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Successful Community Rally against Cholera based on literature review

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Abstract

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Year 2015 Pages 85

In January 2010, an earthquake of the 7.3 magnitude damaged the Republic of Haiti and caused much damage to the urban areas of Haiti, casuality death tolls were around 220,000 and injured about 300,000. Efforts to rebuild the country started immediately and it was led by the United Nations. In october of the same year, the country then fragile health care system and poor infrastructure got another blow, this time in the form of an outbreak of Vibrio Cholerae. This disease is not known to the people of Haiti, therefore in a matter of days the disease had spread like wildfire causing more deaths in the poor impoverishment nation that was struggling to recover from a terrible earthquake. A quick massive campaign of education and awareness was done in order to control a disease from spreading throughout the country but due to poor infrastructure where safe drinking water and basic sanitation is concerned, there was not enough ground for stopping transmission especially in the densely areas such as the makeshift camps or in the rural areas. Treatment centers were opened to treat the infected people along with continuing education by the community health workers; these have been most effective in avoiding more casualities related to cholera. In April 2012, the Schanchol vaccine was introducted in Haiti as an integrated part of the disease control and prevention. After the introduction of the vaccine, there has been improvement in the case fatality rate from 8 562 deaths in 2011 to 16 in 2014. However, cholera infection is still present in the island due to the heavy rains and storms along with flooding that the country experiences every year.

The purpose of the study was to identify an educational material that is suitable for the people of Haiti, especially those living in the rural areas. A material that will motivate them in changing their previous health behavior towards a better one, in order to sustain a safe hygienic practice to keep at bay the risk of cholera transmission.

This research study was executed by using qualitative methodology in an integrated literature review style consentrating on articles of cholera prevention along with health education. Inductive content analysis was used to analyse the data. In doing so, we wanted to find the themes that were most relevant to our study.

Five years after the outbreak, cholera is still a health burden risk in Haiti. The Schanchol vaccine that was introduced in the country in 2012 as an integrated tool of prevention offers protection for only 2 years. The problems of water, sanitation and hygiene in Haiti will take many years to solve, which is why the community has to get involved into whatever project that can affect their well being. Without local interest and commitment, it might prove to be futile to any humanitarian endeavors to eradicate cholera from the country.

Keywords: Haiti, cholera, prevention, water, sanitation, hygiene, health education, awareness.

Laurea-ammattikorkeakoulu **Tiivistelmä**
Laurea Otaniemi
Terveydenedistämisen koulutusohjelma

Serette Kesola & Johanna Wahlberg

Menestyksekäs yhteisö kamppania koleraa vastaan

Vuosi 2015 Sivumäärä 85

Tammikuussa 2010, Haitin tasavaltaa kohtais 7,3 richterin laajuinen maanjäristys aiheuttaen paljon tuhoja kaupunkialueilla. Kuolonuhreja oli noin 220 000 ja vahingoittuneita noin 300 000. Maan jälleenrakentaminen alkoi välittömästi, ja tapahtumia johti Yhdistyneet Kansakunnat. Monet humanitaariset järjestöt lensivät auttaamaan avustustarpeineen pelastaakseen maanjäristyksen uhreja. Lokakuussa samana vuonna maa joka kamppaili valmiiksi hauraan terveydenhuolto järjestelmän ja heikon infrastruktuurin kanssa, koki toisen iskun joka tällä kertaa tuli koleran puhkeamisen muodossa. Tämä tauti ei ollut ennestään tuttu haitilaisille, jonka vuoksi tauti levisi kulovalkean lailla aiheuttaen lisää kuolonuhreja heikkon ja köyhtyneen kansakunnan keskelle, joka edelleen kamppaili selviytyäkseen kauhistuttavasta maanjäristyksestä.
Valtavan laajuisia opetus- ja tietoisuuskampanjoita järjestettiin pikaisesti estämään taudin leviäminen maanlaajuisesti. Heikon infrastruktuurin johdosta, jossa puhdas vesi ja perus viemäröinti ovat huolenaiheena, ei kyetty tekemään tarpeeksi estääkseen taudin tarttumista ihmisestä toiseen, varsinkaan tiheästi asutuilla alueilla tai maalla. Hoitokeskuksia avattiin tartunnansaaneille hoidon turvaamiseksi, sekä tietoisuuskampanjan jatkamiseksi terveydenhoitajien avuin. Tämän todettiin toimivan tehoikkaanpana keinona välttää kolerauhrien lisääntyminen.

Muutama kuukausi myöhemmin Schanchol-rokote otettiin käyttöön Haitilla integroituna osana taudin kontrolloimista sekä estämistä. Pikaisten toimenpiteiden aikaansaamana Haitin terveysministeriö sekä muut humanitaarisen avun tuottajat, ovat saaneet kolera kuolleisuuden lukemat laskuun, vuonna 2011 koleraan kuoli 8 562 ihmistä ja vuonna 2014 enään 16. Kolera infektion vaara kuitenkin säilyy saarella, rankkojen sateiden ja myrskyjen synnyttämien tulvien vuoksi joita maa kohtaa vuosittain.

Opinnäytetyön tarkoituksena oli tunnistaa opestusmateriaalia, joka sopii Haitilaisille, varsinkin niille jotka elävät maalla. Materiaalin tulisi motivoida aikaisempien terveys käsitteiden muuttamisen paremmiksi, joilla pystyttäisiin ylläpitämään turvallisia hygienia taitoja ja näin estämään koleran leviäminen.

Metodina käytettiin laadullista kirjallisuuskatsaus menetelmää, jossa integroitiin koleran estäminen sekä terveys kasvatus. Käytimme sisällön analyysiin induktiivista arviota, täten haluttiin löytää tutkimuskysymyksille relevantteja vastauksia.

Viisi vuotta koleran puhkeamisen ja valtavien tietoisuuskampanjoiden jälkeenkin voidaan huomata että kolera on yhä terveysriski Haitilla. Rokotuksen vaikutus, joka tuotiin maahan estämään koleran leviäminen, kestää vain noin 2 vuotta. Haitin vesi, sanitaatio ja hygienia ongelmien ratkaiseminen kestää vuosia, jonka vuoksi yhteisön tulee olla mukana projekteissa jotka käsittävät heidän hyvinvointiaan. Ilman paikallisten kiinnostusta ja sitoumusta mitkä tahansa humanitaariset pyrkimykset hävittää kolera maasta saattavat olla tuloksettomia.

Avainsanat: Haiti, kolera, ennaltaehkäisy, vesi, viemäröinti, hygienia, terveys, kasvatus, tietoisuus.

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1 Introduction

Haiti as a name means ”Land of Mountains”, which was given by Taino Indians who inhabited the island prior European colonization. Hispaniola is the second largest island in the Caribbean, the island is divided into two parts; three quarters of the island belonging to the Dominican Republic, and one quarter to the Republic of Haiti. The neighbouring islands are Cuba, Jamaica and Puerto Rico. (Schwartz 2015; Jacobson 2003.)

Girault (2014) has estimated that the country has about 10.4 million inhabitants. Around 95% of its population is black and 5% mulattos and white. The largest city which is also the capital is Port-au-Prince has seen in recent years many migrations from the countryside or the rural areas of people in search of better life or hoping to find work. However, nearly half of its population still live in the rural areas. Language spoken mostly is Haitian Creole (creyol), which was changed to be the primary official language in 1987 from French, which stayed as a secondary official language. French is however considered to be the language for the elitist, a reason why only about 5-10% of the population can speak French fluently, which why it is seen as a sign of the social class difference. English has however started to replace French due to extensive emigration to United States and availability of cable televisions. (Schwartz 2015; Jacobson 2003.)

The government of Haiti is Parliamentary Republic. Nonetheless, the history of Haiti as a nation has been brutal and bloody. The island was originally inhabited by Taino Indians, however when the European colonialists (France, Spain and England) came and struggled to control different parts of the island, the Taino Indians were wiped out of the island within just few decades through harsh labours, slaughters and diseases. This genocide meant that the colonialists did not have labour forces left to gather the wanted resources, which is why they needed to import slaves from the western part of the Africa. The slaves were from various tribes and ended up forming the African population in Haiti. For over a hundred years the French had been enjoying the slave trade until the slaves decided to revolt against their masters due to harsh working conditions and treatments. The rebellion battle started with the help of a slave leader named Toussaint L’Ouverture who was later captured by the French and imprisoned in France where he died. However, his followers did not give up on the revolution to free themselves. In November 1791 the final battle inquest for independence took place in the North of Haiti and was led by Jean Jacques Dessalines who defeated the Great Napoleon’s army. After the battle was won, the slaves forced their masters out of the country. Haiti proclaimed its independence from the European masters on the 1st of January 1804 which makes it the first black nation to gain independence in Latin America. (Schwartz 2015; Jacobson 2003).

Haiti is subtropical island with mild climate that varies with altitude. It has a total land area of 27750 km2, only 190 km2 is water constituting about 0.7%. Its mountains are more calcareous than volcanic and accommodate widely varying climate and soil condition. Due to tectonic fault line that runs through the country there are occasional and at times very devastating earthquakes. Once Columbus found Haiti in the 1492, the subtropical island was stunningly beautiful with rich natural resources and lush forested mountains. In 1697 the French colony profited from sugar and coffee industries and became very wealthy fast (WHO 2015b).

Nowadays, Haiti is the poorest country in the Americas as well as one of the poorest in the world (The World Bank). Nearly all of its trees have been cut to make charcoal, which has lead plenty of the land unharvestable due to erosion that the deforestation has caused. Fishing has also been affected due to the runoffs to the rivers. The poor farmers worsen the situation by harvesting more trees in order to make money. It has been predicted that the environmental condition continues to deteriorate. (Jacobson, 2003.) The country lies in the hurricane belt and is subject to severe storms from June to October, occasional flooding and earthquakes as well as, periodic droughts. Haiti was hit by four hurricanes between August and September of 2009, which heavily impacted infrastructure, health and general economic production (IMF 2009).

In January 12th, 2010 the Republic of Haiti was devastated by one of the most powerful earthquake in 200 years with a magnitude of 7.3. According to the government of Haiti, an estimated 220, 000 lost their lives and 300,000 were injured. Following the earthquake about 1.5 million people were subjected to living in tents, exposed to all odds and without access to basic social services. The earthquake intensely weakened the already frailed health care system in the country. Many hospitals, clinics and health centres were destroyed not to mention the loss of medical professionals. Health problems are expected to exacerbate. (Pape et al. 2010.)

The earthquake has affected all works of life regardless of socio economic standards. The most vulnerable groups, who have not been able to recover from the earthquake, are those who have been living in the slums or in areas where houses were poorly built. Many of them have no real jobs and they depend on family from abroad to help in their survival. Therefore, when the earthquake stroked those poorly build houses and apartments collapsed on top of each other killing most of their occupants. Those who survived were quickly moved to makeshift camps for safety on good grounds located in valleys or flat lands. (IOM 2013.)

International organization of Migration (IOM) reported there have been 496 camp tents across the country after the earthquake, three years later, only 150 are left. Some people have moved back to their community and returned to old partly ruined houses, others who have

been renters are not able to do so because of the high rent prices. The article also refers to those people who have remained in the camp sites fear eviction because, the tents are being pitched on private properties; some are reluctant to go out to look for work for fear of when returning they would have no place to live (Quigley & Ramanauskas 2013).

An article published in The New York Times by Sontag (2012) reported a story about the cholera outbreak. In October 2010 in Meille, a small town in the Western side of Haiti, a few people complained of stomach problems resulting in vomiting and diarrhea. Many of the first affected people lost their lives due to dehydration and improper treatments. The disease was unknown for the people who were first infected, and thus was not reported until it had spread widely, and then it became noticeable that people from a certain area in the country suffering from vomiting and diarrhea, and the first affected have lost their lives. Upon investigations, it was found that it was the cholera bacteria. Further investigations revealed that those who were using water from a certain river source were the first casualties. Few weeks later, laboratory analysis revealed that the victims were infected with the Vibrio cholerae. The source of the disease was found in the Artibonite River where human waste from a dumping site had flown into river and infected the water. This river has been for over many generations the main source of water for daily purpose for the inhabitants of the region. Since the first death in October 2010, cholera has killed more than 7000 people and sickened over half a million, roughly 5% of the population In October 2012, hurricane Sandy struck the country, again affecting the millions of people still recovering from the 2010 earthquake (UNOCHA 2012).

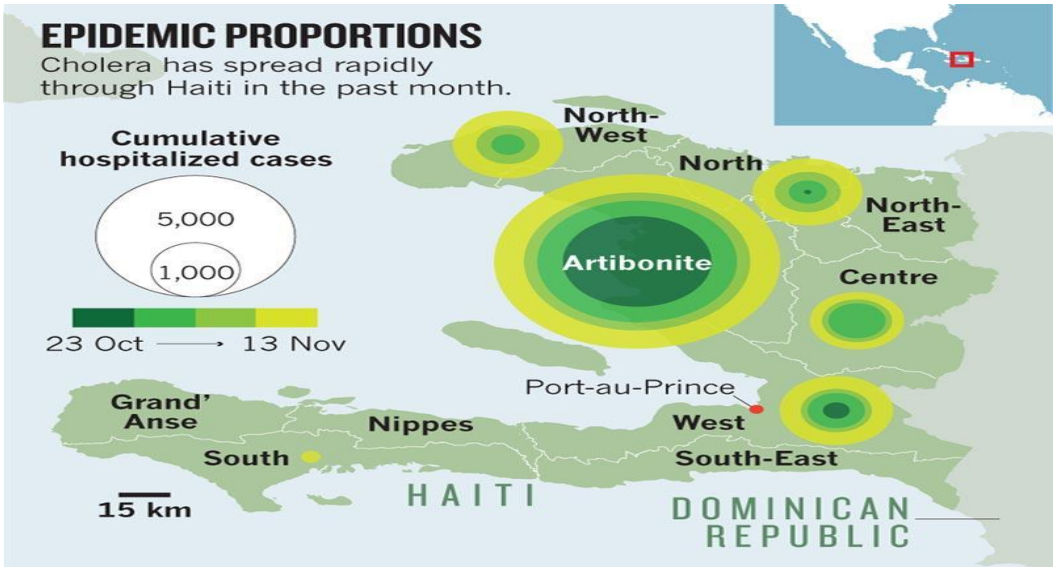

Illustration 1: Map of Cholera spread
(nature International weekly Journal of Science, 2010)

An article in The New York Times by Sontag (2012) stated that even two years after the cholera outbreak, many residents in the small village of Meille were still using the river as their source for daily use such as bathing, washing of clothes, brushing of teeth as well as defecation on the bank of the river, but they use a nearby well for drinking water. One of the resident interviewed reported that since the free supply of purifying water tablets had ran out he was not able to afford them anymore, therefore he has to take the risk of getting back to routine and use the river the same as before. He also stated that if he gets cholera and makes it the health center on time, he will survive. This is to say that even with all the teaching and the propaganda around the danger of cholera where proper use of drinkable water and sanitation is concerned many people are still unable to figure out their roles in getting rid of the illness in the island. According to Henderson chief of the water and sanitation program in Haiti " Without good sanitation, even if you improve the problem of drinking water, you aren't going to see the beneficial effects, it all has to come together" (PBS News 2010).

Illustration 2: Drain of dirty water leading into the sea
(Katz 2010)

2 Successful Community Rally against Cholera

2.1 Cholera

Cholera is a bacterium called *Vibrio Cholerae* that contaminates food and water causing acute diarrhoeal infection; it however does not usually get transmitted from person to person. Its incubation period is very short ranging from two hours to five days. A bacterium in the intestines releases toxins causing heavy but painless watery diarrhoea and vomiting, which requires instant treatment in case of severe diarrhoea or even possible death. Children as well as adults are prone to cholera and it can be fatal in just few hours. 80% to 90% of the infectious cases are mild or moderate and clinically difficult to differentiate from other types of acute diarrhoea. The remaining less than 20% of the acute diarrhoea cases are causing moderate to severe dehydration. Greatest risk of death if infected is with people who have some sort of immune deficiency. (WHO 2015a.)

