maintained by the clinic. The clinic also features three patios on the lower level used as waiting areas by patients during clinic hours and open to community members during the evenings. The clinic also holds various events for the community, such as movie nights on the porch, and serves as a community center in the area.

Study Site Selection

After consulting with NOVA board members, we decided to implement the project at the Martineau location due to logistical factors. The Martineau location is owned and operated by NOVA Hope for Haiti, Inc. while the Boileau location is owned and operated in collaboration with another nonprofit organization. Additionally, the head physician, who was also the researchers' field supervisor, primarily works in Martineau. The researchers were housed in an apartment above the Martineau location, so working at this site reduced transportation costs and

lowered the risk of encountering a road block during political unrests. Lastly, the Martineau location was equipped with 24-hour electricity and access WIFI, which were necessary for program implementation and were not available at the Boileau location.

PHASE ONE METHODS: COMMUNITY NEEDS ASSESSMENT

A community needs assessment was conducted prior to the design of the hand-hygiene education project. The aim of the formative research was to identify knowledge, attitudes and practices present in the NOVA Hope for Haiti, Inc. patient population. The needs assessment was accomplished through the development, piloting, data collection and analysis of a hand hygiene KAPs survey among NOVA Hope for Haiti, Inc. patients aged 18-35 years old.

3.3 Study Population

Study Sample for Community Needs Assessment

The study population included male and female adult NOVA clinic patients at least 18 years old and under 36 years old who had received or were receiving outpatient care. Participants were of mixed educational backgrounds, literacy levels and SES status.

Sampling Size and Sampling

NOVA's clinic has about 30 files for patients between the ages of 18 and 35 years old. Considering an n=30, an estimate of 50% knowledge level (prevalence of knowledge of Hand Hygiene in Cavaillon is unknown), with 5% error, 95% confidence interval, and 80% power, the required sample size was calculated to be 28.

3.4 Instrument Design for the Community Needs Assessment

Needs Assessment Survey Design

This survey was developed by conducting a literature review of already existing hand hygiene KAP tools and modifying questions to the study population. The questions were evaluated for usefulness and applicability through consultation with a public health WASH expert from Emory University.

The survey was then modified based on lessons learned from the pilot implementation. The survey contains 34 questions with multiple choice and Likert scale response options. The survey gathered information on sociodemographic characteristics, knowledge and attitudes about proper handwashing, transmission of microbes and preventative measures, and practices related to frequency of proper hand washing, availability of soap and water, and history of waterborne infection.

Examples of knowledge multiple-choice questions included: "If you wash your hands well with water, do you need to use soap?" "You only need to wash your hands with soap and water if they smell bad?" and "Does failure to wash hands allow the transmission of infectious diseases?" Response options for multiple choice questions included: "Yes," "No," "Does not apply," "I do not know," or "I refuse to respond."

Attitude multiple choice questions included: "Do people in your household believe washing their hands with soap is important after they use the toilet?" or "Do people in your household believe washing their hands with water and soap is important before they prepare food?" Response options for multiple choice questions included: "Yes," "No," "Does not apply," "I do not know," or "I refuse to respond." Attitude questions were also posed as Likert scale questions. For example, respondents were asked: "Please indicate your level of agreement with this statement: I feel as if health professionals influence me to wash my hands." Responses for

Likert scale questions included: “Strongly agree,” “Agree,” “Neither agree nor disagree,” “Disagree,” “Strongly disagree,” “I do not know,” and “I refuse to respond.”

For hand hygiene practices, respondents were asked questions about the presence of materials for proper hand hygiene and their frequency of handwashing at critical times. Examples of multiple-choice questions included: “Is there soap for hand washing available at home?” “Do you wash your hands with soap and water after you visit the toilet?” and “Do you wash your hands with soap and water before you prepare food?” Questions also included history of waterborne disease infection and barriers to proper hand hygiene. Response options included: “Always,” “Often,” “Sometimes,” “Rarely,” “Never,” “Does not apply,” “I do not know,” or “I refuse to respond.”

The survey questions were then transferred to a Google Forms survey administration application for electronic data collection. The paper version of the survey is available in English (Appendix A) and Creole in (Appendix B).

Translation of Needs Assessment Survey

The survey was translated to Haitian Creole by this researcher for proper understanding. The survey was verified by a public health WASH expert from Emory University. The translated survey was also verified by a NOVA clinic’s head physician for colloquial expression.

Piloting of Needs Assessment Survey

The survey was reviewed by clinic staff and a community member prior to pilot testing. The pilot survey was administered electronically via Google Forms over a period of five days in June of 2017 by this researcher to five patients to test comfort and timing. These patients were recruited as a convenience sample and verbally consented. The survey took approximately twelve minutes to complete on average. Due to the high rates of illiteracy in Haitian Creole

among participants, the survey was administered verbally by the researchers. The results of the pilot survey were not used in the final data analysis.

3.5 Data Collection for the Community Needs Assessment

Needs Assessment Subject Recruitment

Patients were recruited using clinic staff as gatekeepers and by convenience sampling. Patients were approached in the clinic waiting areas and asked if they would be willing to participate in a survey collecting information from NOVA clinic patients to inform a health education project. If a patient agreed and met the inclusion criteria, he or she would be brought to an area of the clinic away from other patients and clinic staff. Each participant was read a consent from and verbally consented prior to starting the survey.

Inclusion/ Exclusion Criteria

Inclusion criteria included adult NOVA clinic patients 18-35 years old. NOVA clinic patients were defined as having used NOVA clinic for primary care at least once (self-reported). Exclusion criteria included NOVA clinic medical staff, children under 18 years old, adults over 35 years old, and community members who were not NOVA clinic patients, as previously defined.

Data Collection Procedures

The needs assessment survey was administered verbally. All response options were read to the participant prior to the participant responding. Responses were recorded by a researcher into a Google Forms survey administration application that were then downloaded onto a Google Sheet spreadsheet and to Microsoft Excel for analysis.

3.6 Data Management

All data from the KAP survey were stored on a password protected laptop computer and on the cloud in a password protected Google Drive account. Only this researcher and a co-researcher who worked on the data collection had access to the laptop and the Google Drive account.

3.7 Data Analysis

All data from the KAP survey were analyzed using RStudio Version 1.1.463 and Microsoft Excel Version 16.19. The data collected from the survey were analyzed to quantify existing attitudes and practices towards hand washing and to identify existing knowledge gaps in the study population. The data analysis was univariate; no hypothesis testing was conducted.

PHASE TWO METHODS: CURRICULUM DEVELOPMENT AND IMPLEMENTATION

3.8 Curriculum Development Methods for Hand Hygiene Project (Adults 18-35)

Existing Materials Used to Shape the Curriculum

Information from peer-reviewed literature was used to develop the initial curriculum. Elements from the *WHO Participatory Hygiene and Sanitation Transformation Series (PHAST) step-by-step guide* and activities from the International HIV/AIDS Alliance *Tools Together Now* were used to develop five 120-minute modules.

The PHAST initiative is an approach to working with communities, designed to promote hygiene behaviors, sanitation improvements and community engagement of water and sanitation facilities (Simpson-Herbert, Sawyer, & Clarke, 1997). The participatory techniques from the PHAST initiative were found to be successful and rewarding for communities and facilitators

and have been field-tested extensively (WHO, 1998). This researcher adapted participatory methods from the problem identification, problem analysis, and planning for solutions steps outlined in the guide.

Tools Together Now is a series one-hundred of Participatory Learning and Action tools assembled by the International HIV/AIDS Alliance. The toolkit provides tools appropriate for use in HIV/AIDS community programs. They can be used in rural and urban settings, encourage equal participation, incorporate group analysis and learning, and contain a mixture of visual and verbal techniques (Alliance, 2006). The use of these Participatory Learning and Action tools is not limited to HIV/AIDs interventions and have been used in a variety of fields, including hand hygiene education and prevention (Peal, Evans, & van de Voorden, 2010).

KAP Results and Theory Used to Shape the Curriculum

The analysis of the aforementioned community KAP survey undertaken in Cavaillon was used to make the curriculum specific to the community's self-reported knowledge, attitudes and practices regarding hand hygiene. The curriculum was further informed by the HBM and CBPAR models to better address community specific barriers and assets identified in the analysis of the community KAP survey. In specific, these six constructs from the HBM were considered when designing and implementing health education programming: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy. The CBPAR model was used to build rapport within the community, to ensure that community knowledge was utilized, and to emphasize collective effort to improve WASH-related behaviors and practices.

The curriculum and all learning materials were translated into Haitian Creole. The curriculum was then reviewed by a NOVA clinic staff member and a community member to ensure proper language usage and cultural relevance, regardless of education or literacy levels.

3.9 Curriculum Implementation

The curriculum was implemented during five sessions in July of 2018 between 6pm to 8pm every evening for five days. Participants were recruited using a sign-up sheet that was posted in the NOVA clinic waiting area and clinic medical staff acted as gatekeepers to recruit patients. The course took place on the porch of NOVA's Martineau clinic in Cavaillon, Haiti. The classes were taught in tandem by a co-instructor and this researcher. The content of the curriculum included five modules which were taught in daily classes about 120 minutes for each module. The following is an overview of each module:

Module 1: Hand Washing Basics – This is a 120-minute module which introduces key components of hand hygiene and serves as a starting point for our multi-session course surrounding hand hygiene. Class objectives were accomplished through a group "how should you wash your hands" and "when do you wash your hands" activity and *Maladi Dyare* (Diarrheal Diseases), a didactic lecture covering hand hygiene basics (Partners In Health, 2013). This was followed by audio-visual learning with a short video, *Lave Men Ou Wash Your Hands, A Musical Health Education Video in Haitian Creole* (WeAdvancedHaiti, 2014), a facilitated group discussion, and an interactive hand washing demonstration.

Module 2: Positive and Negative Hand Hygiene Behaviors – This is a 120-minute module which initiates discussion on positive and negative hand hygiene behaviors that are present in the community. Class objectives were accomplished through a didactic lecture on food and waterborne viruses and bacteria and the role of hand hygiene in prevention through the principal

and secondary barriers described in the F Diagram, followed by a group "Positive and negative hand hygiene behaviors in your community" activity, a facilitated discussion with an assets based approach on how to change negative behaviors, an interactive hand hygiene demonstration, and the distribution of hygiene kits.

Module 3: Cholera and Prevention – This is a 120-minute module which introduces cholera disease and prevention and encourages participant lead solutions. Class objectives were accomplished through audio-visual learning with three short videos, *The Story of Cholera: Haitian Creole* (Global Health Media Project & Goodman, 2012), *Hand Washing Song (WorldW888, 2010), and Cholera Prevention* (University of Illinois at Urbana-Champaign, 2011), a facilitated group discussion about barriers and facilitators to cholera prevention in their community, a group "film concept" activity, an interactive hand hygiene demonstration, and the distribution of hygiene kits.

Module 4: Hand Hygiene and Cholera Prevention – This is a 120-minute module which discusses community specific enteric disease prevention and encourages participant command of the information. Class objectives were accomplished through a "hand hygiene and cholera prevention" filming activity, a facilitated discussion about the filming process, and an interactive hand hygiene demonstration.

Module 5: Hand Hygiene and Cholera Prevention Film Screening – This is a 120-minute module which demonstrates student command of hand hygiene information and encourages information spread. Class objectives were accomplished through a "film screening" activity that is open to the community and an interactive hand hygiene demonstration. The sessions ended with the distribution of certificates to recognize participants for their participation.

PHASE THREE METHODS: EVALUATION

3.10 Evaluation of the Hand Hygiene Project

Pre- and Post-Test of Hand Hygiene Project Participants

The evaluation of participant knowledge retention from the five sessions of the hand hygiene project was conducted through an identical pre- and post-test design (Appendix D). The one-page, twelve question test required multiple choice and "true" or "false" responses. Multiple choice questions included items such as "When should you wash your hands?" "What do you need to wash your hands?" and "How many seconds should you take to wash your hands?" Response options for these questions were "All of the above," "Clean water and soap," and "20 seconds." True or false questions included: "Germs can be spread through liquid, dirty hands, flies, and touching dirt," "All bacteria are dangerous," and "People can become infected with a bacterium or a virus from food or water that they consume."

Pre- and Post-Test Data Collection

The pre-test was administered in a paper-and-pencil format to all participants present on the first day of the course (n=16). The identical post-test was administered in a paper-and-pencil format to all participants present on the last day of the course (n=20). Responses were recorded by a researcher into a Google Sheet spreadsheet that were downloaded onto Microsoft Excel for analysis.

Hand Hygiene Project Course Evaluation

A one-page, fourteen question course evaluation form was also used to evaluate the course, activities, teaching materials, and the instructors (Appendix E). Questions evaluating the course included items such as: "The course objectives were clear," "The course presentations were clear," and "The activities were appropriate for the level of the course." Response options

for these questions included “Strongly agree,” “Agree,” “Neither agree nor disagree,” “Disagree,” and “Strongly disagree.”

Questions evaluating the instructors included: “The instructors were knowledgeable of the subject,” “The instructors encouraged feedback during the course,” and “The instructor showed genuine concern for the participants.” Response options for these questions included: “Strongly agree,” “Agree,” “Neither agree nor disagree,” “Disagree,” and “Strongly disagree.” Participants were also asked to grade the course on a scale from one to ten with one being “Not good at all” and 10 being “Very good.” They were also asked to rate the professors on a scale from one to five with one being “Not good at all” and five being “Very good.” Participants also were asked to rate how likely they are to recommend the course from a scale of 1-5, 1 being “Not at all,” and 5 being “Definitely.” Finally, participants were asked to write in any additional comments or recommendations for future implementation of the course.

Course Evaluation Data Collection

The course evaluation form was administered in paper-and-pencil format on the last day of the course. The evaluation form was completed anonymously by all participants present (n=20). Responses were recorded by a researcher into a Google Forms survey administration application that were then downloaded onto a Google Sheet spreadsheet for analysis.

3.11 Data Management

Paper versions of the pre- and post-test and the course evaluation were stored in an unmarked folder in a locked room only accessible to this researcher, a co-researcher and NOVA clinic cleaning staff. Electronic data from the pre-and post-tests and the course evaluations were stored on a password protected laptop computer and on the cloud in a password protected Google

Drive account. Only this researcher and a co-researcher who worked on the data collection had access to the laptop and the Google Drive account.

3.12 Data Analysis

Pre- and Post-Test

Data from the pre- and post-test were analyzed using RStudio Version 1.1.463 and Microsoft Excel Version 16.19. The data analysis was bivariate; Paired t-test and McNemar's test were performed to evaluate participant knowledge retention. Differences in means were considered significant at $P \leq 0.05$.

Course Evaluation

All data from the course evaluation were analyzed using RStudio Version 1.1.463 and Microsoft Excel Version 16.19. The data collected from the course evaluation were analyzed to evaluate the course, activities and teaching materials, and the instructors. The data analysis was univariate; no hypothesis tests were conducted.

3.13 Ethical Considerations

A determination form was submitted to Emory University IRB during the development of the formative analysis. The IRB decided that a review was not required for the project because it was for the purpose of informing a public health community education project. Informed consent was required from survey respondents.

Chapter 4: Results

4.1 Community Needs Assessment

The community KAP survey was administered in Cavaillon, Haiti among 28 NOVA clinic patients between the ages of 18 and 35 years old during the months of June and July of 2018. Verbal informed consent was obtained from each participant and the survey questions and answer choices were read out loud, verbatim, to the participants due to low literacy levels in the region. The survey contained three sections: demographic information, hand hygiene knowledge and attitudes, and hand hygiene practices (Appendix A).

Demographic information

Seventy-nine percent and twenty-one percent of survey respondents identified as female and male respectively. The average age of respondents was 28.5 with a range of 18 to 35 years old. The majority of survey participants highest level of education was secondary school (63%), while 18.5% received a primary school education and 11% received a university education. More than thirty-five percent of respondents worked as merchants, 21.4% were in education (students or teachers), 17.9% were agricultural workers and the remaining respondents worked in the medical field, transportation, as domestic workers, or were unemployed.