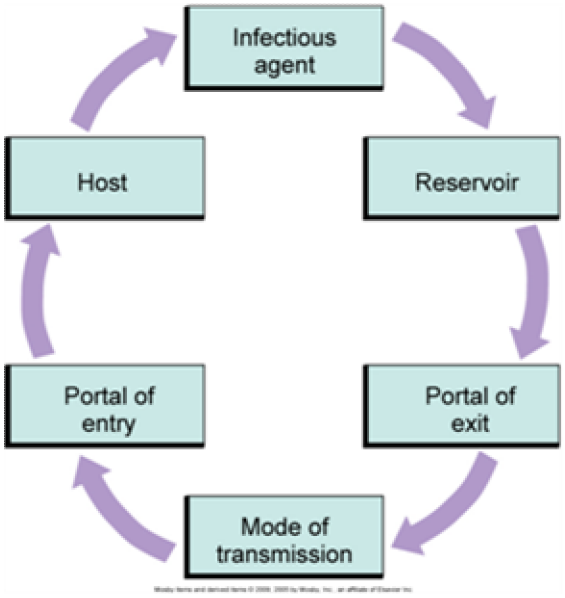

Figure 1: Chain of infection
(Cleaver 2014)

It has been speculated that by some unfortunate accident the Cholera bacterium was brought to Haiti by the Nepalese Battalion who was part of the United Nations peacekeepers 'force who came to Haiti in order to help with the aftermath of the earthquake. Due to Haiti fragile infrastructure, the country was very prominent recipient for the Vibrio Cholerae that shared the same characteristic strains as the one found in Nepal (Knox 2012). There is clearly two

serogroups of V. Cholerae; O1 and O139, causing epidemic outbreaks. Serogroup O139 is located mainly in Asia. Also new types of strains have been found from Africa and Asia that are more potent in causing higher fatality rate. People and water sources like estuaries are the worst carriers of cholera bacterium; algal blooms have been linked to it as well but the outbreaks have not been considered to originate from dead bodies. Global warming has been found to enhance the growth of the bacteria. (WHO 2014.)

In 2013 WHO received 129 064 reported cases of cholera from 47 countries in total. The actual reality of the cases is feared to be much higher. Prior to the earthquake in Haiti in 2010 93% to 98% of the reported cases came from Africa. Due to the earthquake also Dominican Republic was greatly affected therefore in 2013 only 43% of the reports were now coming from Africa and around 47% from the Americas. 58 809 reports came from Haiti alone in 2013. The estimated reality of the cholera cases are believed to be anywhere between 1.4 to 4.3 million and deaths around 28 000 to 142 000 per year in the world. Reasons behind a substantial difference to the actual numbers of the cases being under or over reported are incoherent definitions in cases, lack of capacity for laboratory tests and limited systems for monitoring. Also the fear of negatively impacting the economy will drastically reduce the amount of reports that are actually notified. As seen cholera is still a major public health problem. (WHO 2015c.)

2.2 Problems in cholera prevention

The reason it is such a big problem to follow the guidelines of sanitation and hygiene teaching done before, is that the literacy rates in Haiti are about 60% among 15 years and older, hence the other 40% having challenges with reading well, so when presented with some sort of a written material, it would be a problem for them to apply the message in a given situation. Another problem lies in the fact that 70% of rural households are considered chronically poor. In the rural areas only 11% have access to electricity; these folks live on less than $2/ day (The World bank 2014a). Mobile telephones are widely spread in all part of the country; 75% owns a mobile phone up to 2013 (Heinrich 2013). For the rural area folks, those phones are mostly used as ways to communicate with family and friends from both home and abroad. Even though mobile technology is wide spread through the rural area of Haiti, the physical infrastructures such as water, sanitation and proper road access remain minimal or non-existent.

Extreme poverty has declined in overall in the country from 31% to 24% between 2000-2012 due urban developments. However, the number of poverty in the rural areas remains the same. It also means that urban development has not had a big impact on the rural areas. Liv-

ing conditions in the capital city has improved while the rural areas remain unchanged (The World Bank 2014b).

After the earthquake, many humanitarian relief agencies, along Non-profit organizations flew in to bring their help and support in aid to the victims, which is very good. At the beginning the aids that were received were of vital needs to the catastrophic areas. Pre- 2010 earthquake, Haiti has been a country with many problems with poor sanitation and hygiene is concern. Out of the relief aid 99% went for humanitarian agencies, NGO's and private contractors and other non state service providers, which means that 1% of the humanitarian relief aid went to the public institution or Government. Only 23% of long term recovery funding was allocated to the Haiti Government. The number of NGO's operating in Haiti is estimated to be between 343 to 20,000 which is why Haiti is called the Republic of NGO's (Ramachandran & Walz 2012).

Haiti has received in total 9 billion USD for humanitarian aids for relief after the earthquake in January 2010. Out of the 9 billion, 3 billion came from private individuals and corporations, and 6 billion from bilateral multilateral donors. Dr. Paul Farmer a researcher on tropical Diseases wondered why less than 10% out the 6 billion were allocated to the Haitian Government and less than one percent to the local government. He also pointed out the manner in which the aid funds are used is as important as how much is spent, because 3 years after the earthquake 80%of Haitians still live under the poverty line (Rogers 2013). A spokesman for the Medecins Sans Frontiérs in Haiti stated in an interview with a Channel4news reporter Gilmore (2014) that MSF is the only organization left looking after the cholera patients in some parts of the country, everyone else including the Ministry of Health in Haiti are not engaged anymore in the fight against cholera and that is absolutely unacceptable.

The health system in Haiti is still weak in terms of providing good care for its population, there has been about 2000 people with symptoms of cholera in mid October of 2014 and there have not been enough beds available in the hospital to accommodate them. Haiti is still in need of funding for its health care system. Four years on after the epidemic of cholera, the improvement in the water and sanitation system are not substantial enough for the whole population. Almost 100 patients are arriving every day in one of the Doctors without borders emergency center for treatment. MSF reported 5,600 new cases of cholera in 2014 and the healthcare system has not had enough resources to deal with those cases (Medecins sans Frontiéres- Doctors without borders 2014a).

2.3 Life after the earthquake

2.3.1 Water, sanitation and hygiene in Haiti

Long before the Earthquake in 2010, Haiti had suffered from lack of safe water and basic sanitation. Pan American Health Organization (2012) reported only 63% of the population had access to safe drinking water before the earthquake in 2010. In the urban area of Haiti, there is a weak water system; therefore direct water distribution from pipes into the household was poor or non-existent. For the urban folks when water is scarce, they would have to buy from one of the many water truck vendors who will The vendors gets its water pumped directly from a water source outside of the city which is not purified and most of the time people will drink the water without treating it. Those with available cash will buy distilled water from the supermarkets for drinking purpose and buy water from local mobile trucks for other household purposes. Some households have access to their own pipe water on compound, but mostly drinkable water is provided by the various distilled water companies. While the rural areas folks would get their water from improved water supply sources such as local fountains or communal water supply, those in the far remote villages use rivers, unprotected wells or springs to get water, which can become a health related hazard. After the earthquake and the cholera outbreak in 2010, the United Nations body and other entities have drilled several new wells across the country to help improve the water system in the cities and in cholera crisis areas and communities. Chlorine tablets have been distributed in some areas along with sensitization through various media and community awareness (UN fact sheet 2013). Due to fact that there is still poor drinking water, and sanitation problems in the island, the population is always at risk of catching a waterborne disease which is associated to bad hygiene habits (Medecins Sans Frontiéres 2014b) have used mobile technologies in some populated part of Haiti to help monitor the quality of the water coming from the newly improved facilities or wells in order to keep Haiti's water cholera free.

2.3.2 Solid waste disposal

Haiti has a population of 10 million people 52% of the population lives in the urban area, therefore making the collection of trash burdensome for a fragile economy (CIA facts book 2010). There are only two bodies collecting the solid waste in Haiti: one that is done by the local government in the rural areas and the second by the Ministry of Public Work, Transport and Communication (SMCRS). The later body collects only a fraction of the waste disposal due to limited resources available for the collection of all the garbage that is being thrown on the street. There are no recycling programs for any of the waste to be recycled in the country, however there are a few recycling centers that recycle bottles and exchange recyclable materials for money (Prospére 2014).

2.3.3 Excreta disposal

Pre earthquake 26% had accessed to adequate sanitation facilities, after the earthquake it has decreased to 17% (Thrane 2013). In the Post earthquake 52% of the people lived in the internal displaced people (IDP) makeshift camps, use the temporary latrines provided by the NGO's; 33% used latrines in the damaged earthquake buildings; while 12% use plastic bags as sanitation coping mechanism, and those bags with the defecation are being thrown on the road sides, in trenches or any other unsuitable place making it a public health concern for the population (OXFAM 2010). After the earthquake, OXFAM has conducted a research trial on the introduction of a Peepoo bag that could be used in the camps or in the household as a defecation mechanism. The Peepoo bags were then collected and carried out to a place outside the city, where the excreta was being composted for agricultural purposes. The conducted trial has received favorable responses because the bags are easy to use and since in Haiti defecating in a bag is not strange to many of them, therefore it did not pose a big problem. Furthermore the peepoo bags cuts the traditional link between water and sanitation problems, especially in places where water is scares. The Peepoo bags can only be used as a temporary solution in an Emergency situation, until proper latrines are installed. OXFAM has tried to come up with many solutions to the sanitation problems in Haiti. As a last resort, composting toilets have been introduced in the makeshift camps, the toilets have two cavities which isolate pee from poo and the waste was used for compost as well just like the Peepoo bags. These toilets have known to have a great success in the Philippines; therefore teaching Haitians the proper way to use these toilets might be a bit challenging at first but could be a good solution in the long run.

2.3.4 Treatment plans

Residents of rural areas are very much aware of the disease but they are helpless where proper drinking water and sanitation is concerned. In the beginning Oral Rehydration Salts along with bar of soaps, water purifying tablets have been freely distributed to the population as a means of helping to control the spreading of the disease. In 2011 WHO reported that 100 tons of medical supplies have been distributed to all 10 departments through PROMESS, WFP and MSPP through action of the Mobile Clinic sub clusters since the outbreak in November 2010. When the free supply has been exhausted, the rural area residents find it difficult to buy them from the local markets due to lack of cash, they now get back to their normal way of living despite knowing that they are at risk of getting infected if proper care is not taken. In April 2012, the Oral Cholera Vaccine (OCV) generic name Schanchol was introduced as part of the treatment against cholera in the island. This vaccine which has known to have

success in India and Bangladesh in recent years was waiting for approval by the WHO but was considered to be one of the best solution for the cholera crisis in Haiti. Dr Jon Andrus, Deputy Director of the Pan American Organization stated that the vaccine provides only 60-70% protection which begins after the second dose of administration between 7-10 days (Knox 2013). The vaccine protection last two years before another dose is needed and the vaccine has been administered to those who have been severely affected. For the people who have not received the vaccine as yet, there are still risks of infection occurrence if they have not adopted the basic principle of hygiene. Due to the torrential storms that the island experiences every year, there are always possibilities for new cases of cholera to develop. Vaccination is a partial solution if the problem of proper hygiene is not addressed.

2.3.5 Reaching the rural area folks

Medical staff are finding difficult to cope with the situation in the rural and remote areas because of insufficient supports. All the campaigns against cholera can easily reach the folks living in the cities and make a difference in reducing the number of cholera cases because of constant media diffusion and reminders via posters and banners across the cities and small towns. In the rural areas there is a greater number of low-literacy rate therefore folks are likely to forget what they have seen in posters since there are no television available as a constant reminder. The people living in the rural areas need something that would trigger their minds, to change their attitudes towards hygiene and sanitation in order to fight against the disease, even though 17% of the population have access to proper sanitation in Haiti (Thrane 2013) the fact remains that rural area folks need to learn to use whatever resources are available to them to help themselves and their community. A Survey done in 2012 in some communities not far from the first reported cases of cholera showed that there has been an increase in the knowledge of the water borne disease transmission and preventive measures as well as knowledge about water treatment. In fact the survey was primarily done in order to analyze how effective the Oral Cholera Vaccine (OCV) has been in some communities especially when associated with educational and motivational materials related to water borne illnesses. The researchers used the Knowledge, Attitudes and Practices as tool of measurement (KAP) in their survey in order to assess the residents exciting knowledge and practices associated with the disease (Teng et al. 2013). The results have proven that once the people in the rural communities could get access to the soaps and the water treatment tablets, the knowledge, attitudes and good practices of hygiene where applied, but it seems that when the supplies ran out the new and improved learning patterns are forgotten therefore all good education received on cholera prevention became futile. Socio-economical factors pose a threat to good hygiene practices or water treatment. Another threat is that when it rains, even if one can afford to have latrines, those latrines can be overflowding and people in the rural areas may resort to defecate in the open which is another risk for disease transmission.

The administration of vaccine is effective as long as the safe hygiene practice is consistent along with access safe drinking water. The community action plan is needed in order to raise consciousness of the people in remote areas, as well as those who have been living close proximity of the Artibonite Valley and use the river on a daily basis.

2.3.6 The training of a community health care nurse

Few weeks after the first reported death cases of cholera in the island the Center for Disease Control (CDC) along with the Ministére de la Santé Publique et Population (MSPP) in Haiti launched a trainer-training program which trained about 550 people by December 2010 and those trainers were in turn to train Community health workers who were in total 1100. The CDC and the MSPP has done the training trainers program in order to have work force to dispatch throughout the island and be cholera educators in each community and raise awareness. The training has provided good educational background on cholera; its treatments; its prevention and how to educate members of the community to practice selfcare. Trainers were provided with materials in French and in Creole such as teaching cards and low literacy posters that would easily attract attention and for the use of community outreach education. The cards provide information about the Oral Rehydration Salts, safe hygiene and drinkable water, how to care for the sick at home, how to prevent stigma attached to the disease and what to do and not to do for burial ceremony (Rajasingham et al. 2011).

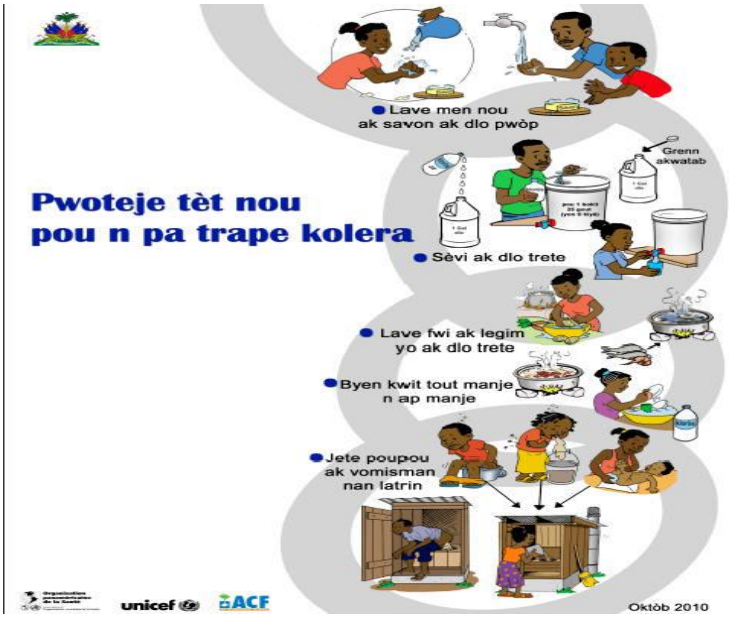

Illustration 3: Cholera prevention health care material
(Help Haiti Heal 2010)

Since the outbreak, the Ministry of Public Health and Population (MSPP) in collaboration with the WHO/PAHO has opened 29 different centers, 167 units and 766 oral rehydration posts throughout the country to handle cholera cases (WHO 2011). Daily statistics of reported cases of cholera are collected to help controlling the disease. Despite the efforts to control the disease and restrain it from infecting neighboring communities, the disease has rapidly flared and has spread throughout the whole country, making it one of the worst cholera epidemics in the world. In December 2011, the WHO reported that there has been a decrease in cholera cases in some departmental levels, but in the North West region such as the Nipples, the situation can be described as unstable with small peaks.

Cholera treatment centers were open as well as Oral Rehydration Post in every department across the island. The MSPP had launched massive broadcasts on the televisions as well as banners and posters across the cities and villages promoting safe guidelines against Cholera. Even though all these methods were put into force but that has not been sufficient enough to keep the disease away. Yes, the records have showed that there has been decline in the case fatality rate in January 2011 by 1% (Tappero & Tauxe 2011). It has also proven difficult for the Community Health Workers to reach people living in the remote parts of the rural areas due to poor road conditions. Many of the CTC/CTU (cholera treatment center or unit) and the ORP (oral rehydration post) are closing down due to lack of funds and many NGO's are leaving to take care of other catastrophic places in the world. Now the question remains, how do the community retains the teaching techniques that they have learnt in order to avoid reoccurring of cholera epidemic in their community or even in the country in other words sustainability of cholera education.

2.4 Looking into future changes

2.4.1 Cultural influences & empowerment

Individual's values and behaviours are influenced not only by psychological characteristics, genetic profile, gender stereotypes, age, social constrains but also cultural background. Hofstede points out that culture is not part of our genetic structure, but a learnt behaviour. Most intensive learning happens during the early years of life; by the age of five one has mastered the use of their language. One has the skills to interact with family members and for example negotiate what one wants. At that point one changes learnt behaviour according to their cultural group. (Mead & Andrews 2010, 7&10.)

Family is usually the first one to influence and introduce their learnt culture to a child. However, it is considered that friends and life outside the home is more influential to a child's behaviour than what comes from within the home environment. The learning that happens

during the early years of life is unconscious; one is not being aware of the cultural traits and values that are soon becoming like a second nature to them and extensively impacting their future behaviour in life. This is a reason why cultural traits are extremely deep-rooted. (Mead & Andrews 2010, 11.)

Initially community signifies the natural union of people that they could depend on each other in order to get through the daily challenges. Previously, it was considered for the community to have an authority over its member's lives. However along with modern society, the meaning of a care community has diminished or changed since the schools, healthcare systems, companies, etc. have taken their parts in the traditional functions of the care community. On an individual level, the meaning of a community however has not diminished. Individuals still needs the respect of the community in order to experience the meanings of life. Along with modern society, the person as an individual holds on to their rights, but is still strongly looking for kinship. In order to fully understand the basis of an individuals' decision making we need to take a deeper look into their background, to see the reasons for their actions. (Kopakkala 2008, 31.)

Despite different expectations of our surroundings, we want to decide of our lives for ourselves. People want to lead their lives from within, which however might be problematic due to the fact that we are an entity of incoherent circumstances. Our minds hold experiences that have become a custom during distinct age stages. At the end, we are a combination of a genetical structure and our lives important individuals' interaction. We have internalized various individuals' attitudes and ways of reaction, still everyone experiences intuitively to be totally something else (Kopakkala 2008, 19). Rural areas folks have been depending on their own surrounding and environment to carry them or to provide for them such as fresh water or to make their livelihood. Therefore they have been feeling safe and comfortable with the same surrounding that they have known for years, how you tell them to change their ways. We have to also look at the cultural factors which is very important for folks living in remote areas, even though the introduction of mobile phones are widely accepted but other changes can be received with resistance. We also have to take into consideration the readiness of the folks to make a change in their lives. It is to show them how beneficial the attitude change can be where treating water and proper hygiene are concerned. As mention earlier, one resident who live on the Bank of the Artibonite river had said, when the free stuff have ran out, he cannot find money to buy what is needed (Sontag 2012).

2.4.2 Sustainability

The essence of the term "sustainability" is used to refer as an action or something that can be maintained over time. In fact that term is used these days in so many contexts (Heinberg

2010). The word sustainability is also used much in environmental issues such as maintain a clean environment. The author further stipulated that the term “sustainable” gained widespread usage after the Bruntland report from the UN world commission on Environment and Development in 1987 where it stipulates that sustainable development that meets the needs of the present generation without compromising the ability for future generations to meet their needs. In other words, we can enjoy what we have now and preserve it for future generation as well. Actually one of the UN Millennium Development Goals for 2015 is goal # 7 which is to “Ensure Environmental Sustainability” (UN 2014). We also find this term in business, research projects and so on, because if a project or a program has been launched and funded for at last 3-5 years, after the initial period, the managers are expecting the program to last or live long until it can achieve the set goals defined in the projects in order to ensure that it was successfully implemented.

What does this term means in association with nursing education or preventive care, it means that any program that is put into place for the benefits of individuals and communities, people should be able to follow it through until it achieves the desired effects. In public health educational nursing program, the patients or clients are expected to continue achieving maximum health benefits for their well beings for a life time (Khan 2000). After teaching has been done, the individual or community is expected to carry on following instructions that were given in order to make the program sustainable or durable to achieve the set goals or targets. An important final step in the life cycle of a program, it is its evaluation which involved assessing new programs and innovations sustainability (Scheirer & Dearing 2011). The research also takes into account several articles that have discussed about developing the capacity of communities to sustain a program focusing on relationships between the researcher in health intervention and the capacity of the community to carry on the interventions.

2.4.3 Awareness

Residents of rural areas are very much aware of the disease but they are helpless where proper drinking water and sanitation is concerned. There are always risks of recurrence of infection even after treatment and with the torrential rains that the island experiences every year, there is always possibility for new cases of cholera to develop. Vaccination is a partial solution if the problem of proper hygiene is not addressed. There is a need to keep on reinforcing the teaching from various propagandas heard from radio stations and seeing visual materials such as posters posted in the community centers. These reminders need to be done in time and place where it is very much convenient to the whole community. Keeping in mind that only few main topics can be taught at any given time for the message to be more effective (US department of justice 2000).

ADKAR which stands for Awareness, Desire, Knowledge, Ability and Reinforcement, is one of the widely used change management models for managing change on an individual level. It is said that a change is successful when the individual has a control over these five keys. (Prosci 2015.)

- Awareness of the need for change

The awareness is already there to be used due to education many NGOs have offered. Since there has been a proof of reduction in mortality in the city area, can the teaching be considered effective? The same effect would be also desired in the rural areas. It would require actual visits to the communities and the residents in the mountains. Educating them about the issue and having interactive communication. Bringing a leaflet to each household, where the information is offered through very simple and clear pictures, due to literacy issues. It is very important that the people are able to communicate in a way that comes natural to them using their mother tongue which is creol.

- Desire to participate and support the change

Making people understand the benefits of the change will help them to take part and support the process. They would not need to be afraid of getting sick by cholera anymore, they would have clean water from the wells and decent toilets that would not be difficult to reach and they could also be eco-friendly and benefit from it by selling the waste to be used as fertilizer. Seeing the opportunities that the change would bring will help to commit to the change.

- Knowledge on how to change

The people would be shown how to build an outhouse, dig a well or take care of compost. Part of the aid funds should be forwarded so that there would be machines available to use and people with expertise to guide, but the actual work labor would come from within the community. This way the community would gain knowledge and experience.

- Ability to implement required skills and behaviors

With the initial help and mastered knowledge they would have acquired all the skills to lead a sustainable life in the community.

- Reinforcement to sustain the change

Not having to worry about getting sick and being able to enjoy fresh water daily are just starting points in being able to live without depending on the foreign aid. The human waste and composting might benefit the whole community by increasing their income and possibly improve the quality of life and help reinforce farming in the rural areas. This will hopefully reinforce to sustain the change as well as perhaps developing it further.

2.4.4 Attitude

One of the goals of the WHO is to eradicate Cholera entirely from the region, but to do so, it will take the will power of each nation that is affected and for that a change in attitude and old thinking is of vital importance. According to Cacioppo et al (1994) attitude change refers to modification of an individual's general evaluative perception of a stimulus or set of stimuli. Therefore, for a change in the behavioral attitude of the communities affected by the disease there should be different programs that will target the different areas in the whole country. Prior to expecting a change in a community's behavior one might need to focus on changing the community's attitude, we need to asses and measure the attitudes before attempting to change them. Our target communities have learnt in the past to defecate over the bank of the rivers or in the woods and that have been acceptable so far and they have never realized that it can someday be a serious health threat. Now to change their attitudes towards a new way of living we need to come up with a plan that constantly will remind them of the danger of poor sanitation. We can motivate them or encourage them to have a change in attitude and for that we need a stimulus. The stimulus can come in form of cash or physical project of building some communal toilets in the communities. In building the toilets, all the people in the community would be invited to come and take part of a project, where the members would acquire knowledge on how to build toilets by themselves so that in the end they would be able to help one another. (Smith & Mackie; Cherry 2015.)

2.4.5 The role of a community health care nurse

The various components of a community public health nurse's roles and responsibilities are as followed: Educator, counselor, clinician, advisor, health monitor statistician, researcher, programmer/planner, change mover, influencer, coordinator of services and community organizer among other among others. Therefore the role of the nurse in the community is very much diverse. The community health care nurse wears many hats for which she should be trained for properly. When disaster or catastrophe strikes, the community is looking up to the nurse for quick action or leadership which they would hope could help them cope with the crisis (Serrano 2013). The community health care nurse has to be one to alert the authorities for any signs of illness that could threaten the lives and well-being of the community and its citizens. The nurse would seek to identify the incumbents of the community and try to help pro-

mote change. She would be a counselor, adviser, and a comforter as well as part of the whole community as a family. The community can look up to the nurse for advocacy in the community where government lacks to pay attention to their pleas; the nurse could be their spoke person where changes are concerned for the betterment and well-being of the members of the community. When disease strikes, she would be the one to gather data and converted into reports that she/he would transmit further to the relevant authorities (Betancur 2013). The nurse should be open to current innovative trends in health care and pass it on to the community that is under their care.

2.4.6 Conclusion of the Successful Community Rally against Cholera theory

Many of the cholera treatment centers or units (CTC/CTU) and the oral rehydration post (ORP) have closed down due to lack of funds and many NGO's have left to take care of other catastrophic places in the world. The number of NGO's who were involved in the fight against cholera in Haiti was 120 and as of December 2013 was reduced to 43 (UN fact sheet 2013). Haiti needs a new kind of approach to help keep into practice the knowledge received about the prevention of the disease in order to avoid reoccurring of cholera epidemic in their community through a sustainable plan.

Even after all the training of trainers in various communities, propagandas along with graphical posters and a sensitization works that has been done yet, there are new infections with the cholera bacterium every year in various parts of the country. A lack of motivation to take care of themselves, could be a hindrance to the educational campaign that have been done in order to keep the disease at bay There has to be a way where the people can make the transition for themselves to change their behaviors without the help of external aids.

3 Purpose of the study

The purpose of our study is to assemble information through integrated literature review, of the key elements of an effective educational health care material for low-literate people living in the rural communities in Haiti.

The research questions:
1. What are the principles of cholera prevention in Haiti based on literature review?
2. What are the key elements for a good educational health care material based on literature review?

4 Methodology

4.1 Integrated literature review

The study was conducted in a qualitative approach by using integrated literature review method. Literature review addresses previously researched topics in order to point out the current state of knowledge. The knowledge is there to guide practice, provide background information to a scientific work, and justify the need of a new research study but most of all to satisfy the intellectual curiosity. Literature review acts as an educator, through that the researcher gets to define and clarify the main problem, collect the prior studies stating the present situation, identify connections, incoherencies, gaps and contraindications as well as propose a plan for how to solve the existing problems. (Torraco 2011; Walker.)

Literature review should be a scattered but straight forward writing of the findings. However, it should not be just a list of summaries of different literatures. It is advised that the information retrieved should be presented by sections pointing out the themes and theories. The aim is to synthesize and evaluate the material found according to the relevance for the research question. Information gathered should be categorized by themes or other similarities in order to acquire consistent results. (Torraco 2011; Walker.)

There are multiple methods to choose from in order to carry out literature reviews for example, meta-analysis, research synthesis, integrative reviews and systematic reviews. The method chosen should be based on the topic, purpose, audience and research question. A purpose and a length of the study are pointing out how detailed the information retrieved from the articles should be. After choosing the literature, an assessment of a quality of the articles is usually expected to part of the literature review. (Torraco 2011; Walker.)

Referring to Dictionary.com (2015) the word “integrate” means to unite, combine, and bring together parts into a whole. So to say integrative literature review combines many separate researches concluding on their related or identical hypothesis. Integrated reviews show the previously gained knowledge of a certain subject through organizing them as if carrying out a primary research. Integrative review follows a five step plan, 1. Identify research problem 2. Collect data 3. Evaluate data 4. Analyze and interpret data 5. Evaluate the state of knowledge of phenomenon and present future directions for research. (Torraco 2011; Walker.)

In a literature review a clear analysis of the meaning of the evidence should be presented without any personal opinions. The review is to be meaningful as to show why the reader should care. Literature review should always be easily accessible and narrative style of line. In order to benefit properly from the literature researchers’ should clearly identify the research question, which will act as a guide through the reviews. By keeping the data collection

narrow will give the best results that can be helped with stating the inclusion and exclusions criteria. The next step is to find the relevant databases by using the Boolean operators. Once the data is collected starts the analysis of the content, where the researcher looks for the parts that are relevant to their study question. (Torraco 2011; Walker.)

4.2 Data collection

The data collection started by familiarizing with cholera prevention and health educational literature. The actual collection of the data happened through internet. By login ourselves into Laurea University of Applied Sciences database, we were able to use several different kinds of search engines through Meta search (such as EBSCO, Emerald, SAGE, Ebrary, Elsevier, Taylor & Francis, Melinda…etc.) for the data collection. Also Google scholar was used for the benefit of the data collection.

A total number of 25 articles were reviewed. The material was firstly limited to years 2011-2015 however, due to not finding wanted material for health educational literature; we decided to set the limit to 2006-2015. The sources benefitted by producing different scientific journals, reports, summaries, interviews, online newspapers articles, and you tube videos with topics on cholera transmission, epidemiology, preventions, treatment and care as well as health education and awareness. The collection was also conducted by trying some French and Finnish search terms, but at the end the focus was on the English literature.

Terms included were:

- “illiteracy” AND “rural community” AND “health education”
- “illiteracy” AND “pictures” AND “education”
- “low-literacy” AND “pictograms” AND “education”
- “illustration” AND “education”
- “low-literacy” AND “rural” AND “health”
- “prevention” AND “cholera” AND “Haiti”
- “infectious” AND “disease” AND “education”
- “cholera” AND “education” AND “Haiti”
- “education” AND “prevention” AND “cholera”
- “rural” AND “community” AND “cholera”
- “health” AND “prevention”

Terms excluded were:

- “malaria”
- “HIV/aids”
- “dysentery”

Seven articles were randomly chosen which met the requirement of our research questions. The split is shown below (Figure 2).

Database	# or articles found	# of articles retained
Elsevier	5	2
EBSCO	10	2
ScienceDirect	3	0
PUB MED	1	1
Google scholar	4	1
WHO	2	1

Figures 2: The results of data collection

4.2.1 Data

The pieces of data were chosen so that it was closely relevant to our study questions.

The data chosen:

1) Marra G. Katz, Sunil Kripalani and Barry D. Weiss. 2006. Use of pictorial aids in medication instructions: A review of the literature.
2) Jackie H. Jones. 2007. Patient illiteracy.
3) Hilary K. Seligman, Andrea S. Wallace, Darren A. DeWalt, Dean Schillinger, Connie L. Arnold, Betsy Bryant Shilliday, Adriana Delgadillo, Nikki Bengal, Terry C. Davis. 2007. Facilitating Behavior Change With Low-literacy Patient Education Materials.
4) Eric D. Mintz and Robert V. Tauxe. 2013. Cholera in Africa; a Closer look and a Time for Action
5) Jason. B Harris, Regina C. Laroque, Firdausi Qadri, Edward. T Ryan, Stephen B. Calderwood. 2012. Cholera
6) Paul Farmer, Charles Patrick Almazor, Emily T. Bahnsen, Donna Barry, Junior Bazile, Barry R. Bloom, Niranjan Bose, Thomas Brewer, Stephen B. Calderwood, John D. Clemens, Alejandro Cravioto, Eddy Eustache, Gregory Jerome, Neha Gupta, Jason B. Harris, Howard H. Hiatt, Cassia Holstein, Peter J.Hotez , Louise C. Ivers, Vanessa B. Kerry, Serena P. Koenig, Regina C. LaRocque, Fernet Léandre, Wesper Lambert, Evan Lyon, John J. Mekalamos, Joia S. Mukherjee, Cate Oswald, Jean William Pape, Anany Gretchko Prosper, Regina Rabinovich, Maxi Raymonville, Jean-Renold Réjouit, Laurence J. Ronan, Mark L. Rosenberg, Edward T. Ryan, Jeffrey D. Sachs, David A. Sack, Claude Surena, Arjun A. Suri, Ralph Ternier, Mathew K.