Hand hygiene knowledge

On average, 89% of respondents reported that if they wash their hands well with water, they still must use soap (Figure 1). However, less than half of the respondents (46%) reported that they needed to wash their hands with soap and water at times other than if their hands look dirty or have a bad smell (Figure 2). All participants reported that toilets contain microbes and 93% reported that touching animals can spread microbes. Eighty-six percent of survey respondents reported that if someone does not wash his/her hands he/she can transmit infectious

diseases (Figure 3). When asked if proper handwashing is a preventative method for cholera infection, 79% of respondents agreed (Table 1). Fifty-percent of respondents agreed that proper handwashing is a preventative method for typhoid infection and 86% of respondents agreed that proper handwashing is a preventative method for other diarrheal diseases (Table 1).

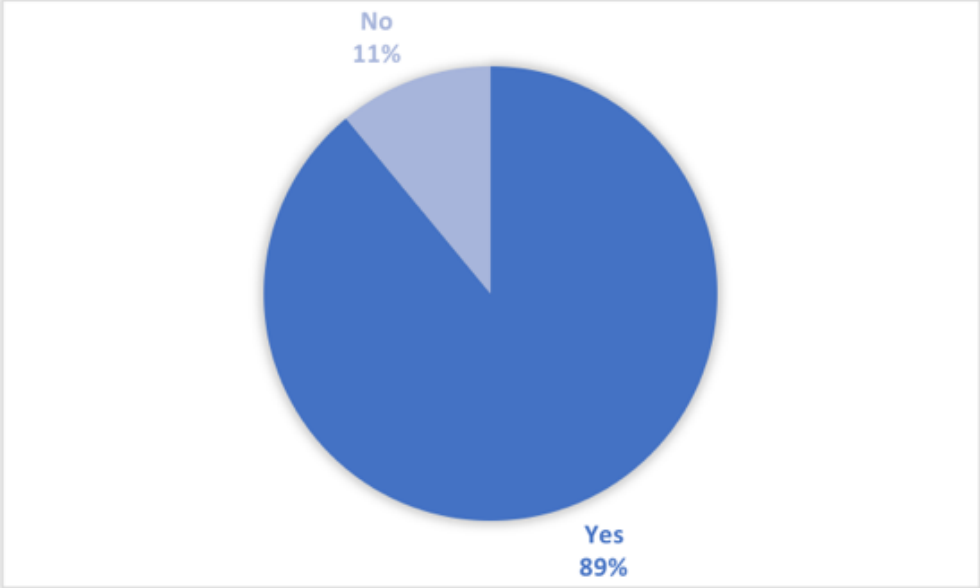

Figure 1. Hand Hygiene KAP Survey Question #B1 If you wash your hands well with water, do you need to use soap? Measured in percent of study participants who selected the response (n=28).

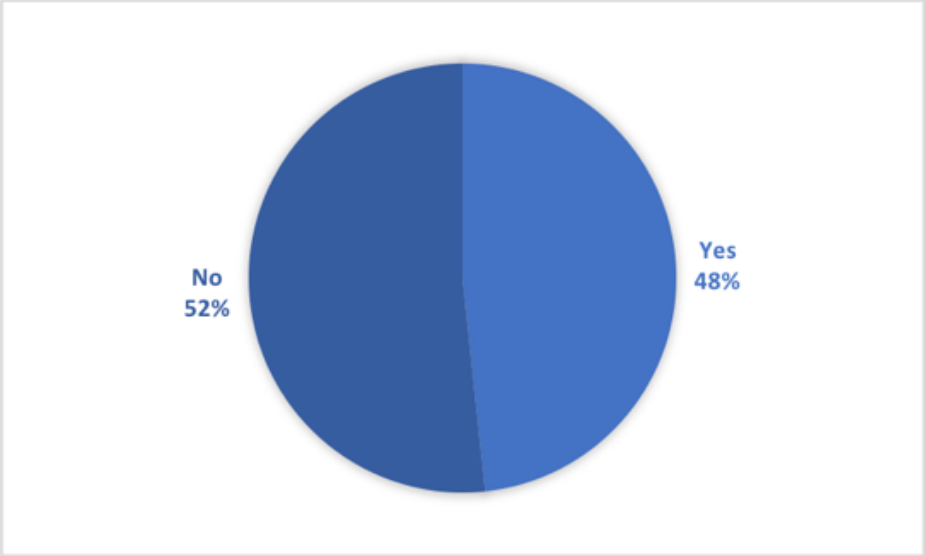

Figure 2. Hand Hygiene KAP Survey Question #B2 You only need to wash your hands with soap if they look dirty or have a bad smell? Measured in percent of study participants who selected the response (n=28).

	Yes	No	I Do Not Know
Do toilets have microbes?	**100%**	**0%**	**0%**
Can microbes transfer to your hands when you touch animals?	**93%**	**4%**	**4%**
Can someone transmit infectious diseases if they do not wash their hands?	**86%**	**11%**	**4%**
Does hand washing prevent cholera?	**79%**	**17%**	**4%**
Does hand washing prevent typhoid?	**50%**	**18%**	**32%**
Does hand washing prevent other diarrheal diseases?	**86%**	**14%**	**0%**

Table 1. Hand Hygiene KAP Survey Knowledge Assessment. Measured in percent of study participants who selected the response (n=28).

Hand hygiene attitudes

The majority of respondents replied that people in their households believe it is important to wash their hands after using the toilet (100%), before cooking (93%), before eating (96%) and after changing a baby's diaper or helping a young child use the toilet (93%) (Figure 3). Ninety-six percent of respondents had previously heard of hand washing with soap and when asked to check all sources of this information that applied, participants selected parents (n=20), schools (n=22), clinics or hospitals (n=22), community programs (n=12) and friends (n=10). Other sources included church (n=1) and the radio (n=1). Eighty-nine percent of participants agreed or strongly agreed that health professionals encouraged them to wash their hands with soap, 93% agreed or strongly agreed that their teachers encouraged them to wash their hands with soap and

89% and 82% agreed or strongly agreed that their family and friends encouraged them to wash their hands with soap, respectively.

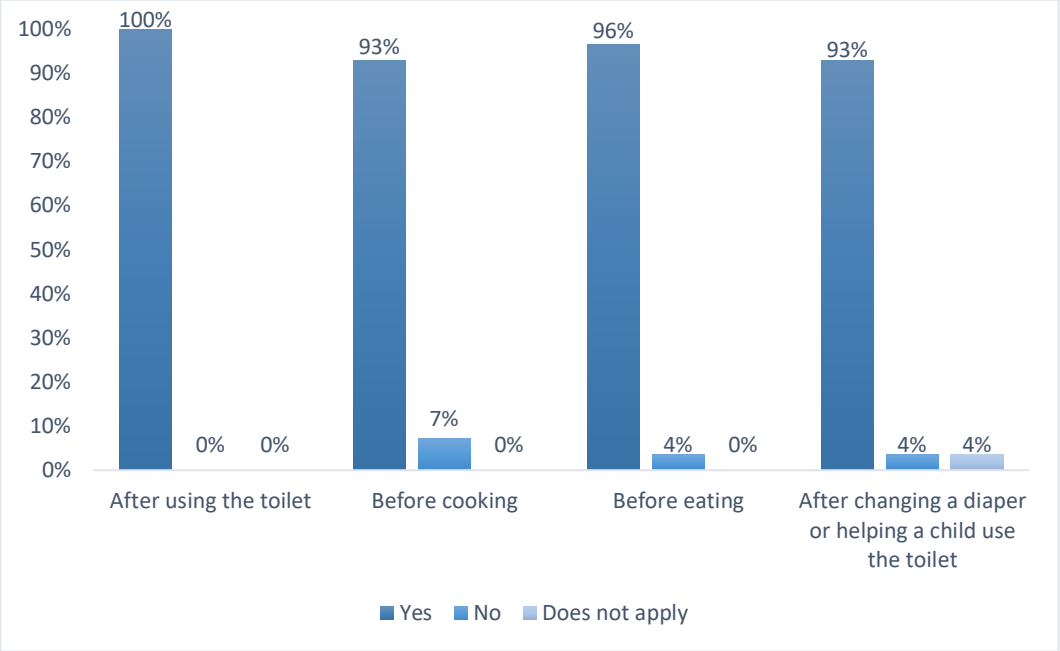

Figure 3. Hand Hygiene KAP Survey. Survey respondents reported the importance of hand washing during critical times in their household. Measured in percent of study participants who selected the response (n=28).

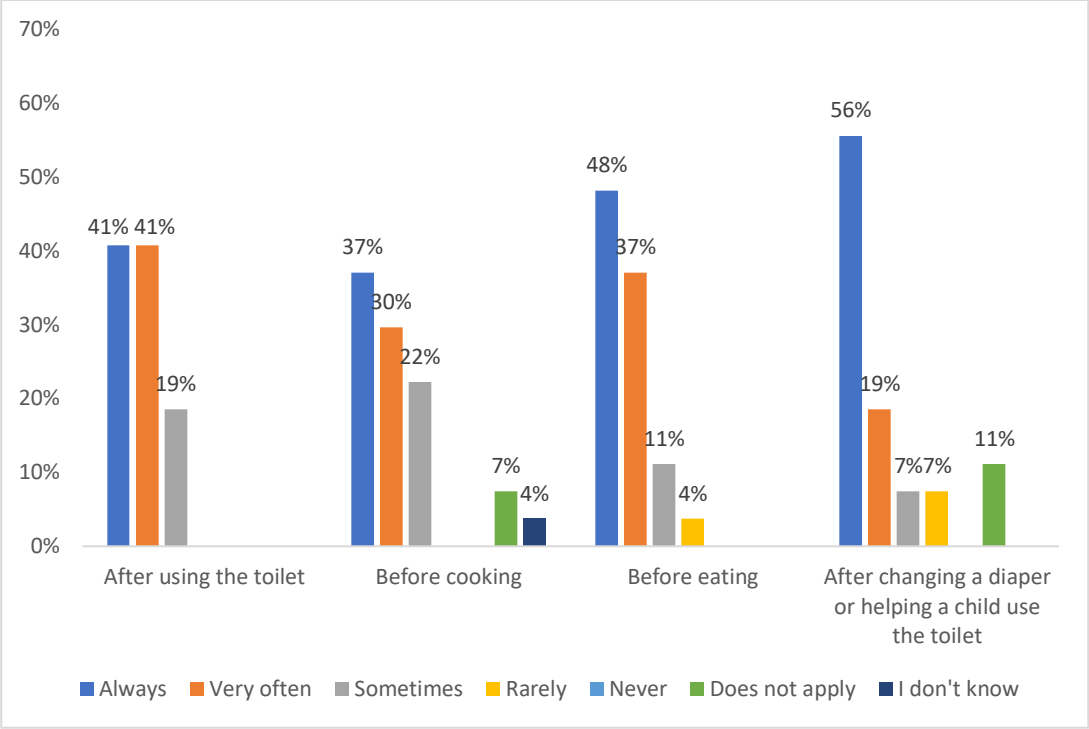

Figure 4. Hand Hygiene KAP Survey. Survey respondents self-reported the frequency in which they wash their hands during critical times. Measured in percent of study participants who selected the response (n=27).

Hand Hygiene Practices

Despite the majority of participants expressing the importance of washing their hands at critical times, only 39% of respondents reported that they always washed their hands after using the toilet, 36% always washed their hands before cooking, 79% always washed their hands before eating, and 54% washed their hands after changing a baby's diaper or helping a young child use the toilet (Figure 4). When asked "Does your household have water for hand washing only?" about 85% (n=22) of respondents said yes and 15% (n=4) said no. Participants that said yes were asked "Where do you get water for hand washing at home?" and were instructed to check all that apply. About 64% of respondents reported that their source of water for handwashing was from a faucet, 18% from Culligan brand bottled drinking water, 9% from the Cavaillon river, 14% from another river (Table 2).

Sources of Water for Handwashing	(n/(%))
Clinic pump	1 / (5)
Other pump	4 / (18)
Cavaillon River	2 / (9)
River that is close by	3 / (14)
Culligan water	4 / (18)
Bottled water	2 / (9)
Well	1 / (5)
Faucet	14 / (64)
Other	8 / (36)
I Do not know	1 / (5)

Table 2. Hand Hygiene KAP Survey Question C2. Where do you get water for hand washing at home? Participants were instructed to check all that apply (n=22).

When asked to report the frequency of the availability of soap at home for hand washing, less than half of the survey respondents (44%) reported that they always have soap at home available for hand washing, about 26% of respondents reported that they often have soap available, 26% sometimes have soap available, and 4% rarely had soap available (Figure 5). When asked to select all responses "What keeps you from hand washing with soap" About 54% of respondents reported the unavailability of soap as a barrier to hand washing with soap (Figure 6). Sixty-three percent of survey respondents dried their hands after handwashing with a towel, 48% let their hands air dry, 15% used a paper towel and 7.4% dried their hands on their clothing. Fifty-seven percent of participants had or know someone who had cholera, 50% reported knowing someone or having had typhoid and 75% of respondents had or know someone who had another diarrheal disease.

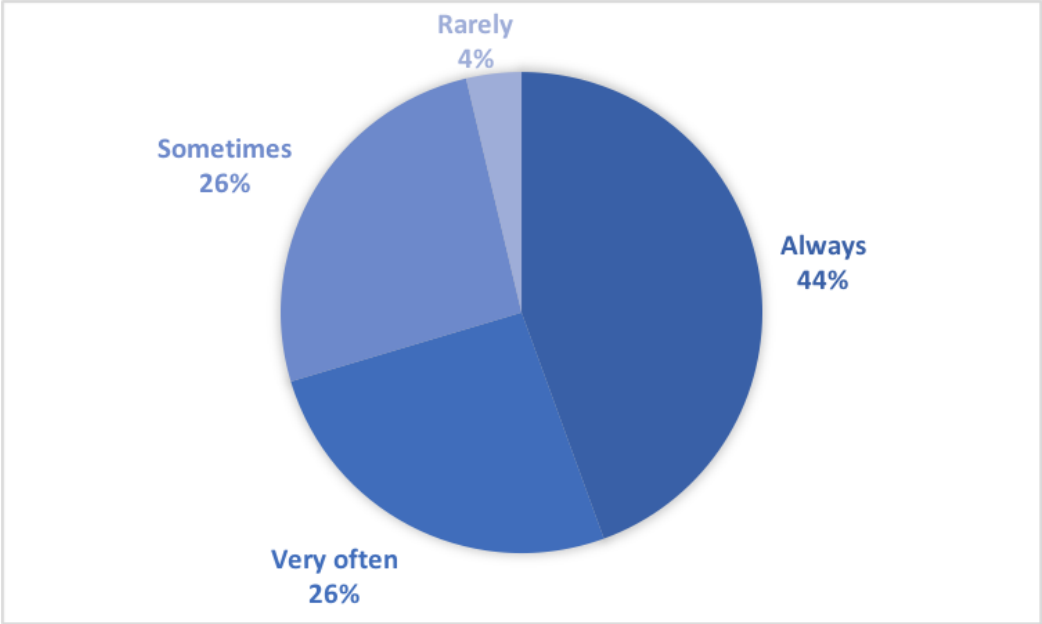

Figure 5. Hand Hygiene KAP Survey Question #C3 Do you have soap available for hand washing in your home? Measured in percent of study participants who selected the response (n=27).