Waldor, David Walton, Jonathan L. Weigel. 2011. Meeting Cholera's Challenge to Haiti and the World: A Joint Statement on Cholera Prevention and Care.
7) World Health Organization (WHO). 2012. Weekly Epidemiology record.

4.2.2 Data analysis

The data was analyzed by using inductive content analysis method. Content analysis is a method that allows analysing variety of contents and then synthesising them at the end. It is a way of organising and describing examined phenomenon. Content analysis aims to build new models to present the summary of the examined phenomenon. The result of the analysis is to generate categories and concepts that describe the examined phenomenon. Inductive content analysis is a method where the research data is analyzed based on the data itself. We chose to use inductive content analysis method since there were no previous theories or frameworks of the chosen topic. (Björkholm 2012, 13; Butte College 2008; Walker.)

The content analysis includes three stages, reducing content of the text by simplifying it, clustering as in grouping them and abstracting meaning creating theoretical content. In simplifying the data the analysed information is reduced so that everything that is irrelevant will be taken down. The research questions help to narrow down the data, so that only relevant information is left to answer to the research questions. (Björkholm 2012, 13; Walker.)

In the data clustering, the simplified original expressions review either similarities or differences identified from the data. Content that consist similar concepts are grouped together and those are named according to their description of the concepts. During clustering the information is continuously condensed, since the single factors are included into more generalized concepts. In Our data analysis the simplified expressions were grouped into similar concepts. The grouping was done based on the integrative factors, which then were named based on describing the concepts the best. The concepts that were generated from the groups created the subcategories. After grouping the data is abstracted so to say conceptualised. By combining the categories together the information can be synthesized even more, and the combined concept that best describe them could be found. (Börkholm 2012, 14, Walker.)

Content analysis is based on interpretation and conclusion, proceeding from empirical data towards more conceptualised view (Björkholm 2012, 14). In this study we have combined subcategories into upper categories which then formed the main categories that ended up being the official research results of this study. Total of seven main categories were formed. Below is an example of the content analysis (Table 1)

Original text	Simplified expression	Subcategory
Non-adherence prohibits optimal management of a variety of acute and chronic medical conditions (Katz, Kripalani & Weiss 2006).	Lack of consistency in treating a medical condition prevents from reaching a desired outcome.	Consistency

Table 1: Example of the content analysis

4.3 Ethical considerations

At the start of our thesis we got acquainted with the scientific ethical research policies, these are to be the backbone of each study conducted. After familiarizing with the guidelines, we then applied them throughout the thesis process. According to the good ethical principles to follow, is to remain honest and careful when recording data, presenting data results, methods and procedures as well as evaluating data. We wanted to have an ethically sustainable and transparent thesis process, which is why we have clearly reported each step done in the process. One of the most important principles in the thesis project was to stay objective with this divisive subject in hand. Therefore we remained objective by carefully avoiding being any way biased in data analysis, methods as well as in interpretation of the data. Openness of the thesis will come into form, once the finished thesis is published in the Theseus-database. The team members position, rights, responsibilities as well as the obligations need also to be defined clearly at the beginning of the process. (Finni & Mero 2007; Resnik 2011.)

We analyzed multiple researchers' studies through the integrative literature review. We respect the work done by the previous researchers' and have clearly brought up the references of their work. The data has been reported according to the best of our understanding of the reviewed literature. We also wanted apply integrity by remaining focused and thorough on the findings, which created consistency to our actions. The researchers have worked closely together on this project, by sharing the duties equally and evaluating each stage of the work together as a team. (Finni & Mero 2007; Resnik 2011.)

4.4 Thrustworthiness

The trustworthiness was taken into consideration in every aspect of this research process. During a research process the credibility, transferability, dependability, and conformability are to be taken into consideration. (Mike 2011.)

Credibility assesses how believable the research findings are. In qualitative research the richness of the gathered data is more important than the amount of data collected. The accuracy of the results can be then determined by the triangulation of the data, multiple triangulation analyses or "member checks", which means that the data is collected from multiple sources. Ultimately the readers are the ones to judge the real credibility of the results in a qualitative study. (Mike 2011; Cohen & Crabtree 2006.)

Transferability evaluates the level of the research being conducted in another context. In order for a reader to do that, the original researcher needs to present extremely detailed information of the research state and methods. Only if the characteristics are comparable is the original research going to be credible. (Mike 2011.)

Dependability assesses how consistent the research results are, and whether they can be repeated. The standard that the research was carried out analysed and presented are the measures of its dependability. All the stages in the process are to be reported in every detail for another researcher to repeat the process, and gain the same type of results. It is easier for the researcher to understand the methods and effectiveness of the research. (Mike 2011.)

Conformability scrutinizes if the research results are supported by the collected data. This is to evaluate whether the researcher has been bias during the research process. In order to improve the conformability in the initial conclusion, a trail of decision making should be applied through the research to show how each step was implemented. (Mike 2011.)

The data in this thesis process was collected from various sources using different methods, but only the relevant data considering the research questions was chosen. We have tried to specify each step of the process in the most detailed way, so that it could benefit the reader and could be applied in the future as a research material. We had no means to act biased in any of the research stages. The data collection, analysis and results were done according to best of our understanding of the ethical and trustworthy thesis process guidelines.

5 Findings

5.1 Cholera prevention & Health educational material

Total of seven main categories were formed: 1) Successful health educational material 2) Role of a community health nurse 3) Disease control 4) Prevention 5) Empowerment 6) Reducing health burden risk 7) Challenges. The main categories were formed as a result of a content analysis related to a literature review of cholera prevention and health educational material.

5.1.1 Successful health educational material

Based on the content analysis results the overlook gave many detailed key concepts to consider in order to create a successful health educational material, and especially when addressing the communities with low-literate population. The focus is on educational material requirements, educational techniques and educational outcomes.

The emphasis on the requirements of the educational material is mostly to be very clear, simple, effective, specific, and patient centered. The layout of the educational material needs to be taken down of all the decorative elements, and focus on bringing the specific message effectively out in the most clear and simple way possible. Driving force in this is the patient centeredness. Evaluation of the skills and abilities of a targeted patient group should always come first, in order to facilitate the message according to their needs. Part of the patient centeredness is also culture sensitivity, it is extremely important to be aware of the values and behaviors of patients' different cultural backgrounds.

Most patients would appreciate educational material that has very little distractions, and would have an explanatory flow in it without any complex professional terminology, but for patients with literacy challenges this is a necessity in order to understand the intended message. This is why pictures and illustrations are an excellent educational technique to use with low-literate patients. Methods that low-literate patients are accustomed to have a better grip, those are easier to comprehend, and do not require much effort. Many learn just by observing others, which is why images have a sticking power with people. Pictures have tendency to be very explanatory, including a message that would otherwise require multiple words to describe the phenomena.

The outcomes of a successfully carried out educational material has many benefits considering the patients. It raises awareness and knowledge among low-literate patients, also breaking the stigma included to literacy challenges. Clearly presented material helps to understand and support in order to follow through instructions of a self-care plan. The visual effects enhances problem solving which seems to have a favorable effect on improving memory, these together reinforces behavioral change. The progress in patients' behavioral change leads to consistency with the newly acquired skills, skills that furthermore create sustainability in action. However, in order to get the message to reach broadly the material needs to be easily producible and cost-effective. One good example could be a flyer that does not require a large sum of money to make it and is very convenient to pass it around.

Subcategory	Upper category	**Main category**

Clear context Clear message Cost-effective Culture sensitive Effectiveness Explanatory Flowing Focused Patient centered Simplicity Specificity Terminology Uncomplexed	Educational material requirement	Successful health educational material
Accustomed Emphasized by pictures Illustrations Methods Observation Pictures as an aid	Educational technique	
Behavioral change Improving memory Problem solving Reinforce Self-care Stigma Support Understanding Awareness Consistency Knowledge Sustainability	Educational outcomes	

Table 2: Successful health educational material

5.1.2 Role of a community healthcare nurse

Based on the content analysis it is nurses' responsibility to evaluate patients' level of literacy skills as well as how well they comprehend the received information. Community health care nurse together with patients create a feasible action plan which is slowly implemented into patients' life. The expected changes in behavior ought to come in small simple steps. Patients are guided by the nurse through each step in a process, and empowered while making the changes in their behavior in order to reach the desired outcome. At the end the nurses need to evaluate the effectiveness of the outcomes originated from the action plan. The improvement of the knowledge alone is not adequate enough to measure the effectiveness of the action plan, but to reflect on the changes self-efficacy, expectation of the outcomes as well as the actual change in behavior are measures to be looked at closely in order to gain deeper understanding of the effectiveness of a action plan.

Subcategory	Upper category	Main category
Guidance Nurses' responsibility Empowerment	Qualities of a community health care nurse	Role of a community health care nurse
Action plan Evaluation Outcome	Process stages	

Table 3: Role of a community health care nurse

5.1.3 Disease Control

Disease controlling depends on many factors such as surveillance associated with occurrence, data gathering, and vulnerability of the population at risk. Cholera is seen as a disease that can be endemic and epidemic and a cholera outbreak can spread like wildfire in a matter of days if action is not taken on time. Cholera presents a burden risk in many impoverished countries due to lack of access to safe-drinking water and non-existent basic sanitation. How do we go about disease control in the rural areas Community health care workers are the ones on location who have all the facts, it is good to screen all reported cases and watch out for the symptomatic patients as well. Surveillance plays an important role in gathering information in a prevalent community and it helps to bring the patient(s) for treatments and also action can be taken to help control transmission in the area where the case (s) have been reported and also helps to detect the source of transmission. The rainy season is the time when waterborne disease such as cholera can be at its peak due the fact that water sources can get easily contaminated with the pathogen. Therefore, surveillance is very important in such a

time and each case should be reported as soon as possible the Ministry of Health and other parties involved in cholera's watch for prompt actions in preventing the disease from causing more harms to the population.

Subcategories	Upper category	Main category
Data Gathering Reliable Data Case report Case finding Reported cases Cholera reported case Incidence of cholera in Asia and Africa The spread of the disease Virulent strains Symptoms Transmission Cholera in Haiti	Statistical report on cholera cases around the globe	Disease control
Case fatality rates report Children mortality rates	Mortality rates	
Health of a population Weakness of Haiti's health Severe dehydration Vulnerability to cholera Cholera control Surveillance Occurrence of *V.Cholerae*	Monitoring	

Table 4: Disease control

5.1.4 Prevention

One of measures employed in an outbreak is about disease prevention besides disease control. Prevention is important in protecting the healthy population from getting sick. Another aspect of prevention is the “case finding” which function is to locate people who displayed symptoms of the disease, and bring them to places where they can get treated. Treatments in the forms of fluid therapies orally or intravenously will help with dehydration and help the patient to recover slowly. Moreover, people who present severe signs of diarrhea must also be treated with antibiotics. Immunization is of great importance in prevention campaign. Therefore everyone should be encouraged to take the cholera’s vaccine in order to have some sort of immunity against cholera reoccurrence. People living in the rural areas who don’t have money to buy soaps or disinfectant should use ashes to replace the soaps which is a cheaper alternative for the household. Water can be boiled for drinking in the household if there is no money to buy the chlorine tablets. In Haiti each household have a meal per day, the meals are usually cooked on open fire made of coal or wood. After the meals have been prepared, the family can add a pot of water on the remaining fire to assure that next day drinking water is ready. At the same time the ashes can be saved instead of being thrown away, they can be used can be for hand washing purpose. Simple method which will save money, it is not 100% guaranteed that ashes are the best option for hand cleaning, but it is a proven method that have worked in other countries but until there is a properly treated system, it is a possible solution. I will not recommend the use of dirt or mud since they are in the outside environment and with lack of basic sanitation, it is a risk. As for defecation, we will propose the peepoo bags or containers. These peepoo bags can be collected by the public health environmental guards or vigilance who will dispose of them safely. The regional office will be in charge of the waste recycling. Cadavers will be buried according to the law that is in effect on how to carry out burial ceremonies. These measures of prevention can be applied as per household until it can be replaced by a better system or enough funds is found for each family to have a access to safe drinking water and basic sanitation.

Subcategories	Upper category	**Main category**

Prevention Education as preventive measure Vaccines Immunization Oral Vaccination Interventions Management of patients Water filtration at home Improved sources of drinking water and improved sanitation Public health activities Cholera response	Activities associated in a disease waterborne outbreak	Prevention
Disease transmission elimination Controlling & prevention, Transmission reduction	Prevention of future outbreaks	

Table 5: Prevention

5.1.5 Empowerment

It is the ability to help educate the people by providing them with knowledge as a tool to fight the disease. In educating the public about risks associated with the disease they will be better prepared to take care of themselves and their household. As the saying goes "knowledge is power", the more one knows about the disease, the better prepare they can be. Training of community health workers provide the workers with enough information and tools to pass on to those people with literacy problems and those living in remote areas on need of preventive measures. The sensitization has to be done in the country's common language so everyone is able to understand efficiently. Empowerment as a motivational tool used to help equip each individual take action for self care against cholera transmission risk. In a country like Haiti where cholera has been unknown to this generation, such outbreak is a big surprising blow for such a vulnerable population. In not knowing about the disease and its management, there has been stigma attached to the disease. If in a neighboring house, there is a case of cholera, it is likely that the whole household will be put on quarantine by the community because of the stigma that was attached to the disease in the early days. We need to reinforce those learning learnt from previous teaching on cholera. A flyer is suggested to be made so that each household have the flyer as a reminder how to make sure that they

kept the teachings in order to avoid the risk of being infected for one reasons or the other. The flyer that will be printed with transparent and clear picture or illustration will act as a constant reminder to each member on how to protect oneself from waterborne disease especially in the raining season. For household with kids, it is extremely important to remind the parents on using the picture as a guide in practice safe hygiene at home because kids and older people are very vulnerable to gastro intestinal parasite. The flyer picture should in a place or wall in the house where it could easily be seen by every member of the household.

Subcategories	Upper category	Main category
Education Strengthening programs Awareness Education materials in the people own language Education and Behaviors efforts Community education to reduce stigma Training	Improving the knowledge of the population about the disease	Empowerment

Table 6: Empowerment

5.1.6 Reducing Health urden risk

Two of the United Nations 8 Millennium Development Goals for 2015 fall into this category

1) To reduce HIV/AIDS, Malaria and other diseases
2) Global partnership for development

HIV/AIDS have been very much predominant in Haiti since 1980's, but mass advertising and preventive campaigns have been effective in reducing the cases of HIV/AIDS in the country. The country has been surviving with a very fragile health care system where basic care is costly in the government general hospital. The people in the country have been living on less than $2 a day, therefore if one falls sick, it can be disastrous for the family first with medical bill, secondly cost for the funeral if the person dies. Some humanitarian aids agencies have been committed in providing care for the less fortunate in Haiti for a number of years even before the 2010 disasters, yet all does not seem to be enough. The people are falling ill all the times especially those being infected by viruses and bacteria.