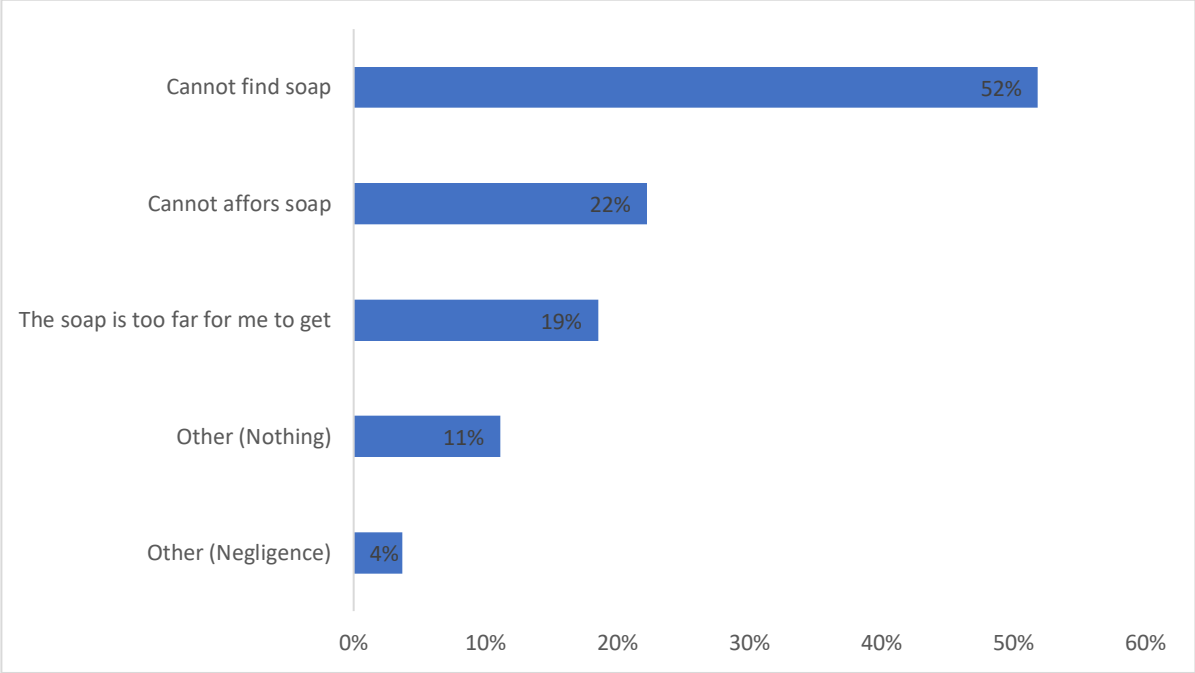

Figure 6. Hand Hygiene KAP Survey Question #C9 What are barriers to hand washing with soap? Participants were instructed to check all that apply (n=27).

4.2 Curriculum Development and Implementation

Curriculum Overview

NOVA Hope for Haiti, Inc. board members and clinic staff requested assistance from this researcher to incorporate hand hygiene education and promotion as a part of their strategy to reduce diarrhea-related morbidity and mortality. Following a KAP assessment, a hand hygiene education project was developed and implemented among NOVA Hope for Haiti patients ages 18-35 years old. The final product is a curriculum written for NOVA's patients 18-35 years old and can be found in Appendix A.

Initially, 32 patients were recruited to participate in the course using a sign-up sheet in the clinic waiting area. In total, twenty-three patients attended the modules (Table 3). The average age of the participants was 25 years old and the range was 18-34 years old. All of the participants had at least some primary school education, the majority reached secondary school and five participants were currently enrolled in university.

Module #	1	2	3	4	5
# Students in Attendance	20	19	23	20	17
# New Students	20	1	5	0	0

Table 3. Hand Hygiene Education Project Attendance.

The curriculum is comprised of five 120-minute modules that include discussions of goals, lectures, and interactive activities. The HBM and CBPAR behavioral theories were used as a framework when developing the curriculum. Activities and tools and associated behavioral theories and components used during the modules are outlined in Table 4. An overview of each module can be found in Table 5. Practical applications of skills taught were integrated into the

curriculum at the end of each module, including hand washing demonstrations and the creation and presentation of a hand hygiene education video. Detailed descriptions of the activities are noted in Table 6.

Activities & Tools	Module Used	Behavioral Theory Component Used	
		HBM	CBPAR
Audio-visual learning	1, 3	• Perceived susceptibility • Perceived severity • Perceived benefits of an action • Cues to action • Self-efficacy	
Certificate distribution	5	• Perceived benefits of an action	
Didactic lecture	1, 2	• Perceived benefits of an action • Perceived barriers • Self-efficacy	
"Film concept" group activity	3	• Perceived susceptibility • Perceived severity • Perceived benefits of an action • Perceived barriers • Cues to action • Self-efficacy	• Directly engaging communities and community knowledge • Grounded in the needs, issues, concerns, and strategies of communities •Supporting and/or enhancing the strategic action that leads to community transformation and social change
"Film screening" activity	5	• Perceived susceptibility • Perceived severity • Perceived benefits of an action • Perceived barriers • Cues to action • Self-efficacy	• Directly engaging communities and community knowledge • Grounded in the needs, issues, concerns, and strategies of communities •Supporting and/or enhancing the strategic action that leads to community transformation and social change

"Hand hygiene and cholera prevention" group activity	4	• Perceived susceptibility • Perceived severity • Perceived benefits of an action • Perceived barriers • Cues to action • Self-efficacy	• Directly engaging communities and community knowledge • Grounded in the needs, issues, concerns, and strategies of communities •Supporting and/or enhancing the strategic action that leads to community transformation and social change
Hand washing demonstration	1, 2, 3, 4, 5	• Self-efficacy • Cues to action • Perceived benefits of an action	
"How and when should you wash your hands?" group activity	1		• Assesses community knowledge • Directly engaging communities and community knowledge
Hygiene kit distribution	3	• Perceived benefits of an action	
Group discussion	1, 2, 3, 4		• Grounded in the needs, issues, concerns, and strategies of communities •Supporting and/or enhancing the strategic action that leads to community transformation and social change
"Positive and negative hand hygiene behaviors in your community" group activity	2		• Grounded in the needs, issues, concerns, and strategies of communities

Table 4. Activities and Tools used in Hand Hygiene Education Project and Associated Behavioral Theories and Components.

Module #	Module Goal	Activities & Tools
1.Hand Washing Basics	To introduce the key components of hand hygiene	• Pre-test • "How and when should you wash your hands?" group activity

		• Didactic lecture • Audio-visual learning • Group discussion • Hand washing demonstration
2. Positive and Negative Hand Hygiene Behaviors	To discuss positive and negative hand hygiene behaviors present in the community	• Didactic lecture • "Positive and negative hand hygiene behaviors in your community" group activity • Group discussion • Hand washing demonstration
3. Cholera and Prevention	To introduce cholera disease and prevention and encourage participants to develop solutions	• Audio-visual learning • Group discussion • "Film concept" group activity • Hand washing demonstration •Hygiene kit distribution
4. Hand Hygiene and Cholera Prevention	To discuss community specific enteric disease prevention and encourage participant command of the information	• "Hand hygiene and cholera prevention" group activity • Group discussion • Post-test • Hand washing demonstration
5. Hand Hygiene and Cholera Prevention Film Screening	To demonstrate student command of hand hygiene information and to encourage information dissemination	• "Film screening" activity • Hand washing demonstration •Certificate distribution

Table 5. Module topics and goals.

Activities & Tools	Description
Pre/Post-test	Participants take a 12-question multiple choice and "true or false" quiz covering information taught during the modules.
"How and when should you wash your hands?" group activity	Two posters stating, "How to wash your hands" and two posters stating, "When to wash your hands" were placed on opposite sides of the wall. Participants formed two groups and wrote out their responses to both questions as a group on sticky notes. They then placed the sticky notes on the wall under the appropriate question.
Didactic lecture	Two? Didactic lectures were facilitated by a PowerPoint presentation. *Maladi Dyare,* created by Zanmi Lasante was used in Module 1 to explain hand hygiene basics. *Mikwob,* by Josma and Savino, was used in Module 2 as an overview of food and waterborne viruses and bacteria and the role of hygiene in prevention through the principal and secondary barriers described in the F Diagram.

Audio-visual learning	Four Haitian Creole language videos with audio. *Lave Men Ou*, used in Module 1, is a song about hand washing followed by the story of a young man who does not wash his hands after using the toilet. The story follows the consequences of his actions and offers hand washing as a preventative method. *The Story of Cholera* (Module 3) is an animated short story that follows a young boy who saves his father and his town from cholera by implementing preventative techniques, including hand hygiene. *Hand Washing Song* (Module 3) shows school aged children singing a catchy song about hand hygiene to prevent cholera. *Cholera Prevention* (Module 3) is an animated short film that explains how to treat water that could be infected with *V. cholerae* so that it is usable for cooking, cleaning and drinking.
Group discussion	Group discussions followed each activity during the class. Participants debriefed, shared responses, and asked clarifying questions. Group discussions tended to be assets based, focusing on aspects of the community that could contribute to increasing good hand hygiene behaviors.
Hand washing demonstration	Instructors demonstrated hand washing with soap and clean water prior to participants washing their hands for 20-seconds with clean water and soap.
"Positive and negative hand hygiene behaviors in your community" group activity	Two posters stating, "Positive hand hygiene practices" and two posters stating, "Negative hand hygiene practices" were placed on opposite sides of the wall. Participants formed two groups and wrote positive and negative hand hygiene behaviors in their communities on sticky notes. They then placed the sticky notes on the wall under the appropriate poster.
"Film concept" group activity	This activity was done in two groups. The participants brainstormed ideas and wrote a script for a 15-minute video regarding hand hygiene, cholera prevention, and topics learned during the week.
Hygiene kit distribution	Hygiene kits containing soap, tissues, a toothbrush, toothpaste, mouthwash and hand sanitizer.
"Hand hygiene and cholera prevention" group activity	Two groups of participants worked together, with the assistance of an instructor, to film a 15-minute video regarding hand hygiene, cholera prevention, and topics learned during the week.
"Film screening" activity	Participants invited family, friends, and community members to view two 15-minute videos regarding hand hygiene, cholera prevention, and topics learned during the week.
Certificate distribution	The certificate distribution was held to bring the educational project to a close and to recognize participants for their participation. Participants who attended four of the five days received a certificate of success, those who attended at least one day received a certificate of participation.

Table 6. Activities and Tools Descriptions.

4.3 Evaluation

Pre-Test and Post- Test

Sixteen participants answered a twelve-question multiple choice and "true" or "false" question pre-test to assess baseline hand hygiene knowledge at the beginning of Module #1 *Hand Washing Basics*. Twenty participants answered an identical post-test at the end of Module #4 *Hand Hygiene and Cholera Prevention* to assess knowledge retention during the hand hygiene education project. Of the twenty-three participants, fourteen took both the pre-test and the post-test.

A comparison of means of the pre-test and post-test scores of fourteen participants was made by a paired *t*-test (Table 7). Though the results of a paired *t*-test were not significant ($p=0.065$), the data showed a trend towards improvement in test scores after the education project implementation (Table 8, Figure 7).

Two outliers in the data were representative of two participants with lower self-reported education levels compared to the other participants (did not complete primary school). This can be associated with lower literacy proficiency, which could have affected pre- and post-tests outcomes. A comparison of means of pre-test and post-test scores excluding the outliers demonstrated a significant improvement in post-test scores when compared to pre-test scores ($p<0.05$) (Table 9, Figure 8).

Participants	Pre-Test (n/(%))	Post-Test (n/(%))	Mean Change (n/(%))	P-Value
Mean (n = 14)	7.86 / (65.5)	9.0 / (75)	1.14 / (9.5)	0.065
Mean (n = 12)*	8.08 / (67%)	9.83 / (82)	1.75 / (14.6)	<0.05

Table 7. Comparison of means of pre- and post-test scores out of 12 questions (n=14)**.** A second comparison of means excluding two outliers in the data was conducted (n=12).

```
    Paired t-test

data:  c$Pre and c$Post
t = -2.0189, df = 13, p-value = 0.06461
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.195177584  0.006606155
sample estimates:
mean of the differences
            -0.09428571
```

Table 8. Analysis of Variance Table Paired *t*-test was conducted to compare pre- and post-tests responses (n=14). The results were not statistically significant (p=0.065).

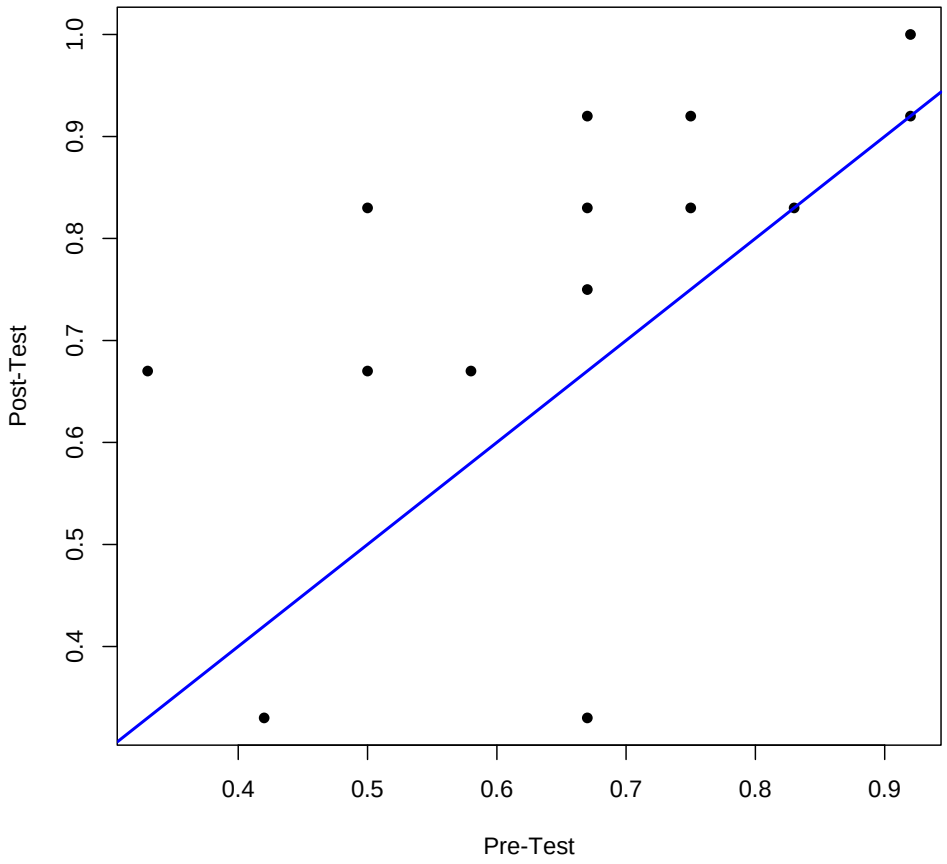

Figure 7. Plot of paired pre- and post-test results from a paired t-test (n=14). Circles below or to the left of the blue one-to-one line indicate tests results with a higher value for post-test

than for the pre-test. There was no significant difference between pre- and post-tests results (p=0.065).

```
        Paired t-test

data:  c$Pre and c$Post
t = -4.4386, df = 11, p-value = 0.0009973
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.21814775 -0.07351892
sample estimates:
mean of the differences
             -0.1458333
```

Table 9. Analysis of Variance Table Paired *t*-test was conducted to compare pre- and post-tests responses (n=12). The results were statistically significant (p<0.05).

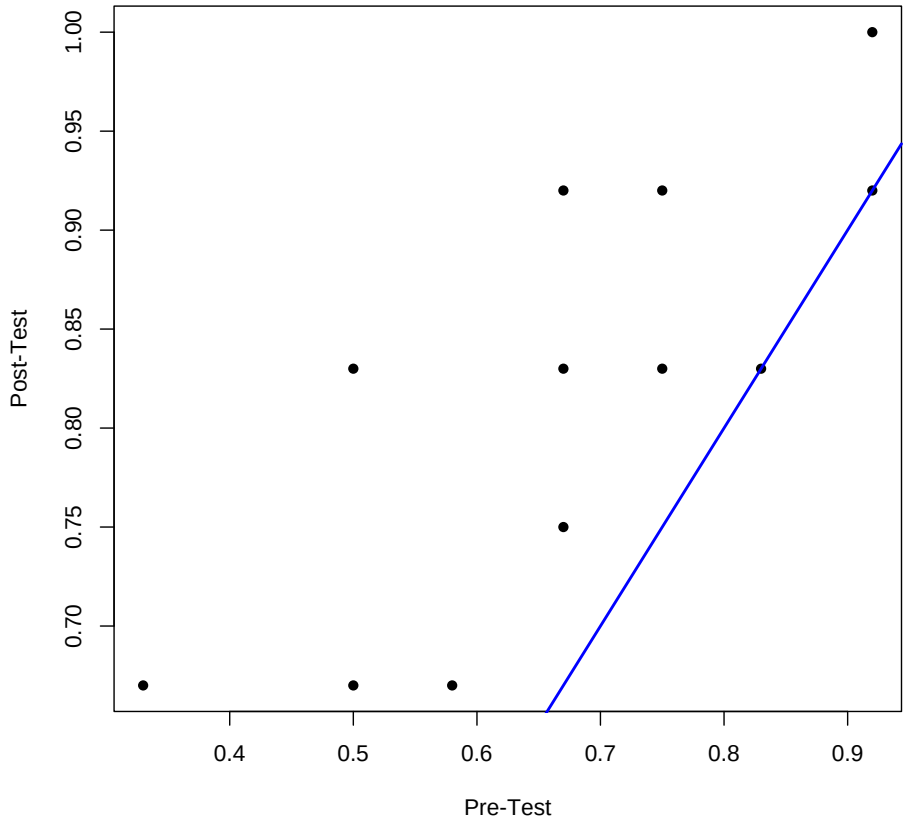

Figure 8. Plot of paired pre- and post-test results from a paired t-test (n=12). Circles below or to the left of the blue one-to-one line indicate tests results with a higher value for the post-test

than for the pre-test. Post- test results were found to be statistically higher than pre-test results ($p<0.05$).

Course Evaluation

Seventeen participants completed the evaluation form at the end of the final module (Appendix E). The majority of the participants (82%) strongly agreed that the objectives and the presentation of the information were clear, the remaining 18% agreed to the statement (Figure 9). Additionally, all of the participants agreed or strongly agreed that the activities used to present the information were appropriate, that they were interested in the subject and that the course met their expectations (Figure 9). On a scale of 1 through 10, 10 being the highest, the participants scored the hand hygiene project a 9.84. On a competence scale of 1 through 5, 5 being the highest, the participants gave the instructors a score of 5. When asked for future recommendations, respondents asked for a summary document of the information presented during the project and for facilitators to expand the project to include others in the community and to other communities. Conclusively, ninety-eight percent the participants reported that they would strongly recommend the health education project to others in the community.

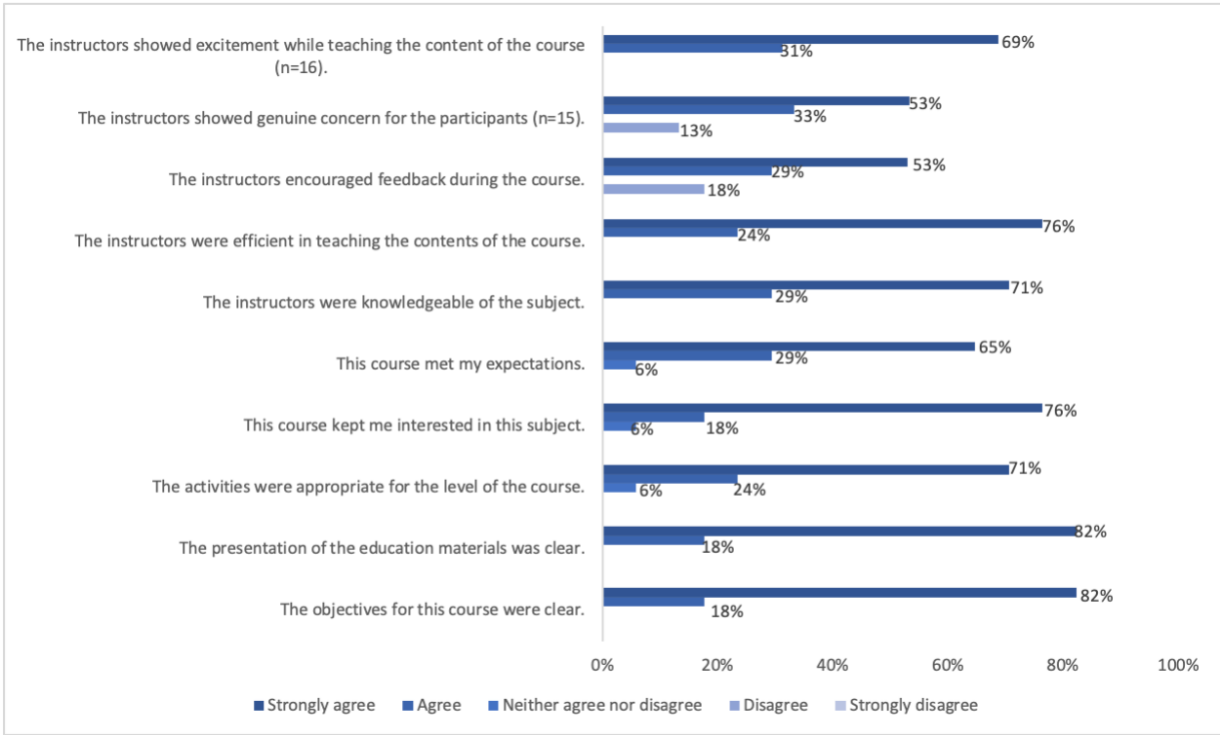

Figure 9. Course evaluation responses. Measured in percent of study participants who selected the response (n=17 unless otherwise noted).

Chapter 5: Discussion, limitations and conclusions

5.1 Discussion

Introduction

Haiti has the lowest rates of access to improved water sources and sanitation facilities in Latin America and the Caribbean, contributing to high diarrhea related morbidity and mortality in the country (Gelting, Bliss, Patrick, Lockhart, & Handzel, 2013; USAID, 2017). Additionally, proper hand hygiene with soap at the critical times is not widely practiced, particularly in rural areas of Haiti. In the South Department of Haiti, where Cavaillon is located, 64% of people do not use water, soap, or any other cleansing products when washing their hands (IHE/Haiti, 2018). This thesis is the result of a hand hygiene education project implemented in the summer of 2018 in Cavaillon Haiti with twenty-three NOVA Hope for Haiti patients ages 18-35 years old. In this hand hygiene project, we found gaps in awareness of the perceived benefits of hand hygiene and inconsistencies with practicing hand hygiene at critical times through our KAP survey. Respondents of the KAP survey also identified inadequate access to soap as a barrier to practicing hand hygiene. Further, an evaluation of the education curriculum and training phase of this project demonstrated participant satisfaction with the project and the facilitators. Further, initial analysis of pre- and post-test scores showed a trend towards improvement in test scores after the education project implementation. However, after excluding two outliers in the data, comparison of pre- and post-test scores showed a statistically significant improvement in post-test scores, suggesting this education curriculum could be utilized as an effective mechanism for improved behavior change.

Community Needs Assessment

A KAP survey was used to assess existing knowledge, attitudes and practices related to hand hygiene in Cavaillon to better inform and tailor the curriculum to the target population. KAP surveys have been used to inform various WASH interventions and to identify information relevant to the prevention and transmission of diarrheal diseases in many settings (Aibana et al., 2013; Jafarian, 2018). Results of the KAP survey demonstrated that participants were not aware of the positive outcomes of hand washing, such as diarrheal disease prevention. These results are comparable to the results of a KAP survey conducted in Haiti wherein half of the participants did not answer at least three questions related to cholera prevention correctly (Aibana et al., 2013). To address this within the curriculum, facilitators emphasized the importance of hand washing with soap to prevent diarrheal diseases such as cholera and typhoid. Participants who perceive benefits to hand hygiene have been found to increase their hand washing practices (N. Contzen, & Mosler, H-J. , 2013).

While participants were knowledgeable of practicing proper hand washing at critical times, KAP survey results indicated that participants did not practice hand hygiene without the presence of physical cues, such as dirty or smelly hands. These results are consistent with the results of another KAP survey conducted in Haiti wherein only 41% of participants washed their hands more than four times per day prior to an intervention (Aibana et al., 2013). Moreover, survey respondents reported that not having soap served as a perceived barrier to hand hygiene, which was confirmed in another study where lack of soap was found to be negatively associated with hand washing (N. Contzen, & Mosler, H-J. , 2013). To address this, hygiene kits containing soap were distributed during Module 4? to project participants to facilitate hand washing (Aibana et al., 2013).

Hand Hygiene Education Project

The hand hygiene curriculum was implemented in Cavaillon, Haiti for Haiti patients ages 18-35 years old, an age group with a high incidence of diarrhea in Haiti (IHE/Haiti, 2018). Facilitators engaged participants with mixed methods activities influenced by the HBM and CBPAR frameworks, such as lectures, audio-visual learning, group activities and discussions.

Similar to a prior intervention that used the CBPAR behavioral model in Haiti, participants were engaged during activities and discussions that allowed them to identify problems in their own communities (Eftekhari et al., 2013; McRiley, 2012). The results of these activities are specific to the participants and the community in which they lived, and therefore are not generalizable. However, participants expressed excitement when given the opportunity to create their own intervention, i.e., the educational videos about hand hygiene. These videos were more relevant to rural Haitian life compared to the existing educational hand hygiene videos available in Haitian Creole.

Participants were motivated by activities that highlighted the perceived benefits of hand washing, cues to action and self-efficacy, consistent with a 2015 study that found that these HBM constructs were important drivers of behavior change during hand hygiene interventions in Haiti (N. Contzen & Mosler, 2015). In this Cavaillon project, participants responded to perceived susceptibility and perceived severity of cholera infection as an incentive for increased hand hygiene, and even focused on these concepts during activities. However, perceived susceptibility and perceived severity have been found to have negative effects on hand hygiene behaviors in Haiti (N. Contzen, & Mosler, H-J. , 2013; N. Contzen & Mosler, 2015; Williams et al., 2015). This finding could be explained by the geography of the current project location. While perceived susceptibility and severity of cholera has been shown to be reduced during the dry season in some areas of Haiti, Cavaillon is located on a river that serves as a water source for the

town making cholera a year-round threat to community members (Williams et al., 2015). Additionally, in Haiti's South Department, more than 10% of households had at least one member who had been infected with cholera (IHE/Haiti, 2018). You could include the data on how many family members and friends they knew had contracted cholera.

During informal conversations with participants, researchers found that nearly all of the participants cared for their own children or other children in their household. Participants reported relaying the information they learned during the project with their households and teaching the children in their households about proper hand hygiene. This is consistent with other WASH education projects, wherein participants communicated behavior change messages to their households (Eberle, 2018; Steinlechner, 2012; WASH in Schools, 2018). Additionally, similar to prior WASH interventions conducted in Haiti, the train the trainer workshop that followed the project helped to create a culture of hand hygiene-educated adults who were seen as teachers responsible for disseminating information in their communities (Fields, n.d.; WASH in Schools, 2018).

Evaluation

A pre- and post-test and an anonymous course evaluation form were used to evaluate participant knowledge retention, the project and the facilitators. During the initial analysis of the pre- and post-test, two outliers in the data were identified and corresponded to two participants with low self-reported education levels, which have been found to be related to reduced literacy in Haitian Creole (Youssef, 2002). After analyzing the pre- and post-tests results without the outliers, an association was found between the project and knowledge retention. However, this project did not measure the translation of knowledge to practice. While some studies have shown that knowledge of hygiene practice are not representative of improvements in hygiene behaviors,

others have identified associations between hand hygiene education and increases in practice (Aibana et al., 2013; Childs et al., 2016; Williams et al., 2015; Wolf et al., 2018).

Lastly, participation in the project activities was high based on attendance and participants displayed personal interests in the subject based on classroom participation and high-quality activities. This is consistent with a study about enrollment, attendance, and participation in preventative parenting groups that found attendance predicted the quality of participation at one of the study sites (Dumas, 2007). Participation and attendance during the project could have contributed to the high scores that participants gave the project and the facilitators on the course evaluation form.

5.2 Limitations

Through the development, implementation and evaluation of this project, multiple limitations were identified. One major limitation was the reliance on electricity and electronics for the implementation of this project, particularly in rural Haitian towns where electricity is rarely available. While the NOVA clinic (project site) relied on solar powered electricity, replication of this education project could pose as a challenge in regions where there are no alternative and consistent sources of energy.

Furthermore, there were disadvantages to the behavioral theories used during the curriculum development stage. The HBM is an individual behavioral theory and did not inform socioeconomic factors that act as barriers to health education and behavior change in the Haiti context, such as poverty, sporadic access to electricity and internet and literacy in Haitian Creole (Edberg, 2015). However, using the HBM in combination with the CBPAR model to develop the curriculum helped to mitigate this. Furthermore, a community needs assessment via a KAP survey was conducted to tailor the curriculum to the rural Haiti setting.

KAP surveys are widely used to assess hygiene knowledge, attitudes and practices that are relevant to the prevention and transmission of diarrheal diseases in various settings (Aibana et al., 2013). However, KAP surveys cannot be used to evaluate the nuances of a socioeconomic context that can serve as barriers or facilitators to translating knowledge to practice (Aibana et al., 2013). Additionally, KAP surveys rely on self-reported data, so we could not verify responses to practice questions. Working with local community members and NOVA clinic staff helped researchers further assess these nuances outside of the survey (Aibana et al., 2013; Jafarian, 2018).

Because the KAP survey was administered during NOVA clinic hours by convenience sampling of patients in the clinic waiting room, there was a chance that the survey could be interrupted if a nurse called a patient to see the doctor while the survey was being administered. Early on during the survey administration, one survey was left incomplete. Researchers worked closely with clinic staff to target individuals with longer waiting times to ensure that daily clinic activities were not interrupted by the administration of the survey. Because clinic staff also worked as gatekeepers by recommending patients to take the survey, a power dynamic may have influenced those who completed the survey. To address this, researchers stressed that participation in the survey was completely voluntary and would not affect a patient's service in the clinic during the informed consent process.

Due to limited literacy of Haitian Creole in the region, the survey was administered verbally. This could have led to interviewer bias based on the reflection of the tone in which researchers read the questions and answers (Bowling, 2005). This was addressed by researchers monitoring and practicing tone regulation during pilot testing. Additionally, social desirability bias could have been present, causing participants to over-report desirable behaviors to present

themselves in the best possible light (Bowling, 2005). To address this participants were assured of confidentiality and anonymity during the informed consent process (Bowling, 2005).

Because the project was implemented in a low-income setting, resources had to be prepared beforehand. This became an issue when more participants attended the education project than were expected. While researchers were able to accommodate additional participants during the project, there was a set-back during the certificate distribution activity at the end of the project. Only fifteen certificates were printed prior to arrival in the country. The original certificates were printed in color. However, due to the resources available to the researchers in country, the additional certificates were printed in black and white ink. Because of this, participants who received black and white certificates were visibly upset. Additionally, the participants wanted the certificates to be printed on card stock rather than on regular printer paper. This could have been avoided had the researchers consulted with community members or clinic staff on this matter.

While the project itself was accommodating for participants with various levels of education and literacy, this was not accounted for during the evaluation of the project. Varying education levels of the participants may have been reflected in the pre- and post-test responses. Two participants who did not complete primary school and who had difficulty with reading and writing Haitian Creole did poorly on the pre- and post-test. To account for this, a second comparison of means of pre-test and post-test scores excluding the outliers was completed. To mitigate this in future project implementation, researchers or facilitators can administer the pre- and post-test verbally to participants who request it. However, because of the anonymous nature of the course evaluation form, researchers and facilitators should not be present during its administration.