Unlike HIV/AIDS, cholera is a waterborne disease and it can be easily treated as long as there are appropriate preventive measures into place to fight against the disease; therefore it is important that emphasis is placed on long term plans for piped water in the communities along with good sewage system that could give access to the a majority of the population if not all. as well as good road access should part of the plan for eradicating cholera in the island. Advocacy for funds that will help strengthen the healthcare system of Haiti should be prioritized as well as funds that are needed for vaccines' stockpile. Donations in terms of money have been pledged from many humanitarian agencies as well as private donors after the 2010 disasters, but only a fraction have so far been used in development programs where water and sanitation issues are concerned. In order to reduce the population health burden risk and moving along with the Millennium Development Goals; investmenting of projects in health infrastructures should be underway. Making funds available for getting supplies and resources ready for public health care is imperative and needed especially in the rainy seasons.

Subcategory	Upper category	Main category
Investments Resources Mobilizing funds. Advocacy Millennium Development Goals. Public Health concern. Need for supplies Sustainability of the free water distribution	Financial resources from all entities are needed to help coordinating activities during an outbreak and prevent further transmissions.	Reducing health burden risk

Table 7: Reducing health burden risk

5.1.7 Challenges

The prevention campaign of cholera in Haiti faces so many challenges that constitute barriers to total eradication. The stigmatization has been one of them, but it is now fading away as people have learnt how to manage the disease and that cholera is not a death sentence. Resistance came in the form of stigmatization as well as lack of knowledge; these barriers need to be broken since it is no one's fault that cholera has happened in Haiti. Natural disasters that occur every year pose a threat to cholera reoccurrence if proper care is not taken. The 2010 earthquake was something out of the ordinary but each year there are cyclones and

floods that threaten the region and Haiti is no exception. Sometimes messages do not get through when it is passed around, people ignored the treat of warning and they have not gotten prepared for the disaster. One way to overcome these challenges is through mobilization campaign through the radio and other media sources. As storms hit the country more than once a year, we need to get the people ready and get the available resources that might be needed in preventing waterborne disease as well as other disease that could arise thereafter a disaster. Rural area folks are mostly at risk when there has been a flood, it is impossible to reach them for a couple of days after a storm; roads are not accessible after floods a in Haiti. So it is best to equip the villagers with knowledge on what to do on their own after the flood in order to avoid getting infected by any bacteria.

Subcategory	Upper category	Main category
Challenges Resistance Stigmatization Shortage of supplies Natural disaster No alternatives Futile message Individual's view on cholera Vaccines short term protection	Hindrances to an effective prevention program	Challenges

Table 8: Challenges

6 Conclusions

Throughout the content analysis of the integrated literature review we were able to establish the most effective methods to use in fight against cholera in the rural communities of Haiti. Due to the limited amount of resources available in the Haitian communities, raising awareness of the know-how by empowering the communities to change their behavior, in order to create problem solving skills for self-care and ultimately reaching consistency in their activities and a sustainable life without cholera threat. Our findings have revealed that safe water and basic sanitation have been a chronic problem in Haiti from before the earthquake or cholera as a matter of fact, especially for the vulnerable population or the far remote rural folks. We also found out that a strategically campaign of vaccine is only part of the solution to the problem created by a pathogen like cholera, in addition to the vaccine other activities should be done such as safe health hygiene practices. The vaccines offer only 2 years of protection; people can be asymptomatic yet they can carry the strains of cholera which means

that the risk of transmission can be present in that environment. Surveillance of the disease is another strategy used for cholera case findings as a mean of disease control. Whether or not the local authorities have put cholera on watch, but if there are no resources into place, it is likely that the disease surveillance would hold no meaning. Many people living in the rural areas can lose their life before they can reach the nearest treatment center, if they have not retained the learning about the first steps in cholera treatment, such as making an oral rehydration therapy with broiling water. A population is always at risk of cholera bacteria as long as the lack of safe drinking-water and basic sanitation is a problem and if those are not dealt with, cholera will always be a health burden risk. Education on behavioral change is important but at the same time can be proven insufficient if the roots of the problem are not addressed. It has been proven that many diseases associated with waterborne pathogens can easily be controlled if the population is provided with better infrastructure that will help in motivating them towards a change in their previous behavioral patterns. There have been many more factors challenges to the cholera prevention campaign, that means the health education and awareness should be reassessed in order to find a better motivator or strategies to overcome the hindrances of the awareness campaign. The healthcare system in Haiti needs to be strengthening so the population can enjoy better health status. We know far too well that developing countries depend on humanitarian aids for quick fix problems related to disasters and catastrophes. A quick fix problem is a short term project that can help the population for few months or weeks while a permanent and sustainable solution to the problems is underway. Due to the fact that the country has always had a weak healthcare system, therefore planning developmental goals in terms of infrastructure in relation with population health, should be done in partnership with international organizations, that have experiences in solving health infrastructure problems along with, the government of Haiti taking into consideration the needs of the urban as well as rural communities.

We were not able to find data that could have added more value to the research from the chosen ones. The data collected was close to the research questions and we had gotten the answers needed to carry on our study.

7 Discussion

The findings in the analysis have revealed that, for the prevention of cholera in Haiti to be effective, there are many factors that have to be combined together in order to consider it a success. The vaccine campaign is a very good start and very much needed in a population that is very much at risk of being affected by waterborne pathogens. Vaccine has always offered protection against many diseases in children as well as in adults around the world due to the fact some bacteria when logged into the human body can cause great harm if not treated at once. The cholera vaccine has been introduced to Haiti at a time of crisis and there were no

other alternatives. WHO has been advocating for mobilizing funds for larger quantity of the cholera vaccines to be produced and made sufficiently available for cholera vulnerable population worldwide. Many communicable diseases such as HIV/AIDS offer only treatments as solutions and these days HIV/AIDS has less stigma attached to it. On the other hand, cholera bacteria can be suppressed with the help of vaccines which is a very good weapon that offers protection against the disease. Antibiotic along with oral or intravenous therapies shorten the symptoms and the life-threaten situation as against someone who has not received any treatment. It is also recommended that along with oral rehydration therapies, patients should take supplements of Vitamin A or Zinc, in a country where people are living on $2 /day, it is very difficult to buy extra supplements with such a salary when there are many other needs to take care of in a household. The only possible way out is to offer those supplements free of charge to the cholera victims. Free supplements is another issue calling for advocacy where the benevolent societies could raise the funds on behalf of the cholera victims since the impoverish nations can hardly afford to buy medications let alone buying supplements.

Cholera prevention cannot only rest on vaccine as a solution; cholera vaccine offers protection for at least 2 years, after that there is risk of getting infected with cholera bacteria again if there are no vaccines available. Therefore there is a need to teach self care to the population. Disasters can greatly affect a community's health and create immediate and long-term suffering and need. Disasters particularly affect vulnerable groups, including children and the elderly. Some disasters are potentially preventable; others cannot be prevented, but much can be done to ameliorate their effects (Anderson & McFarlane 2011, 142)
The Caribbean region experiences many tropical storms every year, and after each storms there is always cases of waterborne disease among the people who live in the very dense communities or in the rural areas. This is due to the fact that, there is lack of safe drinking water and basic sanitation in these areas which put them at greater risks than the rest. If the issues of water and sanitation are not solved, cholera will remain in Haiti for a long time and will be a very high disease risk for the public health sector. Haiti has a fragile economy and has always been on the receiving hand from foreign aids. What the country really needs is not always a helping hand in cash and kind but helps in building the communities' good infrastructures such as chlorinated water pipes and good sewage system providing that the population can have access to a latrine or a proper toilet system. Cholera transmission is via oral fecal route to the gastro intestinal system, therefore safe hygiene plays a vital role in reducing transmissions, the used of soaps to wash hands and disinfectants had been freely distributed at the peak of the crisis, but after the supplies has ran out, the people are left to fend for themselves to find those supplies that were freely given to them before. Many of them cannot afford to do that because of lack of funds. The best way is to find an alternative that is easier to carry on hygiene practice even when there is no money available.

This is where the role of the community healthcare nurse comes in. Previous researches have been documented and they have shown that there has been teaching campaigns on awareness and mobilization throughout the island at the peak of the cholera outbreak in order to create awareness of self- care. In a disaster or catastrophic area, the health care sector has a very big task which is to reduce the amount of people affected and reduce rates of mortality. Human resources in the form of community health care workers are critical in the surveillance and management of an outbreak. The health worker or the nurse in the community will be the first one who will report on the frequency of cases found related to an outbreak in the community to the relevant authorities.

The community health worker or the nurse is like a pillar in the community, she/he will be the one coordinating activities in terms of prevention, preparedness and responses, plans community activities, coordinates and helps in implementing safety measures in relation to prevention, the nurse also analyzes the vulnerability of the community in relation to a respective disease. The community health worker or nurse also is responsible for informing, educating and training of volunteers and members of community. The community health nurse provides assistance where it is needed, responds to long term and short term goals or events related to disease control (Anderson and McFarlane 2011, 152). In Haiti, community nurses as well as community health workers have been trained to recognize the cholera symptoms and made prompt responses to treat the affected patients. Due to the quick actions of the trained nurses and health workers in the community, the cholera fatality rates had decreased. Massive campaign on cholera preventions has been done in the country in order to reduce transmission and create awareness.

Inaccessible roads are one of the many challenges in delivering care to the remote areas. Many of those folks had to travel long distance before they could reach the cholera treatment centers and the lack of public transportation to have fast access to the centers in case of cholera crisis can be fatal. Even though at the peak of the crisis the NGOs had provided some sort of transportation for the patients, but this is no longer available which means if there is a case of cholera reoccurrence in a community if the basic steps of cholera care is not taken that patient can die- According to Medecins Sans Frontiéres (2011) many of the treatment centers had closed down when the cholera cases started to decline in the island, in other words reducing the resources for that community which means that the chlorinated tablets, the soaps for washing hands and disinfectant are no longer available for free distribution. People in the rural areas are peasants with very low to modest income because there are no jobs available around, what they earn is not enough to sustain their family in buying food and paying for children education at school.
Unemployment is a part of many challenges that the country face because there is no cash around for one to take care of his or her family. Providing work for the young generation will

be a good start, at least it will give a ray of hope for the future. The women should be helped with some kind of funds to start a small business in order to make provision for their families since many of them are single mothers. Inviting genuine and good-will foreign investors would also provide employments for the people and put the country on its way of reducing poverty. Men can find work in the various construction or factories that would be investing in the re-building of the country.

Education on cholera preventions has been done in Haiti and yet we found that 5 years later there is still occurrence of the disease in the population. As mentioned earlier, the rural areas people are the ones who are mostly at risks due to many factors such as: bad road access, poor infrastructure where drinking water and sanitation is concerned, low to non-existent incomes, low literacy, among others. How efficient the cholera teaching has been for these folks to maintain a sustainable and a much needed change in behavior patterns where hygiene and safe water is concerned. Our analysis showed that a successful educational material raises awareness, breaks down stigmas; it helps the target population understands and give good support to the topic at hand if presented in a clearly manner. In a population that has low literacy level, it is always good to present materials which have illustrations and pictures as educational techniques. The educational materials have to be focused on the message that is meant to be understood by the patient or the community. Too complicated materials with too many words can shift the client focus and create distraction. Cholera posters have been very illustrated with pictures in Haitian environmental settings that are known to the population. Although many of the posters have had written instructions in creol (which is the mother tongue in Haiti), but for people with low literacy, it might proven to be difficult to read and that could cause the patient to lose interest since he/she cannot read. Therefore it is best to teach by showing the techniques that are presented in illustrations or pictures so the person can keep on practicing them at all times. The nurse educator has to analyze the readiness of the population at risk to accept the message she is trying to pass on and that the members of the community do not put resistance to the message that she/he wants to pass around. Low literacy can be a resistance since the disease is not known to certain community, they could refuse to listen, and then community nurse will need to find strategies that would attract the attention of that said community. Working together along with community leaders in the municipality is a good approach to have support in the community.

Community members can help support each other as well, in the sense of giving advice, support and information sharing. If time allows it, the community health worker needs to find out the strength of the community she is responsible for. He/she has to take into consideration the values, beliefs of the community when doing teaching. There is one thing we have not seen in the posters for safe water drinking and safe hygiene is the suggestion that people can use ashes to wash hands in low income families where soap is considered a luxury and

disinfectants are not available. In a study done by Bloomfield & Nath (2009) it was found that many families in Africa and Asia have used the ashes as hand wash when there was no soaps available. The normal standard material that was printed in Haiti cholera prevention program was standard when there were enough resources available around such as soaps and disinfectants it was easier to practice good sanitary behavioral changes. But when the low income family can barely survive, it is another story and that called for improvement of method or finding other alternatives to solve the problems.

The study also reported that the efficacy of the hand-washing process has a significant impact on the risk of the disease transmission. The efficacy of hand washing depends on a number of factors including the use of soaps or other materials to facilitate the detachment of microbes from the skin surface, the extent of the friction applied to the hand (the duration of techniques in hand-rubbing), the amount and the quality of water used to rinse and dry the hands (Bloomfield & Nath, 2009). Therefore in the absence of soap, ashes can be used, since ashes is cheaper and easier to get, family can save their ashes and use them later, at the same time boiling a pot of water after each evening meal is another way to save money.

It is very much easier to try to teach a population about changing their behaviors for one reason or the other. Some can be very receptive and applied the directives constantly, while others can listen and are not consistent in applying the directives, a third group can listen but not taken any actions. If the community health worker or the nurse works closely with the community she/he can notice the different groups' patterns of processing information, then design a teaching technic that would suit the community at all level. Interaction is very important in dealing with the community, she/he should listen to them, let them point out the problems that are considered barriers to information in the community, then find a solution together as a body so as to achieve maximum benefits in the preventive education. Is there a true effective way to sustain an awareness educational program if there is lack of funds and resources? In this way we view the roles of the financial agencies who invest in developments and sustainable projects; the community nurse would be the advocate for funds and resources allocation and distribution in the community. Haiti is one of the poorest country in the Western Hemisphere therefore it will require a deep and long term commitment from the Haitian government along with the international community to help rebuild Haiti. But first of all, the problems of safe-water, hygiene and sanitation must be solved in order to prevent future waterborne outbreaks after the raining seasons.

The researchers wanted to create a flyer about the use of ashes as an alternative to soaps, boiling a pot of water after the evening meal and store it in a good place, as well as the use of peepoo bag as an alternative for excreta collection until there is a fixed long term project on the Water, Hygiene and Sanitation issues. Since the educational flyer on the proposed al-

ternative was not done during this study, we recommend that this part of the research be done in another study, or as a concrete action research plan, along with the community's involvement in what is the best reminder for them in terms of preventive method strategies, especially if the community has to survive on its own without any help or before the help arrives from humanitarian aids agencies or others, in a catastrophic disaster emergency situation.

Furthermore we have realized that low literacy remains as a challenge especially among the older generation in order to attain sustainable goals through the health educational materials provided. Finally, Haitians need to develop proper surviving skills within their own environment without the interventions of humanitarian aids in order to face the many challenges associated with a weak economy and a fragile health care system.

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Illustrations

Figures

Tables

Appendixes

Appendix 1: Acronyms

ADKAR	**Awareness, desire, Knowledege, Ability and Reinforcement**
CDC	**Center for Disease Control**
CTC	**Cholera Treatment Centers**
CTU	**Cholera Treatment Unit**
DRC	**Democratic Republic of Congo**
IDP	**Internally displaced persons**
IFH	**International Scientific Forum on Home Hygiene**
IMF	**International Moneytary Fund**
IOM	**International Office of Migration**
KAP	**Knowledge And Practices**
MSF	**Medecins Sans Frontiéres (Doctors Without Borders)**
MSPP	**Minister de la SantéPublique et Population (Haiti Ministry of Health)**
NGO	**Non Governmental Organization**
OCV	**Oral Cholera Vaccine**
ORP	**Oral Rehydration Post**
ORS	**Oral Rehydration Salt**
ORT	**Oral Rehydration therapy**
PAHO	**Pan American Health Organization**
UN	**United Nations**
OCHA	**Office for the Coordination of Humanitarian Affairs**
WASH	**Water, Sanitation and Hygiene**
WFP	**World Food Program**
WHO	**World Health Organization**

Appendix 2: Research table

Research, author & Year	Objectives	Research subjects	Studies	Conclusion
1. Use of pictorial aids in medication instructions: A review of the literature; **Marra G. Katz, Sunil Kripalani and Barry D. Weiss.** **2006**	Summarize the shortcomings of traditional consumer drug information, synthesize published evidence evaluating the use of pictorial aids in patient education materials and highlight the use of such aids in high-risk populations, including patients with limited literacy skills.	Consumers: high-risk population, including patients with limited literacy skills.	MEDLINE search for 1966-2005. Key words: Illustration, picture, pictograph, graphics, chart, image, photos, cartoon and drawings. Combined with: Medication, medicine, pill, drug, pharmacy and prescription.	Pictorial aids were found to enhance patients' understanding of how they should take their medication, especially when the pictures were used in combination with written or oral instructions.

Appendix 2

Research, author & Year	Objectives	Research subjects	Studies	Conclusion
2. Patient illiteracy; **Jackie H. Jones.** **2007**	Overview of low-literacy among adults, its effect on health care and the outcomes of care.	Adults age 16 and older in the United States.	Literacy was defined as "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential"	Morally and ethically nurses as advocates of their patients, must acknowledge the reality of illiteracy and health illiteracy.

Research, author & Year	Objectives	Research subjects	Studies	Conclusion
3. Facilitating Behavior Change With Low-literacy Patient Education Materials; **Hilary K. Seligman, Andrea S. Wallace, Darren A. DeWalt, Dean Schillinger, Connie L. Arnold, Betsy Bryant Shilliday, Adriana Delgadillo, Nikki Bengal, Terry C. Davis.** **2007**	To describe a process for developing low-literacy health education materials that increase knowledge and activate patients towards healthier behaviors.	Low-literate patients living in United States.	This process included: Convening a multidisciplinary creative team, soliciting stakeholder input, identifying key concepts to be communicated, mapping concepts to a behavioral theory, creating a supporting behavioral intervention, designing and refining materials, and assessing efficacy. The end result of this process was a guide for a diabetes self-management.	In order to activate patients towards healthier behaviors, it requires focusing attention to factors beyond reading level when developing health educational materials for low-literate patients.

Appendix 2

Research, author & Year	Objectives	Research Subjects	Study	Conclusion
4. Cholera in Africa; a Closer look and a Time for Action; **Eric D. Mintz and Robert V. Tauxe.** **2013**	It is a supporting document of collection of many articles on cholera that aims to enhance the understanding of the researchers on the cholera epidemiology and prevention at the national, sub national and sub regional levels. Observations from the articles can help inform more coordinated, focused and successful campaigns to reduce morbidity and mortality of cholera in Africa.	Cholera victims in Africa and Haiti as well as worldwide.	Cholera control & surveillance strategies Vaccine as a way of reducing mortality rate in vulnerable population. Safe water and basic sanitation as long term goals in the fight against the disease.	More precise timely and cross-cutting surveillance can enhance cholera prevention and control in several ways. The occurrence of cholera in specific areas is an indicator that can be used to more efficiently target rapid investment in household water treatment and sustained improvement in water supply by taking as example the Guinea Worm Eradication program.

Appendix 2

Research, author & Year	Objectives	Research Subjects	Study	Conclusion
5. Cholera; **Jason. B Harris Regina C. Laroque, Firdausi Qadri, Edward. T Ryan, Stephen B. Calderwood.** **2012**	A study on cholera, its epidemiological, pathological, and mode of transmission. Control in the form of vaccines and raising awareness in order to reduce the risk of transmission. Long term preventive measures in the form of improving water system and solving sanitation problems.	People affected with cholera worldwide.	Vibrio cholera, diarrheal illnesses which has since 1961affected 3-5 million people worldwide and killed 120,000.	Many factors can prevent the elimination of cholera around the world. 1) The availability of vaccines to sustain cholera immunization programs. 2) The effectiveness of surveillance in the control of cholera's morbidity. 3) The reoccurrence of cholera in some countries during raining seasons. 4)Lack of safe water and lack of basic sanitation can be hindrances in eliminating the disease.

Appendix 2

Research, author & Year	Objectives	Research Subjects	Study	Conclusion
6. Meeting Cholera's Challenge to Haiti and the World: A Joint Statement on Cholera Prevention and Care; **Paul Farmer, Charles Patrick Almazor, Emily T. Bahnsen, Donna Barry, Junior Bazile, Barry R. Bloom, Niranjan Bose, Thomas Brewer, Stephen B. Calderwood, John D. Clemens, Alejandro Cravioto, Eddy Eustache, Gregory Jerome, Neha Gupta, Jason B. Harris, Howard H. Hiatt, Cassia Holstein, Peter J.Hotez , Louise C. Ivers, Vanessa B. Kerry, Serena P. Koenig, Regina C. LaRocque, Fernet Léandre, Wesper Lambert, Evan Lyon, John J. Mekalamos, Joia S.Mukherjee, Cate Oswald, Jean William Pape, Anany Gretchko Pros-**	The document argues for a comprehensive integrated strategy for cholera prevention and care. Reduce suffering and preventable death in short term and also to build effective water sanitation and health delivery to fortify Haiti against cholera and other diseases of poverty in the long term.	People of Haiti who have been affected by the cholera outbreak.	Epidemiology of cholera in Haiti. Strategy for cholera prevention. Delivery challenges to cholera care. Education and behavioral chance necessary to fight the disease. Building feedback loop: Surveillance and Monitoring. Call for consensus and action	The paper identifies key challenges in the cholera prevention, it also outlines the key components of a comprehensive cholera strategy to aid medical and public health practitioners in Haiti and elsewhere. With leadership from the Haitian government everyone must work together to bolster responses the acute problem of cholera today and strengthen Haiti health, water and sanitation infrastructure to prevent similar outbreaks in the future.

per, Regina Rabinovich, Maxi Raymonville, Jean-Renold Réjouit, Laurence J. Ronan, Mark L. Rosenberg, Edward T. Ryan, Jeffrey D. Sachs, David A. Sack, Claude Surena, Arjun A. Suri, Ralph Ternier, Mathew K. Waldor, David Walton, Jonathan L. Weigel. **2011**				

Appendix 2

Research, author & Year	Objectives	Research Subjects	Study	Conclusion
7. Weekly Epidemiology record; **World Health Organization (WHO).** **2012**	The purpose was to get a rough account of the number of cholera cases reported to the WHO from all regions of the world during the year 2011.	Cholera victims around the world along with those reported with watery diarrhea.	A comparison study of countries from all continents reported to the WHO of having cholera's outbreaks and that include the October 2010 outbreak in Haiti.	It was noticed that there have been a raised in 2011 of the Vibrio cholera due to the huge outbreak crisis in Haiti that started in October of 2010. Even though the Oral Cholera vaccination has been introduced as a method to control the disease, there is still a large number of undiagnosed people in places where cholera is endemic. The fact remains that if the problem of safe water, hygiene and sanitation is not dealt with, there will always be risk of cholera transmission in the impoverish nations of the world.

Appendix 3: Data analysis

Original text	Simplified expression	Subcategory
Non-adherence prohibits optimal management of a variety of acute and chronic medical conditions (Katz, Kripalani & Weiss 2006).	Lack of consistency in treating a medical condition prevents from reaching a desired outcome.	Consistency
Improper medication use is also associated with increased rates of hospitalization, higher health care costs, permanent disability and death (Katz, Kripalani & Weiss 2006).	Wrongly used medication is a direct link to a higher amount of people needing hospital care, health costs, permanent disability and death.	Knowledge
Patients' lack of understanding of their disease condition and treatment regimen may affect their medication adherence (Katz, Kripalani & Weiss 2006).	Not being aware of a disease and its treatment could make patient non consistent with their medication.	Awareness
---patients who express confusion about their medication regimen, do not understand their disease or are uncertain about the reasons for taking their prescribed regimen are significantly less likely to be adherent to treatment (Katz, Kripilani & Weiss 2006).	Patients who admit not knowing about their medication and disease are most likely not stay consistent with their treatment.	Awareness
---materials are often difficult for patients to understand (Katz, Kripilani & Weiss 2006).	At times materials might not meet the level of a patients' understanding.	Understanding
---patient information leaflets are often written at a reading level that is too advanced for most consumers (Katz, Kripilani & Weiss 2006).	Informative leaflets are too complex to understand.	Understanding
---only about 40% of patient information leaflets were appropriate for their target population (Katz, Kripilani & Weiss 2006).	Information is not reaching the intended population.	Patient centered
The mismatch between reading skills and consumer drug infor-	Patients with literacy challenges have a hard time un-	

mation exposes the inherent difficulties that low-literacy patients face---(Katz, Kripilani & Weiss 2006).	derstanding provided information.	Understanding
Future evidence suggests that pictures aid in the development of a mental model that aids in problem-solving (Katz, Kripilani & Weiss 2006).	Pictures help to solve problems.	Problem solving
The combined format also tended to improve memory compared with the text-only format (Katz, Kripilani & Weiss 2006).	Text with pictures helps to improve memory.	Improving memory
The women only recalled steps portrayed by the picture sequence and did not recall the supplementary information presented in text form (Katz, Kripilani & Weiss 2006).	The women remembered the pictures but not the additional text shown.	Improving memory
The authors suggested that pictures and written instructions correspond to promote user comprehension (Katz, Kripilani & Weiss 2006).	Text with pictures assists in understanding information.	Understanding
Several studies and review emphasized the importance of using pictures in conjunction with written or oral instructions to avoid misinterpretation of picture only instructions (Katz, Kripilani & Weiss 2006).	Written or oral instruction supports and clarifies the intended meaning of pictures.	Clear message
Patients who received the leaflets containing pictures demonstrated significantly better understanding--- (Katz, Kripilani & Weiss 2006).	Information with pictures was easier to understand.	Clear message
Six months later, patients who had kept the leaflet had significantly better understanding than those who had lost it (Katz, Kripilani & Weiss 2006).	Constant reminder helped to remember the information.	Consistency
The pictorial materials significantly improved comprehension among	Low-literacy patients were easier to understand infor-	

low-literacy patients (Katz, Kripilani & Weiss 2006).	mation with pictures.	Pictures as an aid
Patient centered instructions significantly improved both recall and comprehension--- (Katz, Kripilani & Weiss 2006).	Information given according to patients needs made it easier to remember and understand.	Patient centered
---patients should be trained to use pictorial medication information before they are expected to use icons as an aid--- (Katz, Kripilani & Weiss 2006).	Instructing on pictorial aid use.	Pictures as an aid
---examined preferences among high-risk groups, including elderly, low-literacy and visually impaired individuals, with participants showing a preference for integrated text and picture information (Katz, Kripilani & Weiss 2006).	Pictures used with text were considered to be better information source among patients with literacy challenges.	Patient centered
---the pictogram labels were often too large and some of the images were confusing (Katz, Kripilani & Weiss 2006).	Presentations of pictures were unclear.	Clear message
To improve patient comprehension and adherence, it is necessary to adapt this information to serve patients' needs and preferences (Katz, Kripilani & Weiss 2006).	Patient centered information enhances the understanding and consistency of the information received.	Patient centered
---pictorial aids have proven to enhance patients' recall, comprehension and adherence--- (Katz, Kripilani & Weiss 2006).	Pictures help to remember, understand and support the information.	Support
---combined methods of instruction using complementary textual and pictorial instructions appear to be more effective than using one format alone (Katz, Kripilani & Weiss 2006).	Text with pictures is more effective than text or pictures only information.	Effectiveness
---due to a potential for misinterpretation, pictures should not replace text-based instructions or oral counseling but rather supplement them (Katz, Kripilani & Weiss 2006).	Pictures are to be additional reinforcement method not a replacement.	Reinforce

To maximize the success of pictorial aids, it is essential to use simple, realistic pictures that convey a clear singular meaning (Katz, Kripilani & Weiss 2006).	Pictures presented should be very simple and clear.	Simplicity
---apply realistic colors, draw images to scale, use appropriate magnification and maintain an uncluttered background to retain focus on the intended message (Katz, Kripilani & Weiss 2006).	The message of a picture should be the focus. Realistic, clear and easy to understand.	Focused
---be cautious about symbols depicting motion and images requiring a specific perspective, as well as images conveying multiple steps in a process (Katz, Kripilani & Weiss 2006).	No disturbing additions should be placed on the pictures. Only few pictures at a time.	Simplicity
In corporation of pictures into drug labels and patient information sheets has particular promise for helping individuals who have difficulty reading and interpreting textual instructions namely patients with limited literacy skills or limited English proficiency (Katz, Kripilani & Weiss 2006).	Pictures aid in understanding of written information among people with limited literacy demands.	Pictures as an aid
---majority of low-literacy patients, text-based pharmaceutical labels and leaflets can be difficult to understand, and this could lead to medication errors and adverse outcomes (Katz, Kripilani & Weiss 2006).	Written information alone can lead to unwanted results.	Outcome
---patients with limited literacy feel ashamed of their reading difficulties, reducing their tendency to seek further instructions--- (Katz, Kripilani & Weiss 2006).	Stigma over literacy pressures no to look for help.	Stigma
---patients of all literacy levels actually prefer picture-based information (Katz, Kripilani & Weiss 2006).	Pictures are a helping aid to everyone.	Pictures as an aid
---inadequate health literary has been reported to have a detri-	Complex health information has a negative impact on	

mental affect on patient-physician communications, patient care outcomes and health promotional activities (Jones 2007).	patients' lives.	Uncomplexed
Patients with low health literacy have lower medication compliance rates, less knowledge of their disease processes and fewer self-care and self-management skills (Jones 2007).	Patients have difficulties to manage their health when health related information is too complex.	Self-care
Inadequate health literacy also is associated with increased rates of hospitalization and higher rates of morbidity and mortality (Jones 2007).	Patients are more likely to get sick or even die due to the lack of ability to understand health related information.	Understanding
---nurses have a professional responsibility to ensure that patients understand all health-related information that is provided (Jones 2007).	Nurses need to make sure that patients understand information they receive.	Nurses' responsibility
---consent forms use complex language that is not easily understood (Jones 2007).	Patients do not understand complex language.	Terminology
---patient are being sent home with complicated disease processes; detailed, complex instructions for self-care--- (Jones 2007).	Patient at home self-care instructions are too complicated.	Self-care
If a patient fails to understand self-care instructions, problems in compliance or a lack of adherence to the treatment plan may result (Jones 2007).	Self-care outcomes are in danger if patients fail to understand the instructions.	Outcome
Self-care instructions commonly are given to patients in a written format either as reinforcement to verbal instructions or as the primary source of information (Jones 2007).	Instructions for self-care usually come in written form only or as an addition to verbal instruction.	Self-care
Although these instructions are intended to inform patients, many of the materials are written at a level that is too difficult for many	Patient information material is too complex in order to understand.	Understanding

patients to understand (Jones 2007).		
Nurses, as advocates for their patients, must acknowledge the reality of illiteracy and health illiteracy--- (Jones 2007).	Nurses need to be aware of the patient literacy skills.	Awareness
It is the nurse's responsibility to assess for illiteracy and implement measures to appropriately ensure patient understanding (Jones 2007).	Nurses are to have knowledge and skills to find out and make sure that patient understand.	Nurses' responsibility
---ensure the message is clear, manageable, practical, relevant and culturally appropriate (Seligman et al. 2007).	Message needs to be simple, on point and taking cultural traits into account.	Culture sensitive
---to identify critical content and determine how it can be clearly communicated (Seligman et al. 2007).	Critical content clearly putout.	Clear context
---focusing on the 2 to 3 concepts recommended for audiences with low literacy skills (Seligman et al. 2007).	Focused content helps low-literate patents.	Focused
Identifying content which, if absent, would render the materials useless for providers or unhelpful for patients helps create low-literacy materials that are effective and more likely to be disseminated (Seligman et al. 2007).	Specify the content that makes low-literate material effective and easy to hand out.	Specificity
---social cognitive theory suggest that materials should improve knowledge, positively influence outcome expectations, emphasize facilitators of behavior change, address impediments to behavior change, and facilitate the creation of goals (Seligman et al. 2007).	Materials provided should enhance knowledge and have positive impact on outcomes and behavioral changes.	Behavioral change
Long-term goals offer general direction to guide health behavior change, but are too remote to offer everyday incentive (Seligman et al. 2007).	Long-term goals are too vague in keeping up the interest for behavior change.	Specificity