5.3 Conclusions

Hand hygiene is a known preventative method to reduce diarrheal diseases, which are prevalent in rural areas of Haiti. This hand hygiene education curriculum, which was informed by a KAP survey, literature and elements of the HBM and CBPAR theoretical framework, was developed and implemented in Cavaillon, Haiti among NOVA clinic patients 18-35 years old. An evaluation of the project demonstrated participant retention of knowledge at the conclusion of the intervention, suggesting potential for positive behavior change. The goal of the curriculum, to educate and empower NOVA clinic patients in an effort to improve hand hygiene knowledge and increase positive hand hygiene behaviors, can be further realized by reinforcing hand hygiene knowledge among NOVA clinic patients and implementing this project yearly.

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Appendix A: Hand Hygiene Survey (English)

HAND HYGIENE SURVEY FOR NOVA CLINIC PATIENTS IN CAVAILLON, HAITI.

NOVA Hope for Haiti, Inc

Year 2018-2019

READ CONSENT INFORMATION FOR EACH RESPONDENT.

"Hello, thank you for taking the time to meet with me today. My name is ___(Name Here)___, and I am working with NOVA Hope for Haiti, Inc. to collect information on hand hygiene education among NOVA patients in Cavaillon, Haiti. We will use this information to inform NOVA and their partners in developing hand hygiene education. Your participation in this survey is completely voluntary. Whether you participate or decide to not participate, your medical service will not be affected. You can choose to not participate. If you decide to participate, you can stop at any time. You do not have to respond to any question that you do not want to answer. Everything you tell me will be completely confidential. The NOVA team and I will be the only people who will have access to the information you give to me today. Your name and any personal information will be de-identified before any of this information is shared.

Do you agree to participate in this survey? YES [_] NO [_]
(Mark an "X" in the box next to the response you choose)

IF THE PARTICIPANT DOES NOT AGREE TO PARTICIPATE IN THE SURVEY, DO NOT CONTINUE THE SURVEY.

SURVEY INFORMATION
DATE PARTICIPANT TOOK THE SURVEY: [_] [_]/ [_] [_]/ [_] [_] (DD/MM/YY)
SURVEY START TIME [_] [_] : [_] [_] AM/PM (Circle one)

SURVEY INSTRUCTIONS:

1. ALL SURVEY INSTRUCTIONS ARE IN CAPITAL LETTERS.
2. THE PERSON WHO IS ADMINISTERING THE SURVEY SHOULD READ ALL OF THE QUESTIONS, UNLESS THE SURVEY SAYS OTHERWISE.
3. THE PERSON WHO IS ADMINISTERIN THE SURVEY SHOULD READ THE SENTENCE WITHIN THE QUOTASION MARKS ("") FOR TRANSITIONS.
4. THE PERSON WHO IS ADMINISTERING THE SURVEY SHOULD READ ALL OF THE RESPONSES FOR EACH QUESTION.
5. DEFINITIONS ARE IN ITALICS AND SHOULD BE READ TO ALL PARTICIPANTS.
6. WHEN READING THE RESPONSES, THE PERSON WHO IS ADMINISTERING THE SURVEY SHOULD NOT READ THE ANSWER CHOICES "I DO NOT KNOW" AND "I REFUSE TO RESPOND." ONLY CHOOSE "I DO NOT KNOW" OR "I REFUSE TO RESPOND" IF THE PARTICIPANT GIVES THESE RESPONSES.

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS QUESTIONS

"I am going to ask you questions about your demographic and personal characteristics."

	Instructions	Questions	Response	Skip Patterns
A.1	ENTER RESPONSE HERE RESPONSE IN YEARS	How old are you?	__ __ years	
A.2	CIRCLE ONE RESPONSE	What is your gender?	Female---------- --1 Male---------- 2 Other gender (specify_____)--88 I do not know---------- --99 I refuse to respond---------- 00	

A.3	CIRCLE ONE REPONS	What is your highest level of education?	I never attended school ------ --1 Primary school---------- --2 Secondary school---------- ---3 University---------- --4 Masters---------- -5 PhD/Doctorate---------- 6 Professional school---------- -7 Other, (specify_____)------ 88 I do not know---------- --99 I refuse to respond---------- 00	
A.4	CHECK ALL THAT APPLY	What is your occupation?	Health or medical work------- -1 Field work---------- -2 Education (such as student, professor)---------- --3 Domestic work---------- --4 Transportation---------- --5 Merchant---------- -6 I do not work---------- --7 Other, (specify_____)---- 88 I do not know---------- -99 I refuse to respond---------- 00	

SEKSYON B: HAND HYGIENE KNOWLEDGE AND ATTITUDES

"Now I will ask you questions about your and other's knowledge and attitudes of hand washing."

	Instructions	Questions	Response	Skip Patterns
B.1	CIRCLE ONE RESPONSE	If you wash your hands well with water, do you need to use soap?	Yes---------- ---1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	
B.2	CIRCLE ONE RESPONSE	You only need to wash your hands with soap and water if they smell bad?	Yes---------- --1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	
B.3	CIRCLE ONE RESPONSE	Do people in your household believe washing their hands with water and soap is important before they prepare food?	Yes---------- --1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	
B.4	CIRCLE ONE RESPONSE	Do people in your household believe washing their hands with water and soap is important before they eat?	Yes---------- --1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	
B.5	CIRCLE ONE RESPONSE	Do people in your household believe washing their hands with soap is important	Yes---------- --1 No---------- -2 Does not apply--------7	

		after they use the toilet?	I do not know---------- -99 I refuse to respond----- 00	
B.6	CIRCLE ONE RESPONSE	Do people in your household believe washing their hands with soap and water is important after they change a child's diaper or help a child use the toilet?	Yes---------- --1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	
B.7	CIRCLE ONE RESPONSE	Have you heard of hand washing with soap and water before?	Yes---------- --1 No---------- -2 Does not apply--------7 I do not know---------- -99 I refuse to respond----- 00	→B.10 →B.10 →B.10 →B.10
B.8	CHECK ALL THAT APPLY	Where did you hear about hand washing?	Parents---------- -1 Friends---------- -2 School---------- -3 Hospital/Clinic---------- -4 Community program--- -5 Other, (specify_____)--- 88 I do not know---------- -99 I refuse to respond----- 00	
B.9	CIRCLE ONE RESPONSE	Please indicate your level of agreement with this statement "I feel as if my teachers	Strongly agree---------- -1 Agree---------- -2 Neither agree nor disagree------3	

		influence me to wash my hands"	Disagree---------- --4 Strongly disagree ------ -5 I do not know---------- -99 I refuse to respond----- 00	
B.10	CIRCLE ONE RESPONSE	Please indicate your level of agreement with this statement “I feel as if health professionals influence me to wash my hands”	Strongly agree---------- -1 Agree---------- -2 Neither agree nor disagree------3 Disagree---------- --4 Strongly disagree ------ -5 I do not know---------- -99 I refuse to respond----- 00	
B.11	CIRCLE ONE RESPONSE	Please indicate your level of agreement with this statement “I feel as if my family influences me to wash my hands”	Strongly agree---------- -1 Agree---------- -2 Neither agree nor disagree------3 Disagree---------- --4 Strongly disagree ------ -5 I do not know---------- -99 I refuse to respond----- 00	
B.12	CIRCLE ONE RESPONSE	Please indicate your level of agreement with this statement “I feel as if my friends influence me to wash my hands”	Strongly agree---------- -1 Agree---------- -2 Neither agree nor disagree------3 Disagree---------- --4 Strongly disagree ------ -5	

			I do not know---------- -99 I refuse to respond----- 00	
B.13	CIRCLE ONE RESPONSE	Do toilets have microbes?	Yes---------- ---1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	
B.14	CIRCLE ONE RESPONSE	Can microbes transfer to your hands when you touch animals?	Yes---------- --1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	
B.15	CIRCLE ONE RESPONSE	Does failure to wash hands allow the transmission of infectious diseases?	Yes---------- --1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	
B.16	CIRCLE ONE RESPONSE	Does hand washing prevent cholera?	Yes---------- --1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	
B.17	CIRCLE ONE RESPONSE	Does hand washing prevent typhoid?	Yes---------- --1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	

B.18	CIRCLE ONE RESPONSE	Does hand washing prevent diarrheal diseases?	Yes---------- --1 No---------- -2 I do not know---------- -99 I refuse to respond----- 00	

SEKSYON C: HAND HYGIENE PRACTICES "For this last section, I am going to ask you questions about hand hygiene practices."				
	Instructions	Questions	Response	Skip Patterns
C.1	CIRCLE ONE RESPONSE	Does your home have water for hand washing only?	Yes---------- -1 No---------- -2 I do not know---------- -99 I refuse to respond-------- 00	→C3 →C3 →C3
C.2	CHECK ALL THAT APPLY	Where do you get water for hand washing at home?	Clinic pump---------- -1 Other pump---------- --2 Cavaillon River- --------- --3 River that is close by----- --4 Culligan water---------- --5 Bottled water---------- -6 Well---------- -7 Faucet---------- -8 Other, (specify_____)-- 88 I do not know---------- -99 I refuse to respond-------- 00	

C.3	CIRCLE ONE RESPONSE	Is there soap for hand washing available at home?	Always---------- -1 Often---------- -2 Sometimes---------- --3 Rarely---------- -4 Never---------- --5 Does not apply---------- -7 I do not know---------- -99 I refuse to respond-------- 00	
C.4	CIRCLE ONE RESPONSE	Do you wash your hands with soap and water after you visit the toilet?	Always---------- -1 Often---------- -2 Sometimes---------- --3 Rarely---------- -4 Never---------- --5 Does not apply---------- -7 I do not know---------- -99 I refuse to respond-------- 00	
C.5	CIRCLE ONE RESPONSE	Do you wash your hands with soap and water before you prepare food?	Always---------- -1 Often---------- -2 Sometimes---------- --3 Rarely---------- -4 Never---------- --5 Does not apply---------- -7 I do not know---------- -99	

			I refuse to respond-------- 00	
C.6	CIRCLE ONE RESPONSE	Do you wash your hands with soap and water before you eat?	Always---------- -1 Often---------- -2 Sometimes---------- --3 Rarely---------- -4 Never---------- --5 Does not apply---------- -7 I do not know---------- -99 I refuse to respond-------- 00	
	CIRCLE ONE RESPONSE	Do you wash your hands with soap and water after changing a child's diaper or helping a child use the toilet?	Always---------- -1 Often---------- -2 Sometimes---------- --3 Rarely---------- -4 Never---------- --5 Does not apply---------- -7 I do not know---------- -99 I refuse to respond-------- 00	
C.8	CHECK ALL THAT APPLY	How do you wipe your hands after you wash your hands with soap and water?	Use towel/cloth---------- 1 Use paper towels---------- -2 Wipe on clothes---------- --3 Air dry---------- -4 Other, (specify_____)--- 88	

			I do not know---------- -99 I refuse to respond-------- 00	
C.9	CHECK ALL THAT APPLY	What keeps you from hand washing with soap?	Cannot find soap---------- ----1 Cannot afford soap-------- ---2 The soap is too far for me to get---------- -----3 Other, (specify_____)-- 88 I do not know---------- -99 I refuse to respond-------- 00	
C.10	CIRCLE ONE RESPONSE	Have you or someone you know had cholera?	Yes---------- 1 No----------2 I do not know---------- 99 I refuse to respond-------- ---00	
C.11	CIRCLE ONE RESPONSE	Have you or someone you know had Typhoid?	Yes---------- 1 No----------2 I do not know---------- 99 I refuse to respond-------- 00	
C.12	CIRCLE ONE RESPONSE	Have you or someone you know had diarrhea?	Yes---------- 1 No----------2 I do not know---------- 99 I refuse to respond-------- 00	

READ THIS STATEMENT TO EACH PARTICIPANT TO THANK THEM. "This concludes the list of questions I wanted to ask you. Thank you for your participation with this survey, it means a lot to us."
SURVEY END TIME [_] [_] : [_] [_] AM/PM (Circle one)

Appendix B: Hand Hygiene Survey (Haitian Creole)

SONDAJ IJYÈN MEN POU PASYAN NOVA YO NAN CAVAILLON, AYITI.

NOVA Hope for Haiti, Inc

ANE 2018-2019

LI ENFÒMASYON KONSANTMAN SA POU CHAK RESPONDAN.

"Sali, mèsi paske'w pran tan w pou rankontre avè m jodi a. Non mwen se __ (NON LA) __, epi mwen travay ak NOVA Hope for Haiti, Inc. pou rasanble enfòmasyon sou edikasyon ijyèn men sou pasyan NOVA nan Cavaillon, Ayiti. Enfòmasyon sa yo nou pral itilize pou enfòme NOVA ak patnè yo pou devlopman edikasyon ijyèn men. Patisipasyon ou nan sondaj sa a konplètman volontè. Si ou patisipe oswa ou deside pa patisipe, sa pap afekte sevis medikal ou. Ou ka chwazi pou ou pa patisipe. Si ou deside patisipe, ou ka sispann nenpòt lè. Ou pa bezwen reponn nenpòt kesyon ou pa vle reponn. Tout sa ou di m 'yo pral konplètman konfidansyèl. Ekip NOVA a ak mwen se sèl moun ki ap gen aksè a enfòmasyon ou bay m 'jodi a. Non ou ak nenpòt enfòmasyon pèsonèl ou yo pral de-idantifye anvan nenpòt nan done sa yo se pataje.

Èske ou dakò pou patisipe nan sondaj sa a? WI [_] NON [_]
(Mete yon "X" nan bwat la akote repons ou chwazi a)

SI PATISIPAN AN PA DAKÔ POU LI PATISIPE NAN SONDAJ LA, <u>PA KONTINYE</u> FE SONDAJ LA.

INFOMASYON SONDAJ LA
DAT PATICIPAN AN PRAN SONDAJ LA: [_] [_]/ [_] [_]/ [_] [_] (JJ/MM/AA)
LÈ SONDAJ LA KOMANSE [_] [_] : [_] [_] AM/PM (Antoure youn)

ENSTRIKSYON POU SONDAJ LA:

1. TOUT ENTRIKSYON POU SONDAJ LA A SE NAN LÈT MAJISKIL.
2. MOUN KI AP BAY SONDAJ LA DWE LI TOUT KESYON SONDAJ LA, SOF SI SONDAJ LA DI OTREMAN.
3. MOUN KI AP BAY SONDAJ LA DWE LI SENTANS NAN MAK SITYASYON (“”) YO POU REZON TRANZISYON.
4. MOUN KI AP BAY SONDAJ LA DWE LI TOUT REPONS YO POU CHAK KESYON.
5. DEFINISYON YO SE NAN ITALIK EPI YO DWE LI POU TOUT PATISIPAN YO.
6. LÈ W AP LI REPONS YO, MOUN KI AP BAY SONDAJ LA A PA DWE LI CHWA “M PA KONNEN” AK “M REFIZE REPONN.” SÈLMAN CHWAZI “M PA KONNEN” OSWA “M REFIZE REPONN” SI PATISIPAN YO BAY REPONS A YO.

SEKSYON A: KESYON DEMOGRAFIK AK KARAKTERISTIK PÈSONÈL

“Mwen pral poze w kèk kesyon demografik ak karakteristik pèsonèl.”