Short-term goals, developed to work toward achieving long-term goals, offer daily incentive to change (Seligman et al. 2007).	Short-term goals are needed for reaching long-term goals.	Simplicity
---social cognitive theory have resulted in sustained behavior change (Seligman et al. 2007).	Observing others promote continuous change in behavior.	Observation
With additional guidance, patients with low literacy skills may be able to achieve the full benefit of written health material (Seligman et al. 2007).	With the help from others low-literate patients might get the full benefits of a written material.	Guidance
---the materials as a tool for behavior change (Seligman et al. 2007).	Information aids behavioral change.	Behavioral change
A brief intervention to teach patients how to develop their own action plans can help them learn to create the short-term goals that are the springboard for sustained behavior change (Seligman et al. 2007).	Supporting the make of an action plan can help patients to create short-term goals in order to change their behavior in the long run.	Sustainability
Action plans are short-term, easily achievable, and highly specific goals for immediate behavior change (Seligman et al. 2007).	Action plan is focused and simple short-term goal that aims for immediate behavior change.	Action plan
---education materials that patients with low literacy can understand, and act on is challenging (Seligman et al. 2007).	Low-literate patients need specified material in order to understand and act on it.	Patient centered
Text, artwork, and layout design must each be developed to emphasize the 2 to 3 key concepts chosen for communication (Seligman et al. 2007).	All the methods need to support each other to bring those 2 to 3 concepts forward.	Methods
Effective materials pay particular attention to writing style (Seligman et al. 2007).	Style of writing needs to be effective.	Effectiveness
Shortening words, substituting general terms for jargon, simplifying	Stripping the material down of all the decorative ways	

sentence structure, using the active voice, eliminating extraneous words, and replacing abstract principles with concrete suggestions will make the material more easily understood (Seligman et al. 2007).	leaving simple and clear instructions that are easy to understand.	Simplicity
Illustrations are engaging for all audiences, particularly those with low literacy (Seligman et al. 2007).	Illustrations are catchy for all but especially for low-literate people.	Illustrations
Drawings and photographs should emphasize key concepts, rather than be purely decorative (Seligman et al. 2007).	Pictures as an emphasis of the main concepts.	Emphasized by pictures
Well-designed pictures can effectively illustrate complex concepts that are difficult to communicate with simple words (Seligman et al. 2007).	Pictures can tell more than some words.	Explanatory
However, readers with low literacy skills are often unable to interpret complex figures--- (Seligman et al. 2007).	Complex figures are hard to understand.	Uncomplexed
Artwork must also be culturally appropriate and represent the diversity of the target population (Seligman et al. 2007).	Material needs to be culturally suitable and representing.	Culture sensitive
Using a large (12-point or higher), clear font, a logical flow of information, flags to draw attention to important text, headers to orient the readers to new topics, and adequate white space facilitate ease of reading (Seligman et al. 2007).	Easy to read. Guiding.	Flowing
Readers with low-literacy skills may have particular difficulty with cross-referencing text, such as using a glossary or referring readers to other pages for additional information (Seligman et al. 2007).	Information needs to be easily glanced through without having to search for it.	Focused
They may also have difficulty with unusual layouts, such as not	Sticking to the customs in page organization.	Accustomed

starting text in the upper left-hand corner of the page (Seligman et al. 2007).		
Educational materials engendering patient confidence and enthusiasm may be more likely to facilitate behavior change--- (Seligman et al. 2007).	A material that empowers patients is more likely to change their behavior.	Empowerment
---assess its use in the target population (Seligman et al. 2007).	The materials effectiveness needs to be evaluated by the target population.	Evaluation
---easily implemented and cost-effective, materials with high dissemination potential (Seligman e al. 2007).	Material that is easy to make and cheap to produce, is likely to be distributed.	Cost-effective
---assess changes in self-efficacy, outcome expectations, and actual behaviors, as knowledge improvement is not closely associated with health outcomes (Seligman et al. 2007).	Changes are evaluated in order to know how effective the material is.	Behavioral change
Timely, accurate and representative data on disease occurrence are the foundation for effective, targeted prevention and control (Mintz & Tauxe 2013).	Data gathering on time on the reoccurrence of a disease is the basic foundation for preventive health measures and control.	Data Gathering
Broadly-based programs for strengthening public health capacity, such as the Integrated Disease Surveillance and response program, the Field Epidemiology and Laboratory Training Program, the African Field Epidemiology Network Program, and the EPIVAC Field Vaccinology Training Program, combined with new international health regulations adopted in 2005 and fully implemented in 2012, have provided new resources and lent new impetus to improved surveillance, investigation, and reporting for many diseases, including cholera (Mintz & Tauxe 2013).	The field Epidemiology and Laboratory Training Program, The African Field Epidemiology Network Program and the EPIVAC Field Vaccinology combined with new international health regulations provides new resources to improved surveillance on report of many diseases.	Strengthening programs

Each Year from 2007 through 2011, at least 20 African countries reported >100000 cases of cholera to the WHO (Mintz & Tauxe 2013).	20 African countries have reported their cholera case more or less than 100 000 cases according to the WHO.	Cases report
During this period, annual case fatality ratio (CFR) for cholera in the African region range from 2, 22% to 2, 95%, and they exceed 5% in 1 country each year. With effective treatment the CFR for cholera should be >1% (Mintz & Tauxe 2013).	During 2007-2011 there has been an increase in the Case fatality rate in the African region. There should be effective treatment for this CFR of cholera to be going down to >1%.	Case fatality rate report
In 2012, at the time of writing 25 African nations have reported 94 553 cholera cases, including >85293 cases from large epidemics to the Democratic Republic of Congo, Sierra Leone, Ghana, Guinea, Uganda and Niger (Mintz & Tauxe 2013).	In 2012, 25 African nations have reported 94 553 cases of cholera with lager epidemics from the DRC, Sierra Leone, Ghana, Guinea, Uganda and Niger.	Reported cases
Active community-based surveillance for this waterborne infectious disease, coupled with a vigorous intervention program based on household water treatment and improved water supply, has eliminated cases and transmissions of dracunculiasis from 13 of 17 African countries and greatly the number of cases in the remaining 4 countries (Mintz & Tauxe 2013).	Community involvement in the disease surveillance along with a strongly-based program where water, hygiene and sanitation is concerned is strongly recommended for eliminating cases of waterborne diseases.	Disease transmission elimination
In Much the same way as occurred when cholera struck the Americas in the early 1990s, events in Haiti galvanized public and political attention to the public health sector, and yielded new guidelines and training materials in French and English that can be of immediate benefit in Africa (Mintz & Tauxe 2013).	In two separate cholera outbreaks from different centuries, the public health sector has the responsibilities to provide educating material in the language that is understood by the population at risk.	Education materials in the people own language
While much more needs to be done to further reduce the risk of endemic cholera over the long term, the decline in cases and in the	The educational on preventive method should be accompanied with providing the people with resources to	Education as preven-

CFR is attributable in part to significant investment in primary prevention through community education and training, dissemination of products for water treatment and hygiene, construction of basic sanitary facilities and provision of cholera treatment supplies and training in communities and health facilities (Mintz & Tauxe 2013).	help them keep in the basic habits of staying away from the risk of infectious diseases.	tive measures
Cholera surveillance has been enhanced and intensified in 9 of the most heavily affected countries in Africa (Mintz & Tauxe 2013).	Cholera surveillance has been intensified in the regions that are most affected in Africa.	Surveillance
The successful fight against cholera also requires dedicated human and financial resources (Mintz & Tauxe 2013).	Community will power and financial resources are the best bets the fight against cholera.	Resources
Per capita investments in cholera prevention and control in Haiti have far outstripped those typically allotted to epidemic cholera in African countries (Mintz & Tauxe 2013)	The help that Haiti far outweigh the help that the African countries have been getting in the fight against cholera.	Investments
While these efforts are welcome beginning, much more needs to be done to address the root conditions that enable transmission of epidemic cholera and a Pandora's box of infectious disease-fecally contaminated drinking water and inadequate disposal of human fecal waste (Mintz & Tauxe 2013).	The root of the cholera epidemic has to do with contaminated water and sanitation. Therefore those issues must be addressed.	Transmission
According to a recent report by Water Aid, 40% of the global population without access to improved drinking water sources and 24% of the global population without access to improved sanitation lives in sub Saharan Africa (Mintz & Tauxe 2013).	Access to drinking water and proper sanitation in a worldwide problem especially in the sub Saharan region of Africa.	Investments
Mobilizing funds for major investments in water, sanitation and hygiene in the parts of Africa that have the largest burden of endemic and epidemic cholera through a mechanism like the "call for Ac-	"Call for action" is a good example of mobilizing funds to help solve the water, hygiene and sanitation problem where cholera is endemic.	Mobilizing funds

tion" that was launched by the government of Haiti and the Dominican republic in January 2011 would yield enormous benefits if successful (Mintz & Tauxe 2013).		
More precise, timely and cross cutting surveillance can enhance cholera prevention and control in several ways (Mintz & Tauxe 2013).	Timely surveillance can help in many ways cholera prevention and control.	Surveillance
Stock out occur when cholera treatment centers run out of critical treatment supplies and are a disturbingly persistent and widespread risk factor for cholera mortality (Mintz & Tauxe 2013).	Shortage of supplies is likely to raise the level on incidence risk in cholera mortality.	Shortage of supplies
---- reliable data on the availability of resources needed for a vaccine campaign (eg. staff, vehicles, and cold storage) and using surveillance data to predict the likelihood that the outbreak will not end before the resources can be mobilized, vaccine delivered, and immunity increased in the target population (Mintz & Tauxe 2013).	If everything that is needed is in place along with reliable data can help in the fight against the disease.	Reliable data
The resources necessary to support more detailed cholera surveillance and the surveillance data to implement targeted interventions that will reduce cholera morbidity and mortality are available within the budgets of development banks and of governmental and non governmental agencies in Africa and elsewhere (Mintz & Tauxe 2013).	Government, financial institutions and non governmental agencies around the world have the capabilities of providing enough resources to assist in cholera surveillance data which can help implement measures of prevention to help reduce the case fatality rates of cholera.	Resources
Management of patients with cholera involves aggressive fluid replacement: effective therapy can decreased mortality from more than 50% to less than 0.2% (Harris et al. 2012).	An aggressive fluid therapy is very effective in reducing mortality in cholera's patients.	Management of patients
Prevention of cholera depends on access to safe water and sanita-	The best way to prevent cholera is to resolve the water	

tion (Harris et al. 2012).	and sanitation problems in a country.	Prevention of cholera
Two oral cholera vaccines are available and the most effective use of these in integrated prevention programs is being actively accessed (Harris et al. 2012).	Vaccine is another method of prevention use against cholera.	Vaccines as part of a prevention program
Although cholera is under-reported, WHO estimates that 3-5 millions cases occur per year predominantly in Asia and Africa, which periodic major epidemics including that in Haiti in 2010 (Harris et al. 2012).	Cholera has predominately affect a great number of people in Asia and Africa every year and also including that of Haiti in 2010, but they are many under-reported cases.	Cholera reported cases
Diarrheal diseases including cholera are the second leading cause of mortality worldwide among children younger than 5 years are one of the main causes of morbidity (Harris et al. 2012).	Children under 5 years are the most vulnerable age group where diarrheal diseases are present.	Children mortality rate
Cholera is also a major cause of severe dehydrating diarrhea in adults (Harris et al. 2012).	Cholera may cause severe dehydration.	Symptoms
Cholera occurs in both endemic and epidemic patterns. It is endemic in many areas of Asia and Africa (Harris et al. 2012),	Cholera can be epidemic or endemic, its endemic pattern is found both in Asia and in Africa.	Cholera pattern in Asia and Africa
In Asia, cholera occurs seasonally before and after the monsoon rains, the incidence in children and disease can occur in neonates (Harris et al. 2012).	The worst time for cholera epidemic in Asia is after the monsoon rains.	Incidence of cholera in Asia
In the past decade, devastating epidemics of cholera have occurred in Angola, Ethiopia, Zimbabwe, Pakistan, Somali, Sudan, Vietnam and Haiti (Harris et al. 2012).	Many African countries have suffered devastating epidemic of cholera in the past decade.	Past decade cholera epidemics
Among immunological naïve populations, cholera affects all age	Non immune population of the cholera strains can	

groups, and epidemics can be associated with high case fatality rates (Harris et al. 2012).	cause high rates of fatality.	Case of fatality rates
This Pattern was recorded in Haiti, where cholera had been notably absent before 2010 (Harris et al. 2012).	Haiti was non- immune to cholera before 2010 out-break.	Cholera in Haiti
Population density, poor sanitation and health infrastructure, and logistical obstacle to appropriate case management also contribute to a high case fatality rate in epidemic settings (Harris et al. 2012).	Poor sanitation and health infrastructure and logistics obstacles can cause high mortality rates in an epidemic outbreak.	Case fatality rate
Natural disasters that disrupt public health facilities such as cy-clones and earthquakes also contribute to cholera epidemic (Harris et al. 2012).	The aftermath of a natural disaster can put a strain on public health system in the forms of major epidemic outbreaks.	Natural disaster
Filtration of water through sari clothes reduces cholera transmis-sions by nearly 50%, consistent with removal of organisms attached to zooplankton (Harris et al. 2012).	Water filtration through a normal clean piece of cloth can reduce the risk of the bacteria in the water by 50%.	Water filtration reduc-es risk of transmission
According to the WHO, a case if cholera should be suspected when a patient aged 5 years or older develops severe dehydration or dies from acute watery diarrhea (Harris et al. 2012).	Cholera is likely to provoke severe dehydration and can lead to death if not properly treated in children from 5 years up.	Severe dehydration
---or when a patient under 2 years or more develops acute watery diarrhea in an area known to have cholera (Harris et al. 2012).	In cholera's area, children under two year who have developed sudden diarrhea should be considered of having the bacteria.	Children under 2 years
Few diseases have a clinical presentation as striking as that of chol-era (Harris et al. 2012).	Cholera symptoms offer much clues about the disease.	Cholera symptoms
Massive watery diarrhea, up to 1 L per hour, can lead to hypoten-sive shock and death within hours of the first symptoms (so called	Cholera at his worst can provoke death if fluid balance is done immediately.	Treatments

cholera gravis) (Harris et al. 2012).		
In an Outbreak, clinicians and public health officials often need to manage many patients at the same time (Harris et al. 2012).	It takes more than one healthcare professional to manage disease outbreaks.	Disease Management
Crucial response features include creation of cholera treatment center, training of staff in case of recognition and management; and provision of safe water and sanitation (Harris et al. 2012).	It is important to have a rapid response multidisciplinary team available on location during an outbreak.	Cholera's response
Dependent on the local situation, radio advertisements, mobile phone messaging, messages on billboard, community volunteers, and other methods can be important ways to educate the public about seeking medical care, oral rehydration use, sanitation and other ways to prevent or minimize transmission (Harris et al. 2012).	Mobilization and sensibilisation through local media are important to create awareness and education in the fight against a disease outbreak.	Awareness and education
Other important components of the public health response include disinfectants, proper disposal of waste and the bodies of those who died, and coordination of the response with community, regional, national and international authorities (Harris et al. 2012).	Efforts in minimizing the spread of the disease is to make sure certain measures are applied in accordance to the protocols rules of hygiene.	Public health activities
Continued progress in provision of safe water and adequate sanitation is a Millennium Development Goal (Harris et al. 2012).	Providing safe water to the 40% of the world population, who are missing it, is part of the WHO Millennium Development Goals.	Safe water and adequate sanitation part of Millennium development goals
During a cholera outbreak, the major response should focus on a case detection, rehydration-based treatment, and provision of safe water in conjunction with adequate sanitation, hand-washing, and safe food preparation (Harris et al. 2012).	Dealing with the issues of Water, Hygiene and Sanitation during a cholera outbreak is of major importance. All of this coupled with prompt treatment and care.	Controlling & prevention

---without reducing the continuing effect of this disease, suggesting that considerations of additional control strategies, such as vaccinations, is warranted (Harris et al. 2012).	The administration of vaccine is another way of controlling the disease.	Vaccination as control strategies
Cholera vaccines are given orally, and have an excellent safety profile, and target induction of mucosal immunity (Harris et al 2012).	The vaccines can be taken orally and it is a safe measure.	Vaccines
---WHO suggests that oral vaccine be considered as part of an integrated program in reactive situations in both epidemic and endemic settings in conjunction with both provision of safe water, adequate sanitation, case detection and rehydration strategies (Harris et al. 2012).	Vaccine is part of controlling the epidemic and also one method of prevention associated with safe water, hygiene and sanitation.	Vaccines
---Cholera remains largely a disease of impoverishment, social unrest and displacement, and continues to be a disease of major public health concern (Harris et al. 2012).	Cholera is always a major health problem especially for the less fortunate people such as the poor or the ones who are seeking safe heavens.	Cholera a public health concern
October 2010, cholera outbreak is the most recent of a long series of affront to the health of Haiti's population (Framer et al. 2011).	The cholera outbreak was a big setback for Haiti health care system fragility.	The health of a population
---it is yet another acute symptom of the chronic weakness of Haiti's health, water, and sanitation system (Farmer et al. 2011).	Cholera has proven how weak the health system has been in Haiti.	Weakness of Haiti's health
The cholera epidemic in Haiti is particularly devastating because of the vulnerability of Haiti after the January 2010 earthquake (Farmer et al. 2011).	The January 2010 earthquake has put a strain on Haiti fragile health care system which is why cholera was so deadly.	Haiti vulnerability to cholera
Some have raised doubts about the sustainability of free water distribution within internally displaced person (IDP) camps (Farmer et	Many have expressed concerns about the lifespan of the free water distribution in the IDP camps.	Sustainability of the

al. 2011).		free water distribution
First we must continue aggressive case finding and scale up treatment efforts, including oral rehydration therapy, intravenous rehydration, antibiotic therapy for moderate to severe cases), and complementary supplementation with zinc and vitamin A (Farmer et al. 2011)	Quick actions have to be taken to rehydrate the patients with fluid balances and antibiotic therapies along with vitamin A and zinc supplements.	Treatment efforts
Second, we must shore up Haiti's water infrastructure by building system for consistent chlorination and filtration of public water sources and by distributing point-of-use purification technologies (Farmer et al. 2011).	The need to build a safe public water system for Haiti which gives access to everyone.	Building a water system in Haiti
We must also strengthen the sanitation infrastructure by improving and expanding waste management facilities (such as sewage system and latrines), and waste monitoring (Farmer et al. 2011).	Sanitation and waste disposal in all forms infrastructure system need to be strengthen.	Strengthening the sanitation infrastructure
Third, link prevention to care by bolstering surveillance, education campaign (about hand- washing, for example), and water, sanitation, and hygiene (WASH) efforts (Farmer et al. 2011).	Prevention to care programs will include surveillance, education campaign about hygiene, water and sanitation.	Education as a method of preventive care
Prevention must also include advocacy for scale-up production of cholera vaccine strategy for Haiti (Farmer et al. 2011).	Advocacy for the production cholera vaccine is a requirement in the fight against the disease in preventive care.	Advocacy for cholera vaccine
With leadership from the Haiti government, we must work together to bolster responses to the acute problem of cholera today and strengthen Haiti's health, water, and sanitation infrastructure to prevent similar outbreaks in the future (Farmer et al. 2011).	The Leaders of Haiti must work together with other partners such as the NGO's in solving the problems of water, sanitation and hygiene in Haiti in order as a method of prevention against future outbreaks.	Prevention
Coupling community education about cholera transmission with the	Through education, community will learn to adopt safe	

provision of necessary supplies could improve hygiene behavior and reduce social stigma (Farmer et al. 2011).	hygiene practices as the preventive measure against cholera.	Community education to reduce stigma
People may defecate near public water supplies if they lack decent sanitation and sewage systems, they may draw water from contaminated sources if there is no alternative; and they may not washed their hands if soap is too expensive or inaccessible (Farmer et al. 2011).	If proper infrastructures are not put in place for the less fortunate, they will commit some actions that are unhealthy for them and for the environment such as defecating near water sources and source that same source for providing them with daily water use.	No alternative
The structure of poverty mediates risk of cholera infection, and therefore information can only keep cholera at bay if vulnerable population is not furnished with necessary resources and supplies (Farmer et al. 2011).	If there is lack of supplies for the population where resources is concerned therefore there is always risk of cholera reoccurrence.	Need for supplies
As noted proper hand-washing can significantly reduce the transmission of cholera and other waterborne disease (Farmer et al. 2011).	Proper hygiene is good way of prevent rapid transmission of waterborne disease.	Transmission reduction
Yet without adequate access to soap and clean water, public health message is futile (Farmer et al. 2011).	In order for the public health campaign to be effective, the population has to be provided to some resources that will help them practice the pattern learnt.	Futile message
Therefore, Education and behavioral change campaign must be linked with distribution efforts to make prevention and treatment tools available to all those receiving public health messages (Farmer et al. 2011).	Education needs to be accompanied by certain resources in order to be effective in a certain preventive campaign.	Education on Behavioral change
Health workers have encountered resistance to building treatment sites because local residents fear that these facilities could cholera in the community (Farmer et al. 2011).	Lack of knowledge can be a hindrance to preventive measures in a disease outbreak.	Resistance
OCHA and many Haitians media groups have reported lynching of	The officials and the media have reported on how little	

individuals thought to have used witchcraft to spread cholera (Farmer et al. 2011).	people knew about the disease and therefore have results in beliefs conflict.	Individuals' view on cholera
Stigma is, in part tied to ignorance about disease etiology, transmission, prevention and treatment (Farmer et al. 2011).	Lack of knowledge about the disease and its care can lead to negative beliefs.	Stigmatization
Behavioral and education efforts must therefore be linked to a flow of resources and medical supplies to the effective (Farmer et al. 2011).	Awareness and attitudes changes must be accompanied by medical resources in order to be effectives.	Education and Behaviors efforts
In addition, geographic information system (GIS) and basic capacity data have been used to map treatment site across the country (Farmer et al. 2011).	Keeping record track of treatments site across the country.	Record
Reliable data regarding treatment availability (and lack thereof) would improve the delivery of cholera care (Farmer et al. 2011).	In order to deliver effective treatment care on cholera, we need to have reliable data.	Reliable data
Surveillance is a key part of treatment and prevention, and simple but effective model exist (Farmer et al. 2011).	An effective model of treatment and prevention is the surveillance system of the diseases case.	Surveillance
Surveillance enables treatment experiences to drive prevention strategies and guides the efficient allocation of limited resources (Farmer et al. 2011).	Surveillance is also effective strategy in allocating limited resources where it's needed.	Surveillance
Surveillance must be part of a comprehensive response to the immediate epidemic and a cornerstone of the country's health infrastructure (Farmer et al. 2011).	Surveillance is to be considered as part of cornerstone activities to an immediate epidemic outbreak.	Surveillance
Education, supplement chain, treatments, and prevention channels can be coordinated to feed information to a central source (Farmer et al. 2011).	Coordination of activities of the disease can be reported to a central source.	Coordination

Scaled-up case finding and treatment are needed to ensure rapid access to care in rural areas (Farmer et al. 2011).	There is great need in stepping up access to care for people in the rural areas.	Case finding
Rural regions, where the majority of cholera cases have been recorded, face many delivery challenges, including large distances between patients and treatment centers, poor infrastructure, inadequate transport services, and insufficient health personnel (Farmer et al. 2011).	They are many challenges in delivery care to the rural regions.	Challenges
For example, household water treatment and safe storage (HWTS) technologies offer families an independent means of water treatment and storage, and they have been shown to reduce waterborne disease transmission even during epidemics (Farmer et al. 2011).	Access to safe water and its storage in each family has proven to have reduced the transmission of waterborne disease even during epidemic outbreaks.	Prevention
Cholera caregivers should also be trained to identify and treat other diarrheal diseases and illness of poverty (Farmer et Al 2011)	Education and awareness of household member is an important factor in treating the ill stricken members.	Training
Haiti faces both urgent and entrenched challenges that require solution combining speed in the short-term and sustainability in the long term (Farmer et al. 2011).	The challenges in the Haitian healthcare system require fast moving short term solution as well as sustainable long term goals.	Sustainability
In 2011, cholera cases caused by *Vibrio cholerae* have been reported from all regions of the world (WHO 2012)	Many regions around the world they have been reported cases of cholera.	Cholera reports around the world
A total of 58 countries reported a cumulative total of 589854 cases including 7816 deaths with a case fatality rate (CFR) of 1.3%, representing an increase of 85% in number of cases compared with the previous year (WHO 2012).	Cholera cases have been on the increase around the world in 2011.	Increase in cholera case fatality rates
In 2011, 61% of reported cases at the global level originated from a	The highest number of cholera case in 2011 has been	

large outbreak affecting Haiti, and the Dominican Republic that started at the end of October 2010. (WHO 2012).	from the outbreak of October 2010 that has affected the island of Hispaniola.	Report from Hispaniola
The actual numbers of cholera cases are known to be much higher than those reported (WHO 2012).	Not all cholera cases have been reported.	Case report
Prevention, preparedness and response all depend upon an effective surveillance system and are linked and interdependent (WHO 2012).	Surveillance is a response system that is linked to all other preventive measures of cholera activities.	Surveillance system
There is a need to shift the emphasis from response to prevention in order to avert outbreaks by expanding access to improved sources of drinking-water and improved sanitation, and by working with communities to encourage behavioral change to diminish the risk of infection (WHO 2012).	Improving the water system and sanitation problems along awareness and sensibilization can greatly reduce the risk of infection in a community.	Improved sources of drinking water and improved sanitation
Additionally, oral cholera vaccines which have proven to be safe and effective are now considered to be part of a comprehensive and multidisciplinary approach to cholera prevention and control (WHO 2012).	Oral vaccines are now considered to be a part of the cholera prevention program.	Cholera Vaccines
In 2011, the 65th World Health Assembly adopted resolution WHA 64.15 recognizing the emergence of cholera as a significant public health burden and calling for the implementation of an integrated and comprehensive approach to cholera control (WHO 2012).	Cholera has been recognized by the WHA as a public health burden therefore it is imperative that there is a system into place that will help control the disease.	Cholera as a public health burden
The outbreak which has spread to the whole country within one month after onset in October 2010, affected mainly highly populated areas before spreading to rural areas (WHO 2012).	After the first onset of the disease, the populated areas greatly affected before heading to the rural areas.	Affected areas
The explosive of the nature of the outbreak was linked to the lack	Many factors contributed to the explosiveness of the	

of immunity against *V. Cholerae* as well as to the limited access to safe- drinking water and basic sanitation, and the internal migration that followed the earthquake in January 2010 (WHO 2012).	cholera outbreak due to the fact that the population did not have any immunity against the bacteria, poor sanitation as well as lack of treated water especially after the January earthquake in 2012.	Immunity
Under the *International Health Regulations* (2005) notification of all cases of cholera is no longer mandatory. However public health events involving cholera must always be assessed against the criteria provided in the regulations to determine whether there is a need for official notification (WHO 2012).	Not all cases of cholera need to be reported according to the International health regulations (2005) unless needed be according to development related to public health events.	Reported cases
Local capacities for improving diagnosis, and for collecting, compiling and analyzing data, need to be strengthened so that vulnerable populations living in high-risk areas may be identified and benefit from comprehensive control activities (WHO 2012).	Data collection can help identified the areas where high-risk population is living so that there will be activities that are put into place to control the disease.	Control activities
Cholera surveillance should be a part of an integrated disease surveillance system that includes feedback at the local level information-sharing at a global level (WHO 2012).	The surveillance of cholera has be able to give feedback into a central system that would be providing feedback information at the local as well as on the global level.	Cholera surveillance
Experience shows that quarantine and embargoes on the movement of people and goods are unnecessary and ineffective in controlling the spread if cholera (WHO 2012).	Quarantine and embargoes ineffective in controlling the spread of cholera.	Cholera control
Countries neighboring cholera- affected areas are encouraged to strengthen their own disease surveillance and national preparedness to rapidly detect and respond to outbreaks should cholera spread across borders (WHO 2012).	Countries that share borders with a cholera outbreak country is advised to establish their own system of surveillance for early detection and put into place a system that will help control the spreading of the disease	Cholera control

	in their own population.	
Today, no country requires proof of cholera vaccination as a condition for entry and the international certificate of vaccination or prophylaxis no longer includes a special space for this (WHO 2012).	There is no need to show proof of vaccination against cholera when travelling outside of countries that have been affected by cholera.	Cholera vaccination
V. Cholerae O139, which emerged in the bay of Bengal in 1992, has so far been confined to South- East Asia (WHO 2012).	V. Cholerae O139 has been confined to South-East Asia since it discovery in 1002 in the bay of Bengal.	V. Cholerae O139
During 2011, only China reported occurrence of cases due to O139 strains. Countries are encouraged to test for both serogroups O1 and O139 when diagnosing *V. cholera* infection (WHO 2012).	WHO has recommended that all countries which have been having the Serogroups O1 would also test for the O139 when it comes to Vibrio Cholerae, because in 2011 it was found that there was O139 strains in China.	Occurrence of V.Cholerae
Recently newly evolved strains have been reported from several parts of the world. These variant El Tor strains express the toxin produced by classical strains, and appear to be more virulent (WHO 2012).	El tor strains which a new evolved strain from the previous one was discovered in other parts of the world and was found to be more virulent.	Virulent strain
These strains have first been identified in Bangladesh and have since been reported from several African countries, from Asia and from Hispaniola; they cause severe episodes of cholera associated with higher CFRs (WHO 2012)	The same sever strains of V. cholera that has been identified in Bangladesh been found in other parts of the world as well including the recent outbreak in Hispaniola.	The spread of the disease
Several oral cholera vaccines have been developed and proved to be safe, immunogenic and effective. Only 2 of these are currently being marketed (WHO 2012)	There are many oral vaccinations that are effective against cholera, but only two of them are being marketed.	Oral vaccination
One of these vaccines have been used in several mass vaccination campaigns with WHO support, and its use has enabled evidence to be collected on the effectiveness an implementation of oral cholera	Research has been done on the effectiveness and implementation of the oral cholera vaccines as preventive method during outbreaks.	Vaccines as a protection

vaccines as public health tool in protecting populations at high risk for outbreaks (WHO 2012).		
---immunization should be used with other prevention and control strategies in areas where the disease in endemic and in areas at risk for outbreaks (WHO 2012).	Immunization alone is not sufficient, it need to be done along with other strategies especially in are where the disease is endemic and in high-risk population.	Immunization
---WHO ad hoc meeting of experts on the integrated response to cholera outbreaks during large-scale humanitarian crises, a firm consensus was reached that, cholera vaccines should be used reactively to reduce mortality in areas where other interventions cannot delivered effectively (WHO 2012).	In areas where there are no other methods that can be done to reduce mortality, the cholera vaccines campaign must be undertaken.	Cholera Vaccines
Vaccinations should not disrupt other high-priority interventions, such as providing access to safe drinking water, improving basic sanitation, hygiene and social mobilization, all of which are efficient when properly applied (WHO 2012).	Vaccines are to be combined along with solving the problems of safe drinking water, hygiene and basic sanitation as well as mobilization. They are all in the same package.	Interventions
Vaccines provide a short term option for population in high-risk areas; longer term activities such as improving drinking-water and sanitation, need to be put in place to provide sustained control (WHO 2012).	Vaccines are a short term solution, but providing the basic necessity such as safe drinking water and sanitation is a long term sustainable goal in controlling the spread of cholera.	Vaccines, short term option