	Instriksyon	Kesyon	Respons	Paten sote
A.1	ANTRE REPONS LA MET REPONS LAN AN ANE	Ki laj ou genyen?	__ __ ane	
A.2	ANTOURE YON REPONS	Ki sex ou ye?	Fanm---------- 1 Gason---------- -2 Lót sèx (specifye_____)--88 M’pa konnin---------- -99	

			M’refize reponn---------- -00	
A.3	ANTOURE YON REPONS	Ki nivo edikasyon ou genyen?	Mwen pat janm al lekòl------- -1 Lekòl primè---------- --2 Lekòl segondè---------- --3 Inivèsite---------- -4 Metriz---------- -5 Fakilte/Doktora---------- -6 Lekòl pwofesyonèl---------- --7 Lòt, (specifye_____)----- 88 M’ pa konnen---------- 99 M’refize reponn---------- -00	
A.4	TCHEKE TOUT KI APLIKE	Ki okipasyon travay ou?	Travay sante ak/oswa medikal---------- --1 Travay latè---------- --2 Edikasyon (tankou elèv, pwofesè, etidyan)---------- -3 Menajè---------- --4 Transpòtasyon---------- --5 Machann---------- -6 M’pa travay---------- -7 Lòt travay, (specifye_____)---- 88 M’ pa konnen---------- 99 M’refize reponn---------- -00	

SEKSYON B: KONESANS AK ATITUDE APATI DE LAVE MEN "Konye a mwen pral pose w kesyon so konesans ak atitid ou oswa lòt moun genyen apati de lave men"				
	Instriksyon	Kesyon	Respons	Paten sote
B.1	ANTOURE YON REPONS	Si ou lave men ou byen ak dlo, eske ou bezwen sèvi ak savon?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.2	ANTOURE YON REPONS	Ou sèlman bezwen lave men w ak dlo avèk savon si yo parèt sal oswa li gin move sant?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.3	ANTOURE YON REPONS	Èske moun lakay ou kwè lave men yo ak dlo avèk savon enpòtan anvan yo kwit manje?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.4	ANTOURE YON REPONS	Èske moun lakay ou kwè lave men yo ak dlo avèk savon enpòtan anvan yo manje?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7	

			M’ pa konnen---------- 99 M’refize reponn--------- 00	
B.5	ANTOURE YON REPONS	Èske moun lakay ou kwè lave men yo ak dlo avèk savon enpòtan apre yo finn itilize twalèt la?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M’ pa konnen---------- 99 M’refize reponn--------- 00	
B.6	ANTOURE YON REPONS	Èske moun lakay ou kwè lave men yo ak dlo avèk savon enpòtan apre yo finn chanje kouchèt yon timoun oswa netwaye yon timoun ki itilize twalèt la?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M’ pa konnen---------- 99 M’refize reponn--------- 00	
B.7	ANTOURE YON REPONS	Èske ou konn tande pale de lave men ak dlo ak savon?	Wi---------- -1 Non---------- -2 Sa pa aplike avè m------- -7 M’ pa konnen---------- 99 M’refize reponn--------- 00	→B.10 →B.10 →B.10 →B.10
B.8	TCHEKE TOUT KI APLIKE	Ki kote ou te tande pale de lave men?	Paran---------- --1 Zanmi---------- --2 Lekòl---------- --3 Lopital/Klinik---------- -4 Pwogram kominote------ -5 Lòt kote,	

			(specifye_____)--88 M’ pa konnen----------99 M’refize reponn---------00	
B.9	ANTOURE YON REPONS	Tanpri endike nivo ou an akò ak deklarasyon sa a "Mwen santi mwen pwofesè m ban m presyon pou m lave men m "	Trè dakò----------1 Dakò----------2 Ni dakò ni pa dakò----3 Pa dakò----------4 Pa dakò nèt ----------5 M’ pa konnen----------99 M’refize reponn---------00	
B.10	ANTOURE YON REPONS	Tanpri endike nivo ou an akò ak deklarasyon sa a "mwen santi pwofesyonèl sante ban mpresyon pou m lave men m”	Dakò Dakò----------1 Dakò----------2 Ni dakò ni pa dakò----3 Pa dakò----------4 Pa dakò nèt ----------5 M’ pa konnen----------99 M’refize reponn---------00	
B.11	ANTOURE YON REPONS	Tanpri endike nivo ou an akò ak deklarasyon sa a "mwen santi fanmi m ban m presyon pou m lave men m”	Dakò Dakò----------1 Dakò----------2 Ni dakò ni pa dakò----3 Pa dakò----------4 Pa dakò nèt ----------5 M’ pa konnen----------99 M’refize reponn---------00	

B.12	ANTOURE YON REPONS	Tanpri endike nivo ou an akò ak deklarasyon sa a "mwen santi zanmi m ban m presyon pou m lave men m"	Dakò Dakò---------- -1 Dakò---------- -2 Ni dakò ni pa dakò----3 Pa dakò---------- -4 Pa dakò nèt ---------- -5 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.13	ANTOURE YON REPONS	Èske twalèt gen mikwòb?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.14	ANTOURE YON REPONS	Èske ou ka jwenn mikwòb lè w manyen bèt?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.15	ANTOURE YON REPONS	Èske lè on moun pa lave men l li ka transmèt maladi enfeksyon?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.16	ANTOURE YON REPONS	Èske lave men anpeche maladi kolera?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	

B.17	ANTOURE YON REPONS	Èske lave men anpeche maladi tifoyid?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	
B.18	ANTOURE YON REPONS	Èske lave men anpeche maladi dyare?	Wi---------- -1 Non---------- -2 M' pa konnen---------- 99 M'refize reponn--------- 00	

SEKSYON C: PRATIK LAVE MEN "Pou denye seksyon sa mwen pral poze w kesyon sou pratik lave men."				
	Instriksyon	Kesyon	Respons	Paten sote
C.1	ANTOURE YON REPONS	Èske lakay ou gen dlo pou moun ka lave men yo selman?	Wi---------- -1 Non---------- --2 M' pa konnen---------- 99 M'refize reponn--------- 00	→C3 →C3 →C3
C.2	TCHEKE TOUT KI APLIKE	Ki kote yo pran dlo pou lave men nan lakay ou?	M' pa konnen---------- 99 M'refize reponn--------- 00	
C.3	ANTOURE YON REPONS	Èske gen savon ki disponib pou lave men lakay ou?	Toujou---------- -1 Trè souvan---------- --2 Pafwa---------- -3 Raman---------- -4 Pa janm---------- -5 Sa pa aplike avè m-------- -7	

			M’ pa konnen---------- -99 M’refize reponn---------- 00	
C.4	ANTOURE YON REPONS	Ou lave men avèk savon apre vizite twalèt la?	Toujou---------- -1 Trè souvan---------- --2 Pafwa---------- -3 Raman---------- -4 Pa janm---------- -5 Sa pa aplike avè m-------- -7 M’ pa konnen---------- 99 M’refize reponn--------- 00	
C.5	ANTOURE YON REPONS	Ou lave men w ak dlo avèk savon anvan ou prepare yon manje?	Toujou---------- -1 Trè souvan---------- --2 Pafwa---------- -3 Raman---------- -4 Pa janm---------- -5 Sa pa aplike avè m-------- -7 M’ pa konnen---------- 99 M’refize reponn--------- 00	
C.6	ANTOURE YON REPONS	Ou lave men w ak dlo avèk savon anvan ou manje?	Toujou---------- -1 Trè souvan---------- --2 Pafwa---------- -3 Raman---------- -4 Pa janm---------- -5	

			Sa pa aplike avè m--------7 M’ pa konnen----------99 M’refize reponn---------00	
	ANTOURE YON REPONS	Ou lave men w ak dlo avèk savon apre chanje kouchèt yon timoun oswa netwaye yon timoun ki te itilize twalèt la?	Toujou----------1 Trè souvan----------2 Pafwa----------3 Raman----------4 Pa janm----------5 Sa pa aplike avè m--------7 M’ pa konnen----------99 M’refize reponn----------00	
C.8	TCHEKE TOUT KI APLIKE	Kijan ou siye men w apre ou fin lave yo ak dlo avèk savon?	Itilize sevyèt/twal---------1 Itilize papye----------2 Siyèl sou rad ou----------3 Kite l sèch pou kont li----4 Lòt jan, (specifye_____)----88 M’ pa konnen----------99 M’refize reponn---------00	
C.9	TCHEKE TOUT KI APLIKE	Ki sa ki anpeche w pou lave men w avèk savon?	Pa jwenn savon----------1 Pa ka achete savon--------2 Li twò lwen pou m al pran savon----------3 Lòt bagay,	

			(specifye_____)---88 M’ pa konnen----------99 M’refize reponn---------00	
C.10	ANTOURE YON REPONS	Eske ou menm oswa yon moun ou konnen te gin kolera?	Wi----------1 Non----------2 M’ pa konnen----------99 M’refize reponn---------00	
C.11	ANTOURE YON REPONS	Eske oumenm oswa yon moun ou konnen te gin Tifoyid?	Wi----------1 Non----------2 M’ pa konnen----------99 M’refize reponn---------00	
C.12	ANTOURE YON REPONS	Eske oumenm oswa yon moun ou konnen te gin dyare?	Wi----------1 Non----------2 M’ pa konnen----------99 M’refize reponn---------00	

LI REMAK SA A CHAK PATISIPAN POU REMÈSYE YO. “Sa konkli lis kesyn mwen te vle poze w. Mèsi pou patisipasyon ou na sondaj sa a, li vle di anpil pou nou.”
LÈ SONDAJ LA FINI [_] [_] : [_] [_] AM/PM (Antoure you n)

Appendix C: Final Curriculum

La Sante nan Pwòp Men Nou

A Hand Hygiene Education Curriculum for Community Members in Rural Haiti

Written by: Cassandra Savino

Target Audience

NOVA Hope for Haiti clinic patients, 18-35 years old.

Purpose

To educate and empower NOVA clinic patients in an effort to improve hand hygiene knowledge and increase positive hand hygiene behaviors.

Location

The sessions will be held on the premises of NOVA Hope for Haiti's Martineau clinic in an area where community activities are commonly held.

Time Frame

This is a five-module hand hygiene education project to be taught for five consecutive afternoons. Each session will take 120 minutes.

Measurement

Identical pre- and post-tests will be given before the project begins and after it ends. The tests are designed to determine baseline hand hygiene knowledge and to assess knowledge retention during the hand hygiene education project.

Learning Goals

Module 1. Hand Washing Basics: To introduce the key components of hand hygiene.

Module 2. Positive and Negative Hand Hygiene Behaviors: To discuss positive and negative hand hygiene behaviors present in the community.

Module 3. Cholera and Prevention: To introduce cholera disease and prevention and encourage participant lead solutions

Module 4. Hand Hygiene and Cholera Prevention: To discuss community specific enteric disease prevention and encourage participant command of the information

Module 5. Hand Hygiene and Cholera Prevention Film Screening: To demonstrate student command of hand hygiene information and to encourage information dissemination

Module 1. Hand Washing Basics

Total Time: 120 minutes

Module Goal within Overall Project: This module is designed to introduce key components of hand hygiene. Furthermore, this module seeks to identify baseline participant knowledge of proper hand hygiene.

Module Summary: This module begins with an introduction and establishment of group expectations by the facilitators and the participants. Next, a pre-test is distributed and completed by each participant. Then, facilitators introduce the topics that will be covered during the week. Participants are then divided into two groups and asked to complete a group activity. This is followed by the *Maladi Dyare* (Diarrheal Diseases), PowerPoint presentation and lecture covering hand hygiene basics (Partners In Health, 2013). Then participants watch a short video, *Lave Men Ou Wash Your Hands, A Musical Health Education Video in Haitian Creole* (WeAdvancedHaiti, 2014). Facilitators collect pencils and notebooks from each participant and then, facilitators demonstrate proper hand hygiene. Participants are invited to partake in the handwashing activity.

Specific Objectives:

a) To educate participants on the key components of hand hygiene and critical times for hand washing.

b) To discuss the importance of hand hygiene in relation to diarrheal diseases.

c) To practice, through an interactive hand washing demonstration, proper hand washing.

Materials Needed:

- Poster paper
- Pencils
- Marker
- Notebooks
- Pre-Test
- Sign in sheet
- Small box/bin
- Post-it notes
- Projector
- Speaker
- PowerPoint Slides
- Bucket of water
- Soap
- Tape

Schedule:

Activity	Materials	Time
1. Introduction	Sign in sheet, notebooks, pencils, tape, poster paper, marker, small bin or box	40 mins
2. Pre-test	Pre-test for each participant and pencils	10 mins
3. Introduction of topics for the week	None	10 mins
4. "How should you wash your hands?" and "When do you wash your hands?" group activity	Post-it Notes, pencils, tape, 2 pieces of poster paper labeled "How should you wash your hands" and "When do you wash your hands"	15 mins
5. Didactic lecture	PowerPoint slides, projector	15 mins
6. Hand washing video and group discussion	Projector, speakers	20 mins
7. Interactive hand hygiene demonstration	Bucket, water, soap	10 mins

Activity 1: Introduction

Aim of activity: To begin the module by introducing participants and facilitators and establishing group expectations.

Time: 40 minutes

Materials: Sign in sheet, notebooks, pencils, poster paper, marker, small bin or box, tape

Directions for facilitators:

1) Sign participants in and distribute a notebook and a pencil to each participant. Introduce yourselves and instruct participants to share, one at a time, their names, what they are expecting to gain from the course, and something interesting about themselves.
2) Introduce and establish basic group expectations as a group and write the rules on a poster paper displayed at the front of the room. Remind the group that rules can be added or changed throughout the duration of the project.
3) Explain that there is a bin at the front of the room where participants can write and leave questions anonymously, which will be answered during the next module.
4) Remind participants of the attendance policy: participants who attend at least four modules will receive a Certificate of Success and those who attend less than four modules receive a Certificate of Participation at the end of the course

Activity 2: Pre-test

Aim of activity: To establish baseline hand hygiene knowledge of the group.

Time: 10 minutes

Materials: Pre-test, pencils

Directions for facilitators:

1) Hand out pre-test to each participant.
2) Read instructions for the pre-test to the group.
3) Ask participants to raise their hands if there are any questions about the pre-test.

4) Collect the pre-test after ten minutes.

Activity 3: Introduction of topics for the week

Aim of activity: To introduce the focus of each module.

Time: 10 minutes

Materials: None

Directions for facilitators:

1) Introduce the topics for each module:
    a. Module 1. Hand washing basics
    b. Module 2. Positive and Negative Hand Hygiene Behaviors
    c. Module 3. Cholera and Prevention
    d. Module 4. Hand Hygiene and Cholera Prevention
    e. Module 5. Hand Hygiene and Cholera Prevention Film Screening
2) Ask if participants have any questions about the module topic or the hand hygiene education project. Answer any questions participants may have.

Activity 4: "How should you wash your hands?" and "When do you wash your hands?" group activity

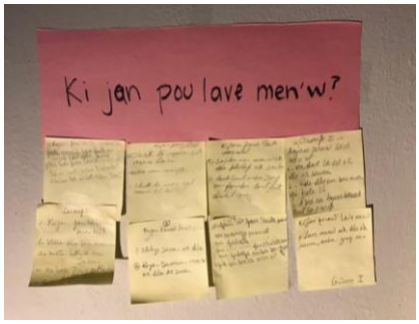
Aim of activity: To identify and discuss hand hygiene knowledge and behaviors practiced among participants.

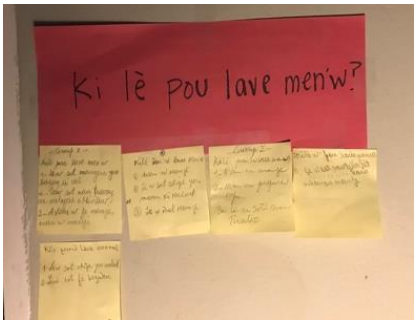
Time: 15 minutes

Materials: Post-it Notes, pencils, tape, 2 pieces of poster paper labeled "How should you wash your hands?" and "When do you wash your hands?"

Directions for facilitators:

1) Introduce the activity to the participants. Explain that they will be divided into two groups. Direct their attention to the wall, where there are two pieces of poster paper with the words "How do you wash your hands?" and "When do you wash your hands?" written on them for each group. Each group will be given a pack of Post-it Notes and have about fifteen minutes to write responses to the question on the wall. They will then post the Post-it Notes onto the wall under the appropriate questions.
2) Separate the participants into two groups and invite them to move themselves around so that they form a circle with their groups. Provide each group with a pack of Post-it Notes.
3) At the end of the fifteen minutes, invite the participants to return to their seats.





"How do you wash your hands?" and **"**When do you wash your hands?" group activity

Activity 5: Didactic lecture

Aim of activity: To educate participants about proper hand hygiene and the critical times to wash hands.

Time: 15 minutes

Materials: PowerPoint slides, projector

Directions for facilitators:

1) Turn on the projector and open the *Maladi Dyare* PowerPoint presentation to the title page, available on the Partners In Health Knowledge Center website (Partners In Health, 2013).
2) Explain the activity, say: *Now that we have identified how and when we wash our hands, this PowerPoint presentation will demonstrate the critical times for proper hand hygiene and the six steps for hand washing.*

3) Present slides 1-6 of the presentation, answering participants' questions after each slide.

Maladi Dyare (Partners In Health, 2013).

Activity 6: Hand washing video and group discussion

Aim of activity: To visualize and understand the importance of proper hand hygiene and the consequences of not practicing proper hand hygiene.

Time: 20 minutes

Materials: Projector, speakers

Directions for facilitators:

1) Introduce the activity. Say: *Now we will watch a video about the importance of proper hand hygiene.*

2) Play minutes 4:42-8:48 of the *Lave Men Ou Wash Your Hands, A Musical Health Education Video in Haitian Creole* video available on YouTube (WeAdvancedHaiti, 2014).

3) Invite participants to gather in a circle so that they can see each other and the facilitators.
4) Begin the discussion with asking for any questions or comments about the activity and the presentations. Ask the following questions to prompt discussions:
    a. *Did you find any similarities or differences between the recommended actions and the way and times that you washed your hands?*
    b. *Did you know about the critical times to wash hands?*
    c. *Were you surprised that not washing your hands could make you sick?*
5) Thank the group for a great discussion. Ask the group to stay seated and collect pencils and notebooks from each participant.

Activity 7: Interactive hand hygiene demonstration

Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 10 minutes

Materials: Bucket, water, soap

Directions for facilitators:

1) Instruct participants to surround the bucket of water and demonstrate proper handwashing using water from the bucket and soap.
2) Ask the group to form a line and take turns washing their hands for 20 seconds with soap and water.
3) Remind participants to let their hands airdry or use a clean paper towel or cloth, if available.
4) End of module. Thank participants for attending and participation and let them know when the next session will be.


Interactive hand hygiene demonstration

Module 2. Positive and Negative Hand Hygiene Behaviors

Total Time: 120 minutes

Module Goal within Overall Project : This module is designed to identify positive and negative hand hygiene behaviors that are present in the community and to facilitate discussion for an assets-based approach to changing negative behaviors.

Module Summary: This module begins with facilitators signing participants in and distributing their notebooks and pencils. The facilitators and newcomers introduce themselves and the group reviews group expectations. This is followed by a didactic lecture on food and waterborne viruses and bacteria and the role of hand hygiene in prevention. The participants then form two groups for a "Positive and negative hand hygiene behaviors in your community" activity and group discussion. Participants then wash their hands during an interactive hand hygiene demonstration and facilitators distribute hygiene kits to each participant.

Specific Objectives:

a) To educate participants on food and waterborne viruses and bacteria and the role of hand hygiene in disease prevention.

b) To discuss positive and negative hand hygiene behaviors that are present in the community.

c) To practice, through an interactive hand washing demonstration, proper hand washing.

Materials Needed:

- Poster paper
- Pencils
- Marker
- Notebooks
- Tape
- Sign in sheet
- Group expectations
- Small box/bin
- Post-it notes
- Projector
- PowerPoint Slides
- Bucket of water
- Soap

Schedule:

Activity	Materials	Time
1. Introduction	Sign in sheet, notebooks, pencils, tape, group expectations, marker, small bin or box	40 mins
2. Didactic lecture	PowerPoint slides, projector	30 mins
3. "Positive and negative hand hygiene behaviors in your community" group activity and discussion	Post-it Notes, pencils, tape, 2 pieces of poster paper labeled "Positive and negative hand hygiene behaviors in your community"	30 mins
4. Interactive hand hygiene demonstration	Bucket of water, soap, paper towels	10 mins
5. Hygiene kit distribution	Hygiene kits	10 mins

Activity 1: Introduction

Aim of activity: To begin the module by introducing facilitators and new participants and establishing group expectations.

Time: 40 minutes

Materials: Sign in sheet, notebooks, pencils, tape, group expectations, marker, small bin or box

Directions for facilitators:

1) Sign participants in and distribute a pencil and the appropriate notebook to each participant. Introduce yourselves and instruct new participants to share, one at a time, their names, what they are expecting to gain from the course, and something interesting about themselves.
2) Remind participants of basic group expectations that are listed on a poster paper displayed at the front of the room. Ask the group if anyone wants to make any changes to the rules and Remind the group that rules can be added or changed throughout the duration of the project.
3) Remind participants that there is a bin at the front of the room where participants can write and leave questions anonymously, which will be answered during the next module.
4) Answer any questions that were left in the bin.
5) Remind participants of the attendance policy: participants who attend at least four modules will receive a Certificate of Success and those who attend less than four modules receive a Certificate of Participation at the end of the course.

Activity 2: Didactic lecture

Aim of activity: To educate participants about proper hand hygiene and the critical times to wash hands.

Time: 30 minutes

Materials: PowerPoint slides, projector

Directions for facilitators:

1) Turn on the projector and open the *Mikwòb* PowerPoint presentation to the title page.
2) Explain that you will be presenting about food and waterborne bacteria and viruses and how proper hand hygiene can help prevent them.
3) Present the presentation, answering participants' questions after each slide.

Mikwòb

Bakteri ak Viris

1

2

ki sa ki se yon bakteri?

Bakteri yo se mikròb yon selil ke ou ka jwen anpil kote.

Yo ka danjere, tankou lè yo lakòz enfeksyon, oswa benefisye, menm jan nan pwosesis dijesyon.

Bakteri danjere ou ka jwen nan dlo ak manje:

- Kolera
- Tifoyid
- E. coli

3

Kolera

- Kolera se yon maladi dyare ki ka touye 50% de moun ki pa trete
- Li gaye pa dlo ak manje ki kontamine pa matyè fekal on moun ki malad
- Gen moun ki enfekte ki pa gen okenn sentòm oswa ki gen sentòm ki pa twò grav
- Moun sa yo ka trete ak siksè si yo pran sewòm oral
- Moun ki gen sentòm pi grav yo ap bezwen trete ak sewòm ak antibyotik.

4

Tifoyid

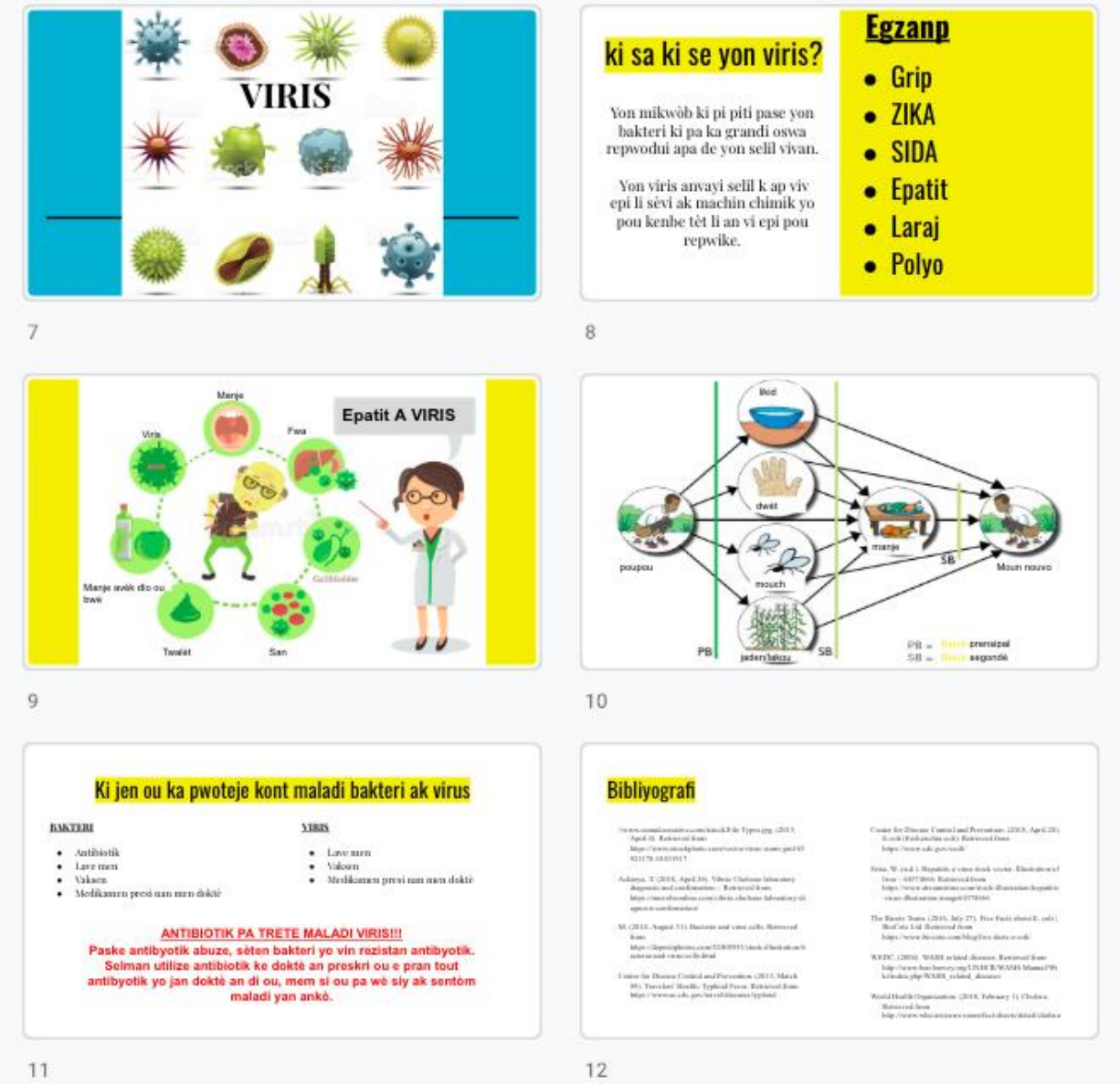
- Typhoid se yon maladi grav gaye pa dlo ak manje ki kontamine pa matyè fekal on moun ki malad.
- Sentòm tifoyid yo se lafyèv, feblès, doulè nan vant, maltèt, ak pedi apeti.
- Gen kèk pasyan ki gen konstipasyon ak/oswa yon gratèl.
- Gen lòt pasyan ki pa gen okenn sentòm, men yo ka toujou gaye maladi a
- Raman, on pasyan ka mouri de typhoid

5

E. coli

- E. coli se yon bakteri ou ka jwenn nan anviwònman an, nan manje, ak nan trip nan moun ak bèt.
- Moun toujou gen E. coli nan trip yo, men lè yo gen trop yo ka malad.
- Sentòm E. coli yo se kranp nan lestomak, dyare (souvan gen san nan dyare), ak vomisman. Pafwa gen kèk moun ki gen yon lafyèv.

6



Activity 3: "Positive and negative hand hygiene behaviors in your community" group activity

Aim of activity: To identify and discuss hand hygiene knowledge and behaviors practiced among participants.

Time: 15 minutes

Materials: Post-it Notes, pencils, tape, 2 pieces of poster paper labeled "Positive hand hygiene behaviors" and "Negative hand hygiene behaviors"

Directions for facilitators:

1) Introduce the activity to the participants. Explain that they will be divided into two groups. Direct their attention to the wall, where there are two pieces of poster paper with the words Positive hand hygiene behaviors" and "Negative hand hygiene behaviors" written on them for each group. Each group will be given a pack of Post-it Notes and have about fifteen minutes to write responses to the question on the wall. They will then post the Post-it Notes onto the wall under the appropriate questions.
2) Separate the participants into two groups and invite them to move themselves around so that they form a circle with their groups. Provide each group with a pack of Post-it Notes.
3) At the end of the fifteen minutes, invite participants to gather in a circle so that they can see each other and the facilitators.
4) Begin the discussion with asking for any questions or comments about the activity and the presentations. Ask the following questions to prompt discussions:
    a. *How can negative hygiene behaviors change in your community?*
5) Thank the group for a great discussion. Ask the group to stay seated and collect pencils and notebooks from each participant.

"Positive hand hygiene behaviors" and "Negative hand hygiene behaviors" activity

Activity 4: Interactive hand hygiene demonstration

Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 10 minutes

Materials: Bucket, water, soap

Directions for facilitators:

1) Ask the group to form a line and take turns washing their hands for 20 seconds with soap and water.
2) Remind participants to let their hands airdry or use a clean paper towel or cloth, if available.
3) Ask the group to return to their seats.

Activity 5: Hygiene kit distribution

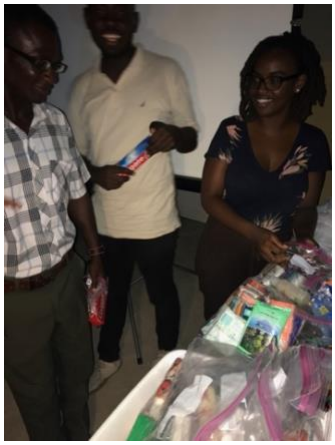
Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 5 minutes

Materials: Hand hygiene kits

Directions for facilitators:

1) Distribute one hand hygiene kit to each participant. Hygiene kits include: soap, tissues, hand sanitizer, toothbrush, toothpaste, mouthwash, floss.
2) End of module. Thank participants for attending and participation and let them know when the next session will be.



Hygiene kit distribution

Module 3. Cholera and Prevention

Total Time: 120 minutes

Module Goal within Overall Project: This module is designed to discuss the etiology of cholera and its presence in the community and to promote participants to develop solutions for cholera prevention in the community.

Module Summary: This module begins with facilitators signing participants in and distributing their notebooks and pencils. The group reviews group expectations. This is followed by three short videos short videos about cholera infection and prevention and a facilitated group discussion about barriers and facilitators to cholera prevention in their community. Then, participants will partake in a group activity creating a film concept for a hand hygiene educational video followed by an interactive hand washing demonstration.

Specific Objectives:

a) To educate participants on cholera disease transmission.

b) To discuss barriers and facilitators to cholera prevention in the community.

c) To promote participant lead solutions for cholera and diarrheal disease prevention in the community.

d) To practice, through an interactive hand washing demonstration, proper hand washing.

Materials Needed:

- Pencils
- Marker
- Notebooks
- Sign in sheet
- Group expectations
- Small box/bin
- Projector
- PowerPoint Slides
- Bucket of water
- Soap
- Tape

Schedule:

Activity	Materials	Time
1. Introduction	Sign in sheet, notebooks, pencils, tape, group expectations, marker, small bin or box	20 mins
2. Cholera video and reflection	Projector, speaker, notebook, pencils	15 mins
3. Group discussion	Notebooks, pencils	25 mins
4. Film concept activity	Notebooks, pencils	50 mins
5. Interactive hand hygiene demonstration	Bucket of water, soap, paper towels	10 mins

Activity 1: Introduction

Aim of activity: To begin the session and establish group expectations.

Time: 20 minutes

Materials: Sign in sheet, notebooks, tape, pencils, poster paper, marker, small bin or box

Directions for facilitators:

1) Sign participants in and distribute a pencil and the appropriate notebook to each participant.
2) Remind participants of basic group expectations that are listed on a poster paper displayed at the front of the room. Ask the group if anyone wants to make any changes to the rules and Remind the group that rules can be added or changed throughout the duration of the project.
3) Remind participants that there is a bin at the front of the room where participants can write and leave questions anonymously, which will be answered during the next module.

4) Answer any questions that were left in the bin.

5) Remind participants of the attendance policy: participants who attend at least four modules will receive a Certificate of Success and those who attend less than four modules receive a Certificate of Participation at the end of the course.

Activity 2: Cholera video and reflection

Aim of activity: To visualize the spread of cholera and preventative methods in similar communities.

Time: 15

Materials: Projector, speaker, notebook, pencils

Directions for facilitators:

1) Introduce the activity. Say: *Now we will watch three videos about cholera and how to prevent its spread.*

2) Play the *The Story of Cholera: Haitian Creole* video available on YouTube (Global Health Media Project & Goodman, 2012).

3) Play the *Hand Washing Song* video available on YouTube (WorldW888, 2010).

4) Play the *Cholera Prevention* video available on YouTube (University of Illinois at Urbana-Champaign, 2011).

5) Allow participants five minutes to write a reflection about the videos in their notebooks. Probe participants with the following questions:

    a. How did the video make you feel?

    b. What did you like or dislike about the videos?

    c. Of what was presented, what seemed feasible?

Activity 3: Group Discussion

Aim of activity: To discuss barriers and facilitators to cholera prevention in the community.

Time: 25 minutes

Materials: Notebooks, pencils

Directions for facilitators:

1) Invite participants to gather in a circle so that they can see each other and the facilitators.
2) Begin the discussion with asking participants to share their reflections on the videos. Ask the following questions to guide the discussions:
    a. *What did you think about the videos?*
    b. *Were there any cholera prevention methods shown in the videos that you see in your community?*
    c. *What are other preventative methods that occur in your community that were not mentioned in the videos?*
    d. *What are some barriers and facilitators to taking these preventative measures?*
    e. *How would you present this information to your community?*
    f. *What are some things you would do differently (especially something you think could work in your community?)*
3) At the end of the 25 minutes, thank the group for a great discussion.

Activity 4: Film Concept activity

Aim of activity: To promote participant lead solutions to cholera prevention in their community.

Time: 50 minutes

Materials: Notebooks, pencils

Directions for facilitators:

1) Explain the activity to participants. Tell participants that they will be divided into two groups to create a concept for a fifteen-minute film about hand hygiene and diarrheal disease prevention. Participants will be filming their concept during the next session. The films can

be creative and should capture an audience's attention. The film should include lessons learned during the hand hygiene education project, including but not limited to:

   a. A demonstration of proper hand washing for 20 seconds with soap and water,
   b. The critical times to practice proper hand hygiene,
   c. Proper hand hygiene at critical times can prevent diarrheal diseases,
   d. Cholera is a bacterium, not a virus,
   e. And antibiotics cannot treat viruses

2) Divide participants into two groups and answer any questions they may have about the activity.
3) When there are 5 minutes left, collect notebooks and pencils from participants.
4) Ask participants to remain seated and hold a vote amongst participants on whether they want to invite community members to the screening of their films during the last module or if they want to show the film to the group only.
   a. If participants vote to screen the films to the group only, continue to **activity 5.**
   b. If participants vote to invite community members to the film, ask participants to invite friends and family members. Request for volunteers to create invitation flyers to hang up around the clinic at the end of the module.

Activity 5: Interactive hand hygiene demonstration

Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 10 minutes

Materials: Bucket, water, soap

Directions for facilitators:

1) Ask the group to form a line and take turns washing their hands for 20 seconds with soap and water.
2) Remind participants to let their hands airdry or use a clean paper towel or cloth, if available.
3) End of module. Thank participants for attending and participation and let them know when the next session will be. Remind participants that they will be filming their concepts during the next session.

Module 4. Hand Hygiene and Cholera Prevention

Total Time: 120 minutes

Module Goal within Overall Project: This module is designed to promote participant lead preventative education in their community.

Module Summary: This module begins with an introduction. Then, participants demonstrate their command of the hand hygiene project's educational material by presenting participant lead solutions to diarrheal disease prevention in their community during a group filming activity. Participants partake in a facilitated group discussion about the activity. Then participants take a post-test, identical to the pre-test given during module 1. This is followed by an interactive hand hygiene demonstration.

Specific Objectives:

a) To discuss community specific enteric disease prevention.

b) To promote participant lead solutions to cholera and diarrheal disease prevention in the community.

c) To practice, through an interactive hand washing demonstration, proper hand washing.

Materials Needed:

- Pencils
- Marker
- Notebooks
- Sign in sheet
- Group expectations
- Small box/bin
- 2 video recorders
- Bucket of water
- Soap
- Tape

Schedule:

Activity	Materials	Time
1. Introduction	Sign in sheet, notebooks, pencils, tape, group expectations, marker, small bin or box	20 mins

2. Hand hygiene and cholera prevention filming activity	Notebooks, pencils, 2 video-recorders, bucket of water, soap, paper towels	60 mins
3. Group discussion	Notebooks, pencils	20 mins
4. Post-test	Post-test for each participant, pencils	10 mins
5. Interactive hand hygiene demonstration	Bucket of water, soap, paper towels	10 mins

Activity 1: Introduction

Aim of activity: To begin the session and establish group expectations.

Time: 20 minutes

Materials: Sign in sheet, notebooks, tape, pencils, poster paper, marker, small bin or box

Directions for facilitators:

1) Sign participants in and distribute a pencil and the appropriate notebook to each participant.
2) Remind participants of basic group expectations that are listed on a poster paper displayed at the front of the room. Ask the group if anyone wants to make any changes to the rules and Remind the group that rules can be added or changed throughout the duration of the project.
3) Remind participants that there is a bin at the front of the room where participants can write and leave questions anonymously, which will be answered during the next module.
4) Answer any questions that were left in the bin.
5) Remind participants of the attendance policy: participants who attend at least four modules will receive a Certificate of Success and those who attend less than four modules receive a Certificate of Participation at the end of the course.

Activity 2: Hand hygiene and cholera prevention filming activity

Aim of activity: To give participants the opportunity to create an educational video regarding hand hygiene and cholera prevention that is designed for use in their community.

Time: 60 minutes

Materials: Notebooks, pencils, 2 video-recorders, bucket of water, soap, paper towels

Directions for facilitators:

1) Ask participants to break out into their assigned groups to film their fifteen-minute films about hand hygiene and diarrheal disease prevention. Remind participants that the films can be creative and should capture an audience's attention. The film should include lessons learned during the hand hygiene education project, including but not limited to:
    a. A demonstration of proper hand washing for 20 seconds with soap and water,
    b. The critical times to practice proper hand hygiene,
    c. Proper hand hygiene at critical times can prevent diarrheal diseases,
    d. Cholera is a bacterium, not a virus,
    e. And antibiotics cannot treat viruses
2) Each facilitator will work with one group to record the film and answer any questions participants may have about the activity. Remind participants that they can walk around the area and use any materials or props that are readily available.
3) At the end of the 60 minutes, ask participants to return to their seats.
4) Facilitators will cut and edit the videos before the beginning of the next session.

Activity 3: Group discussion

Aim of activity: To allow participants to debrief about the filming process and compare the techniques they used in their films.

Time: 20 minutes

Materials: Notebooks, pencils

Directions for facilitators:

1) Invite participants to gather in a circle so that they can see each other and the facilitators.
2) Begin the discussion with asking participants to reflect on the filming process. Guide the discussion with the following questions:
    a. *What information did you present and how did you present it?*

b. *Why did you present your information this way?*

c. *Who was the film's target audience?*

3) At the end of the 20 minutes, thank the group for a great discussion.

Activity 4: Post-test

Aim of activity: To evaluate participant knowledge retention.

Time: 10 minutes

Materials: Post-test, pencils

Directions for facilitators:

1) Hand out post-test to each participant.
2) Read instructions for the post-test to the group.
3) Ask participants to raise their hands if there are any questions about the post-test.
4) Collect the post-test after ten minutes.

Activity 5: Interactive hand hygiene demonstration

Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 10 minutes

Materials: Bucket, water, soap

Directions for facilitators:

1) Ask the group to form a line and take turns washing their hands for 20 seconds with soap and water.
2) Remind participants to let their hands airdry or use a clean paper towel or cloth, if available.

3) End of module. Thank participants for attending and participation and let them know when the next session will be. Remind participants that they will be screening their films during the next session.

Module 5. Hand Hygiene and Cholera Prevention Film Screening

Total Time: 120 minutes

Module Goal within Overall Project: This module is designed to wrap up the hand hygiene education project with the encouragement of information dissemination in the form of a presentation of participants' work.

Module Summary: This module begins with an introduction followed by a film screening activity. Community members may have been invited to view the films. Then, facilitators disseminate certificates to participants as a recognition for their attendance and participation in the program. Then, participants are asked to complete a course evaluation form. The module and the hand hygiene education project conclude with final remarks and an interactive hand hygiene demonstration.

Specific Objectives:

a) To demonstrate student command of hand hygiene information.

b) To promote participant lead solutions to cholera and diarrheal disease prevention in the community.

c) To encourage participants to disseminate information to community members.

d) To practice, through an interactive hand washing demonstration, proper hand washing.

Materials Needed:

- Pencils
- Marker
- Notebooks
- Sign in sheet
- Group expectations
- Small box/bin
- Projector
- Speaker
- Bucket of water
- Soap
- Tape
- Certificates

Schedule:

Activity	Materials	Time
1. Introduction	Sign in sheet, tape, group expectations, marker, small bin or box	20 mins
2. Hand hygiene and cholera prevention filming screening	Projector, speaker	35 mins
3. Certificate ceremony	Certificates of Participation, Certificates of Success	40 mins
4. Course evaluation	Course evaluation for each participant, pencils	10 mins
5. Final remarks	Notebooks	5 mins
6. Interactive hand hygiene demonstration	Bucket of water, soap	10 mins

Activity 1: Introduction

Aim of activity: To begin the session and establish group expectations.

Time: 20 minutes

Materials: Sign in sheet, tape, group expectations, marker, small bin or box

Directions for facilitators:

1) Sign participants in.
2) If any community members are present, welcome them and explain the project that participants have been a part of.
3) Explain basic group expectations that are listed on a poster paper displayed at the front of the room to any new comers in the group. Ask the group if anyone wants to make any changes to the rules and Remind the group that rules can be added or changed throughout the duration of the project.

4) Answer any questions that were left in the anonymous bin.

Activity 2: Hand hygiene and cholera prevention filming screening

Aim of activity: To present the participants' hand hygiene and cholera prevention videos and encourage information dissemination.

Time: 35 minutes

Materials: Projector, speaker

Directions for facilitators:

1) Introduce and play the first film that will be presented as well as the participants who created the film.
2) Introduce and play the second film that will be presented as well as the participants who created the film.
3) Ask the group to remain seated for the certificate ceremony.

Activity 3: Certificate ceremony

Aim of activity: To recognize participants for their attendance and participation during the project.

Time: 40 minutes

Materials: Certificates of Participation, Certificates of Success

Directions for facilitators:

1) Introduce the activity. Say: *Now we will recognize participants for their attendance and participation during the hand hygiene education project with Certificates of Success and Certificates of Participation.*
2) Call on participants who received the Certificate of Success one at a time and invite them to approach the front of the room. Hand each participant a certificate and ask the participant to return to his or her seat.

3) Call on participants who received the Certificate of Participation one at a time and invite them to approach the front of the room. Hand each participant a certificate and ask the participant to return to his or her seat.
4) Thank the participants again for their participation and attendance during the program.
5) Invite community members to leave. Ask participants to stay in their seats.

Activity 4: Course evaluation

Aim of activity: To evaluate the course and the facilitators.

Time: 10 minutes

Materials: Course evaluation, pencils

Directions for facilitators:

1) Hand out a course evaluation and a pencil to each participant.
2) Read instructions for the course evaluation to the group.
3) Ask participants to raise their hands if there are any questions about the course evaluation.
4) Collect the course evaluation after ten minutes.

Activity 5: Final remarks

Aim of activity: To close out the hand hygiene education project.

Time: 5 minutes

Materials: Notebooks

Directions for facilitators:

1) Thank participants for their participation in the project and the hard work they put into creating the videos.
2) Ask participants if there are any final questions or comments about the project
3) Return notebooks to participants.

Activity 6: Interactive hand hygiene demonstration

Aim of activity: To demonstrate and invite participants to practice proper hand hygiene.

Time: 10 minutes

Materials: Bucket, water, soap

Directions for facilitators:

1) If any community members are present, explain that the group will participate in an interactive hand hygiene demonstration.
2) Ask the group to form a line and take turns washing their hands for 20 seconds with soap and water.
3) Remind participants to let their hands airdry or use a clean paper towel or cloth, if available.
4) End of module. Thank participants for their attendance and participation in the project.

References

Global Health Media Project, & Goodman, Y. (Writers). (2012). The Story of Cholera: Haitian Creole. YouTube.

Partners In Health (Producer). (2013). Maladi Dyare: Fòmasyon Ajan Kominote. *Household Development Agent Training Curriculum*. [Microsoft PowerPoint Slide Presentation]

University of Illinois at Urbana-Champaign (Writer) & D. o. Entomology (Director). (2011). Cholera Prevention (Haitian Creole), *Scientific Animations without Borders*. YouTube.

WeAdvancedHaiti. (2014). Lave Men Ou Wash Your Hands, A Musical Health Education Video in Haitian Creole. *Better Health for Haiti*. YouTube.

WorldW888 (Writer). (2010). Hand Washing Song. YouTube.

Appendix D: Pre- and Post-Test

Name: _____Date: _____

Test: Hand Hygiene

1. When should you wash your hands?
    a. After using the toilet
    b. Before you eat or prepare food
    c. After caring for someone who is sick
    d. All of the above
2. What do you need to wash your hands?
    a. Only clean water
    b. Clean water and soap
    c. You don't need to wash your hands
3. How many seconds should you take to wash your hands?
    a. 5 seconds
    b. 10 seconds
    c. 15 seconds
    d. 20 seconds
4. Germs can be spread through liquid, dirty hands, flies and touching dirt.
    a. True
    b. False
5. All bacteria are dangerous.
    a. True
    b. False
6. Cholera is a virus.
    a. True
    b. False
7. Antibiotics can cure you if you have a virus.
    a. True
    b. False
8. How can you protect yourself against bacteria and viruses?
    a. Drink juice or tea
    b. Watch the World Cup with your friends
    c. Wash your hands with soap and water
    d. Take medicine
9. It's easy to see microbes.
    a. True
    b. False
10. People can become infected with a bacterium or a virus from food and water that they consume.
    a. True
    b. False
11. You can use oral rehydration solution for dehydration.
    a. True
    b. False
12. What do you need to make oral rehydration solution at home?
    a. Sugar + water + soda
    b. Salt + water
    c. Sugar + salt + soda
    d. Sugar + salt + water

Appendix E. Course Evaluation

Question number	Instructions	Question	Response
1.	Enter value	From a scale of 1-10, 1 being "not good at all" and 10 being "very good," how would you grade this course.	Score: ____
2.	Circle response	The objectives for this course were clear.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
3.	Circle response	The presentation of the education materials was clear.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
4.	Circle response	The activities were appropriate for the level of the course.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
5.	Circle response	This course kept me interested in this subject.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
6.	Circle response	This course met my expectations.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
7.	Enter value	From a scale of 1-5, 1 being "not good at all" and 10 being "very good,"	Score: ____

		how would you grade the instructors.	
8.	Circle response	The instructors were knowledgeable of the subject.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
9.	Circle response	The instructors were efficient in teaching the contents of this course.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
10.	Circle response	The instructors encouraged feedback during the course.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
11.	Circle response	The instructors showed genuine concern for the participants.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
12.	Circle response	The instructors showed excitement while teaching the content of this course.	Strongly Agree----------1 Agree----------2 Neither agree nor disagree--3 Disagree----------4 Strongly Disagree----------5 Unknown----------9 Refused----------0
13.	Enter value	From a scale of 1-5, 1 being "Not at all," and 5 being "Definitely," how would you recommend this course to others?	Score: _____

14.	Enter response	Please write any comments or suggestions that could help us improve the course.	Comment: