SCHOOL OF PUBLIC HEALTH, COLLEGE OF HEALTH SCIENCES,

UNIVERSITY OF GHANA

FACTORS CONTRIBUTING TO THE 2014 HIGH CASES OF CHOLERA IN THE LA DADE-KOTOPON MUNICIPALITY, ACCRA

BY

RITA ADJOA ANSONG

THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH DEGREE

JULY, 2015

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DECLARATION

I, Rita Adjoa Ansong hereby declare that except for references to other people's work which has been duly acknowledged, this dissertation is as a result of my own original research, produced from my own effort with guidance from my supervisor, and that no part of this dissertation has been produced or presented for the award of Master of Public Health (MPH) Degree anywhere.

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RITA ADJOA ANSONG DATE

(STUDENT)

…… ……..

DR MAWULI DZODZOMENYO DATE

(SUPERVISOR)

DEDICATION

This dissertation is dedicated to the Lord Almighty.

My family, Mr. Ohemeng Nketiah Wilfred, Ohemeng Agyeiwaa Freda, Ohemeng Boahemaa Mellisa and Ohemeng Nketiah Gideon for their fervent prayers.

My parents Madam Akua Dapaah, my mum and my late dad Mr. John Kwasi Ansong for showing me the light of the world.

Mr. Zikpi my former teacher who by his effort was the brain behind my formal basic education.

AKNOWLEDGEMENT

To God be the glory. No one has ever written a dissertation through his or her own ideas. This work has come to pass not through my ideas alone, but the good Lord who strengthened me throughout this programme.

I express my profound gratitude to my children and all other family members and friends for their physical, social and spiritual support.

My countless appreciation goes to my supervisor, Dr. Mawuli Dzodzomenyo through whose timeless effort and ideas this dissertation has come to be.

I wish to express my warmest gratitude to all my lecturers and course mates whose guidance and contribution has brought me this far.

Finally, I express my heartfelt appreciation to all my teachers from my elementary education to the tertiary.

ABSTRACT

Background: The study determined the factors that contributed to the recent high cases of cholera in the La Dade-Kotopon Municipality. It is established that all regions in Ghana has reported cases when the outbreak started in April, 2014. The Greater Accra Region recorded the highest number of cases of which LA Dade-kotopon Municipality contributed to most of the cases recorded.

Objective: The study assessed factors (such as level of knowledge, hygiene practices and socio-economic factors) of community members contributing to the 2014 high cases of cholera in La Dade- Kotopon Municipality.

Method: A cross sectional descriptive study was employed using a quantitative tool. Simple random sampling method was used in selecting 403 participants within the La Community in the Municipality who were administered questionnaires. The data elicited was analysed with Excel 2013 and Stata/SE version12 and summarized into charts, and frequency tables. Chi square was used to test the associations between the variables and odds ratio for the strength of associations.

Result: A majority (98.0%) of the respondents think that the cause of cholera is a germ whilst 0.8% think it is a curse and 1.0% indicated that they did not know what the cause of cholera was. 92.0% of respondents said that frequent hand washing could prevent cholera, however a few of the respondents (0.8%) indicated indiscriminate dumping of refuse and eating with dirty hands could prevent cholera. More than three quarters of the respondents (78.3%) said they washed their hands whenever their hands were dirty but only 2.3% of respondents washed their hands after defecation. The findings revealed most respondents' monthly earnings were between GHC 500.00 and below. The associations between the level of knowledge, hygiene practices and socioeconomic

factors with cholera were not statistically significant ($p \geq 0.05$). The level of knowledge of respondent and cholera infection indicated the following chi and p-values (cause $x^2 1.5$, $p > 0.812$, symptom x^2 0.5, $p > 0.924$, transmission x^2 0.1 $p > 0.730$, treatment x^2 2.3, $p > 0.726$ and prevention x^2 3.9, $p > 0.346$). Thus regardless of respondent's knowledge on cholera they are at risk of cholera. As well as the chi and p-values for hygiene practices and socioeconomic factors of respondents were also $p \geq 0.05$. The results revealed that those who have never had education before have a lower odd ratio (0.73) of getting cholera. Also those with SSS/SHS have a higher odds ratio (1.26) of getting cholera. Similarly, those with no employment have a higher odds ratio (1.25) of getting infected with cholera. Likewise, respondents who earn incomes below GHC 2, 000 have a higher odds ratio of being infected with cholera. Thus regardless of respondents' socioeconomic status, they were predisposed to cholera. There was therefore no need for adjusted odds ratios due to it not being significance statistically.

Conclusion: The study found that, there was no relationship between level of knowledge of respondents on cholera, hygiene practices and socioeconomic factors of respondents and cholera.

Recommendation: There is the need for a multi-sectorial approach, the Ministry of Health and Ghana Health Service needs to intensify health education cholera prevention. The Metropolitans, Municipals, Departments and Agencies should get involved as the major stakeholders in cholera prevention. Also the community, opinion leads, chiefs and queen mothers should actively participate in cholera prevention. The ministry of local finance should give a priority environmental and sanitation issues in the allocation of the national funds.

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LIST OF ABBREVIATIONS

AMA……Accra Metropolitan Assembly

CDC……Communicable Disease Control

CFR……..Case Fatality Rate

CTU…….. ...Cholera Treatment Unit

GHS…… ..Ghana Health Service

GSS……...Ghana Statistical Service

IV…… ..Intravenous

KVIP…… ..Kumasi Ventilated Improved Pit

MDG…… ..Millennium Development Goals

MPH…… ..Master of Public Health

ORS……..Oral Rehydration Salt

PHC……..Population and Housing Census

SWA …… ..Sanitation and Water for All

UNICEF…… ..United Nations Children's Fund

WHO…… ..World Health Organization

DEFINITION OF TERMS

Age.....	Number of Completed Calendar Years
Educational Level.....	Ever attended or attending School and the highest level of education attained
Employment Status.....	The status of a respondent in an establishment
Household.....	A person or group of persons who live together and sharing the same house keeping arrangements
Knowledge.....	The level of awareness level with regards to cholera
Marital Status.....	A contractual union of opposite sexes.
Occupation	The type of work a respondent is engaged in
Personal Practices.....	The hygiene practices of an Individual
Socio-Economic Factors.....	The type of social class an individual belongs to.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Cholera is an acute intestinal infection caused by the bacterium *Vibrio Cholerae.* The disease is spread from person to person by ingestion of food or water contaminated with human excreta containing the bacteria. As to the nature of it acuteness, it has a short incubation period of less than one to five days (two hours to five days). Once the bacteria finds itself in the human intestines, it produces an enterotoxin that causes one to have copious watery stools characterized by frequent vomiting (Ali et al., 2012). The copious fluid loss leads to rapid dehydration. Death can occur within 2 to 24 hours if prompt treatment is not given (WHO, 2000).

The disease can affect both adults and children (WHO, 2004). About 20% of those individuals who are affected experience acute watery diarrhoea and 10 to 20% of persons infected develop both watery stools and vomiting. The case fertility rate may reach 30 to 50% if not promptly treated, but can be reduced to 1% if treated promptly (Barua, 1972). Treatment of cholera is basically by rehydration, thus by replacing the salt and the fluid lost (WHO, 2004). Up to 80% of cases can be successfully treated with oral rehydration salts. However very severe dehydrated cases of cholera require the administration of intravenous fluids. Such patients also require antibiotics to diminish the duration of diarrhoea, reduce the volume of rehydration needed and also shorten the duration of *Vibrio Cholerae* excretion (Ghana Health Service, 2010).

About 75% of people infected with *Vibrio Cholerae* 01 and 0139 do not develop symptoms. Among the ones who develop cholera, 80% have mild or moderate diarrhoea. Where sanitary facilities are not available; bacteria are shared back to the environment which constitutes a source of further potential infection to others (WHO, 2004).

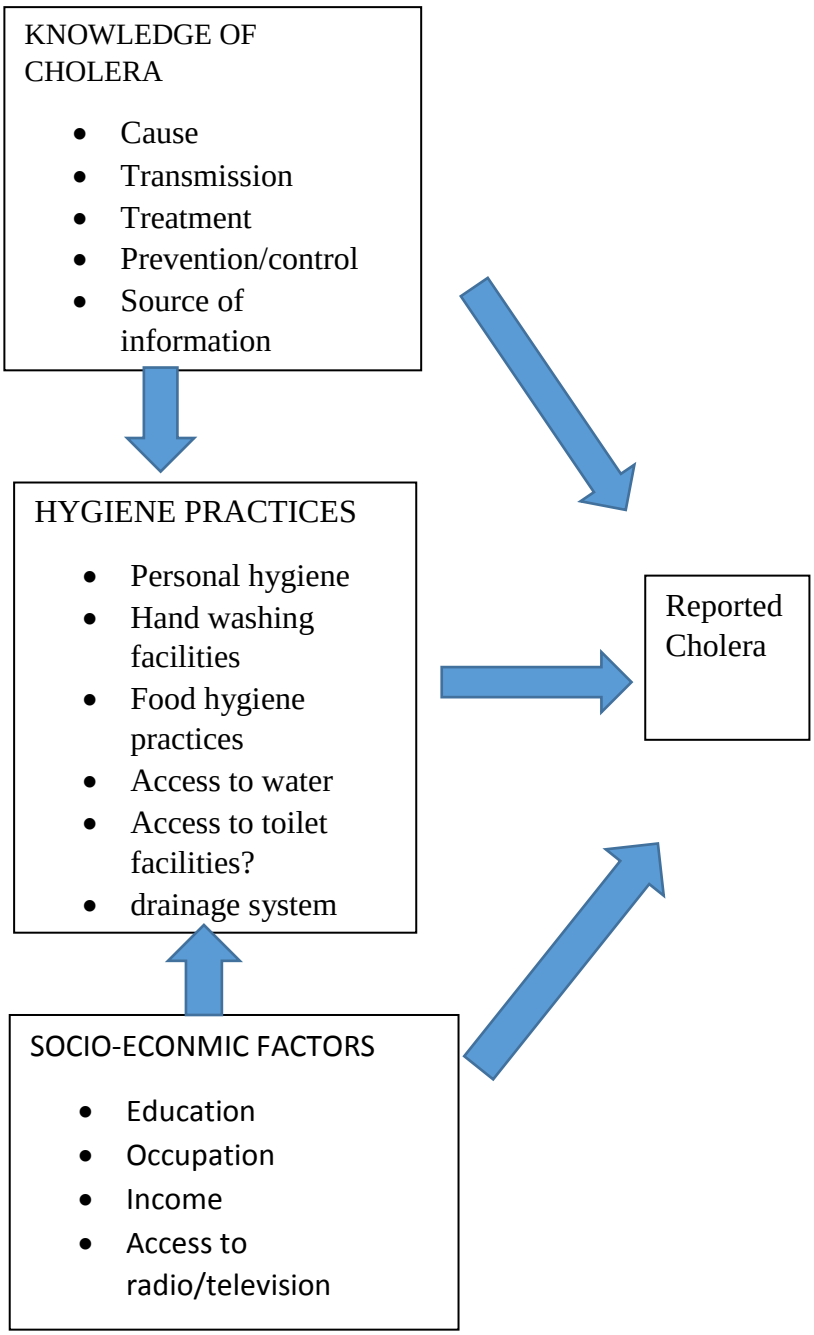
Effective surveillance is paramount to identify early cholera cases in endemic areas. Surveillance would guide intervention and also lead to prevention and preparedness activities (WHO, 2000).

1.2 STATEMENT OF THE PROBLEM

Globally, 3 to 5 million people are infected with cholera and a 100, 000 to 120, 000 deaths occur every year due to cholera (WHO, 2014). In Africa, of the 32 countries that reported deaths globally, 20 were on the African continent. These countries accounted for 3,397 deaths which was 45% of the global total deaths (WHO, 2011). The Americas, Haiti also reported 3,990 deaths, which accounted for 53% of the global deaths within a period of over seventy days (WHO, 2011). Cholera is now endemic in Ghana. Every five years, Ghana reports outbreaks of cholera (Opare et al., 2012). According to the Ghana Health Service (2011), the cholera outbreak that began in September 2010 were mainly from the Eastern, Central and Greater Accra Regions. Countries wide, over 8,000 cases with 89 deaths were reported in April 2011(GHS, 2011). Opare et al. (2012) also reported that, the Eastern region reported two confirmed cases of cholera in October 2010. UNICEF (2014), said that in the 2014 outbreak of cholera, Ghana recorded more than 15,400 cholera cases with 126 deaths as at September 2014. Most of the cases have been reported in the Greater Accra Region including the districts in Accra Metro and La Dade-kotopon. The La General Hospital recorded 1,615 cases of cholera as at October 2014, most of which came from the La Township. Males constituted the majority of the cases being 1,231 and females 722. These were cases coming from the sub communities of La such as Wireless, Apaapa, Kojo-Sardine, Maami and Ageman. A few cases from other municipalities such as Teshie and Osu were also recorded (Municipal Health Directorate La, 2014). Despite the interventions put in place (which included health

educational programs and adverts on both print and electronic media, posting of posters at public places), the disease still persisted due to poor environmental conditions such as, poor waste management, open defaecation and lack of a drainage system in the area. For further targeted interventions, an assessment of the factors responsible for the high morbidity and mortality needs to be evaluated. This study therefore seeks to determine the factors that contributed to the 2014 high cases of cholera in La.

1.3 CONCEPTUAL FRAMEWORK



The conceptual framework of this work illustrates the factors contributing to cholera. The factors that contribute to cholera are interconnected and multi-dimensional. Knowledge on cholera can help improve the hygiene practices that can predispose one to the disease. The hygiene practices determine how effectively one is likely to improve

one's personal hygiene, environmental and sanitation that could impact on individual's health. Literature has it that socio economic factors have a great impact on health.

1.4 JUSTIFICATION

This study is significant because the current levels of the knowledge, personal factors such as hygiene practices and the socio-economic factors of community members in La on cholera would be better understood and this would contribute to the development of interventions by the Ghana Health Service as well as the Municipal Health Directorate and the Accra Metro Assembly to redirect their strategies to curb cholera especially in the high risk population. The study will serve as academic document for future researchers to develop similar documents as well as help the researcher to develop knowledge and skills in future studies. It will also help stakeholders in planning and formulating future policies with regards to cholera as well as help non - governmental organizations who are interested in disease control activities draw their future policies. As a result of assessing potential gaps in knowledge, hygiene practices and socio-economic factors, appropriate policies and timely public health interventions can be implemented to limit or prevent cholera, ensuring an improved quality of life and reducing the social and economic trauma of cholera on the community.

1.5 RESEARCH QUESTIONS

1. What is the level of knowledge of community members in La Dade-kotopon on cholera?
2. Are hygiene practices of community members contributing to the recent outbreak of cholera in La Dade-Kotopon?
3. Do socio-economic factors of community members in La Dade-kotopon predispose them to Cholera?

1.6 GENERAL OBJECTIVE

To determine the factors contributing to the recent high cases of cholera in La Dade-Kotopon township of Accra.

1.6.1 SPECIFIC OBJECTIVES

1. To assess the level of knowledge of community members in La Dade-Kotopon on cholera
2. To determine the hygiene practices of community members contributing to the 2014 high cases of cholera in the La Deda-Kotopon.
3. To identify the socio-economic factors contributing to cholera in La Dade-Kotopon

CHAPTER TWO

LITERATURE REVIEW

2.1 KNOWLEDGE ON CHOLERA

A study carried out in Cameroon indicated a great handicap in information flow during and prior to the cholera outbreak (Njoh, 2010). UNICEF (2012) mentioned responding to cholera emergency through interpersonal communication reaching about 245,000 people and one million were reached with priority behaviour change messages through radio and television programs focussing on disease recognition, treatment seeking practices, and good hygiene practice. UNICEF however, asserted that implementing certain interventions in high-risk groups with poor knowledge of and attitudes toward cholera may not be appropriate. It is therefore important to understand the current levels of knowledge, attitudes, and practices of a given community to implement campaign programs and other preventive measures (UNICEF, 2012).

The World Health Organization (2004), indicated that cultural concepts of illness and how to treat and prevent it cannot be over looked because, it has practical implications for behaviour, public health, and disease control that need to be considered (WHO,2004).

According to WHO (2000), health education should continue throughout the year with intensification before the cholera season. As mentioned by WHO (2000), most of the educational messages are technically good, but difficult to implement. WHO (2004), cited that if soap for hand or chemicals for water treatment are not available, alternative solutions should be recommended to ensure basic hygiene practices to limit cholera transmission. Lime juice added to water, beverages or other foods have the ability to

inactivate *Vibrio Cholerae* (WHO, 2000). Also, WHO cited that it would be necessary to organize focus group discussions to identify gaps in knowledge and the kind of reinforcement needed in cholera periods in high risk communities. Checking to see whether soap and chemicals to treat water are available and affordable is another important thing recommended to do during these periods (WHO, 2000).

2.1.1 CAUSES OF CHOLERA

According to the World Health Organization (2004), cholera is a diarrhoea disease caused by infection of the intestine with the bacterium, either by type *1O* or *O139 Vibrio Cholerae*, which can infect both adults and children. In a retrospective descriptive study by Alam et al. (2006), on 16,379 stool samples cultured in Karachi Pakistan, it was discovered *Vibrio Cholerae O1 Ogawa* was the most common organism isolated in (32.8%) of the stool cultured. It was also found as the most common enteric pathogen isolated in an urban setting. According to Opare et al. (2012) *Vibrio Cholera Serotype Ogawa* caused the East Akim Municipality cholera-outbreak affecting many young adult males then females.

2.1.2 INCUBATION PERIOD OF CHOLERA

The incubation period of cholera according to World Health Organization (2001), is within two (2) hours to five (5) days; because of this short incubation period, death can occur within two (2) to twenty four (24) hours if medical care or treatment is not promptly sought for. This short incubation period can lead to a large number of cases reported extremely quickly (WHO, 2014). In other words, the short incubation period of

two to five days, according to Opare et al. (2012), enhances the potentially explosive pattern of outbreaks.

2.1.3 MANIFESTATIONS OF CHOLERA

As mentioned by WHO (2004), the disease is characterized with diarrhoea. Twenty percent (20%) of those who are infected with the disease develop acute watery diarrhoea whilst ten (10%) to twenty (20%) of these individuals develop severe diarrhoea with vomiting, leading to the loss of fluid and salt, which leads to severe dehydration and death within hours if individuals infected are not promptly and adequately treated (WHO, 2004). Severe Lethargic, unconsciousness, floppy sunken eyes, unable to drink or poor drinking ability, dry mouth, slow returning skin pinch etc. are suggestive of dehydration. In children, tears may not be present, thirst and eager drinking can be attributed to dehydration (WHO, 2004).

2.1.4 TRANSMISSION OF CHOLERA

Opare et al. (2012), indicated that transmission is closely linked to inadequate environmental management. Whilst WHO (2004), indicated that cholera is usually transmitted through faecal contaminated water or food and remains an ever present risk in many countries. The World Health Organization (2004), mentioned, new outbreaks can occur sporadically in any part of the world where water supply, sanitation, food safety, and hygiene are inadequate. The greatest risk occurs in over-populated communities and refugee settings characterized by poor sanitation, unsafe drinking-water, and increased person-to person transmission (WHO, 2004). According to Grandesso et al. (2014), two community-based density case-control studies were

performed to assess the risk factors for cholera transmission during inter-peak periods of the ongoing epidemic in two urban Haitian settings (Gonaives and Carrefour), the study indicated that close contact with cholera patients contributed to the severity of the outbreak (Grandesso et al.,2014). These were identified as sharing latrines, visiting cholera patients, helping someone with diarrhoea, eating food from street vendors and washing dishes with untreated water. Their findings revealed that, in addition to contaminated water, factors related to direct and indirect interpersonal contact played an important role in cholera transmission. Obeng (1997), indicates personal contact with infected people, and most likely ingesting the parasite from fingers and eating bowls, and food contaminated with the watery stool is the most effective way of spreading cholera.

2.1.5 CHOLERA TREATMENT

The World Health Organization (2004), recommends that cholera treatment units should be ready in endemic settings before an outbreak occurs. This should be done by identifying suitable sites, pre-position of supplies, stocks of drugs, personal protective equipment, containers with disinfectant, organization of patient flow and individual job descriptions for personnel in cholera treatment centres . In slums and refugee camps where there are no health care facilities, cholera treatment centres can be set up using tents. During outbreaks in open communities, the CTU might be established inside the health care facility or in another community building, for example a school, if the health centre is too small to ensure isolation of the cholera patients (WHO, 2004).

In untreated cases, the case fatality rate may reach 30–50%. Treatment is straightforward and, if applied appropriately according to WHOs standards, should keep case-fatality rate below 1% (WHO, 2004). Rehydration with replacement of electrolytes lost is the

mainstay of cholera treatment. According to the dehydration stage, the patient should receive different rehydration therapy oral or intravenous fluids. Oral rehydration solution (ORS) should be used during and after intravenous (IV) therapy.

Surveillance of the patient is crucial during the early stage of treatment (WHO, 2004). According to WHO standards, Ringer's lactate is the preferred IV fluid and Nine percent (9%) normal saline or half normal saline with five percent (5%) glucose can also be used, but ORS solution must be given at the same time to replace the missing electrolytes. Plain glucose solution is not effective in rehydrating cholera patients (WHO, 2004). When IV rehydration is not possible and the patient cannot drink, ORS solution can be given by nasogastric tube. However, nasogastric tubes should not be used for patients who are unconscious (WHO, 2004).

Cited by WHO (2004), antibiotics should be given only in severe cases, to reduce the duration of symptoms and carriage of the pathogen. Antimicrobial resistance is increasing, and in most countries *Vibrio Cholera* is resistant to cotrimoxazole (septrin). In some settings, it has also developed resistance to tetracycline. The laboratory should be asked about patterns of resistance of the strain at the beginning and during the outbreak, antibiotic sensitivity to antibiotics may return after a certain period (WHO, 2004). Through an active case search in the communities of East Akim Municipality, Opare et al. (2012), revealed that a number of cases did not report to health facilities for medical attention, but instead resorted to alternative local measures for treatment. Examples of these are, drinking of starch extracted from cassava, salty water, and a concoction of charcoal mixed with salt. A few others took Oral Rehydration Salts (ORS) bought from chemical shops in the East Akim Municipality, Ghana.

2.1.6 PREVENTION/CONTROL OF CHOLERA

According to the World Health Organization (2004), it is impossible to prevent cholera from being introduced into an area, but spread of the disease within an area can be prevented through early detection and confirmation of cases, followed by appropriate response. WHO (2002), indicates that cholera is an acute public health problem with the tendency of causing high mortalities. It spreads quickly amongst local regions and eventually, across borders as people travel. Cholera outbreaks seriously affect travel and trade, therefore a well-coordinated, timely, and effective response to outbreaks is paramount (WHO, 2004).

Response activities should always be followed by planning and implementation of preparedness activities that will allow future cholera outbreaks to be dealt with more effectively. A strong cholera preparedness plan and programme is the best preparation for outbreaks in countries at risk of cholera, whether or not they have yet been affected, or countries in which seasonal recurrence of the disease may be expected (WHO, 2004).

Environmental Protection Agency (2013) cites that to ensure long term prevention of cholera, it is important to maintain the provision of potable water supply. Improvements in food safety and sanitation, and the creation of community awareness on preventive measures are the best means of preventing cholera as well as other diarrhoea diseases. In cholera outbreaks, mass chemoprophylaxis is not effective in controlling cholera. Therefore, selective chemoprophylaxis (one dose of doxycycline) may be useful for members of a household who share food and shelter with a cholera patient. However, in societies where intimate social mixing and the exchange of food between households are common, it is difficult to identify close contacts (WHO, 2004). Moreover,

chemoprophylaxis may be useful when a cholera outbreak occurs in a closed population, such as a prison. A comprehensive public-health package should consist of investment in safe water and sanitation, improved food safety, and the inclusion of a safe and affordable oral cholera vaccine to prevent cholera in high-risk populations (WHO, 2004).

2.1.7 KEY MESSAGES TO GIVE TO THE COMMUNITY

According to WHO (2004), Page 42-44 the most important messages to prevent the family from being contaminated are:

- *Wash hands after taking care of patients touching them, their stools, their vomits, or their clothes.*
- *Beware of contaminating the water source by washing patients' clothes in the water.*
- *Go to the health care facility as soon as possible in case of acute watery diarrhoea.*
- *Start drinking ORS at home and during travel to the health care facility.*
- *Wash your hands before cooking, before eating, and after visiting the toilet.*
- *Ensure food is not exposed to flies and cooked food is eaten hot.*
- *Ensure drinking water is safe by chlorination or boiling.*

Grandesso et al. (2014), also suggested that in order to reduce cholera transmission, intensive preventive measures, such as hygiene promotion and awareness campaigns are to be implemented during inter peak periods, when prevention activities are typically scaled up (Grandesso et al. 2014).

2.2 HYGIENE PRACTICES

2.2.1 PERSONAL HYGIENE

A study conducted among food handlers in selected schools in Malaysia demonstrated that food handlers had basic knowledge of good personal hygiene. This is significant because lack of knowledge of personal hygiene and its practice have been shown to be contributory factors to food borne illnesses in various vendor foods (Tan et al., 2013).

The study results proved that the basic knowledge respondents had on personal hygiene practices, was mainly on hand washing (30.7%) and (18.7%) on glove use. Less than eleven percent (<11%) proved their knowledge on other good personal hygiene practices that were related to the use of hair restraint, clean nails and hands, no bare hand contact with food, wearing clean attire and typhoid injection (Tan et al., 2013). The socio-cultural practices as to how Africans socialize with each other in social gatherings was also mentioned (WHO/Chaignat, 2014). Human behaviour related to personal hygiene and food preparation contributes greatly to the occurrence and severity of outbreaks (WHO, 2003). A recent study in Cameroon also illustrated that low educational activities dedicated to health, hygiene and sanitation practices and an abundance of adulterated food, impacted cholera infection and transmission and suggested that behavioural change within the whole community was needed (Huq et al., 2005).

2.2.2 HAND WASHING FACILITIES

The study according to Tan et al. (2013), also revealed that hand washing was the most familiar practice performed by (30.7%) of the respondents, but further investigation on proper hand washing revealed eighty eight percent (88%) of food handlers failed to describe good hand washing practices with drying of hands being the most missed step. Only twelve percent (12%) of respondents were able to describe a reasonable procedure for hand washing (Tan et al., 2013).

During the study by Nkongo and Chong (2009) in Tanzania, it was realized that, a total of thirty eight (38) households out of forty two (42) reported that they washed their hands after visiting the toilet (Nkongo and Chong, 2009). It was also established that, thirty (36) out of forty two (42) households mentioned that they had hand washing

facilities, but when observed, it was the availability of cleaning facilities only. According to the study, 6 households had the facilities either inside or outside the toilet (Nkongo and Chong, 2009). Hand washing at critical times was a key message for good hygiene practices (Nkongo and Chong, 2009). Practitioners in water and sanitation were challenged because; most surveys indicated that households did not always follow good hygiene practice (Nkongo and Chong, 2009). Six (6) out of the thirty nine (39) households had suffered one of these conditions: cholera (38), typhoid (34), diarrhoea (33), skin disease (31) and others (Nkongo and Chong, 2009).

2.2.3 FOOD HYGINE PRACTICES

Eighty percent (80%) of the respondents knew that the use of gloves was to prevent bare hand contact to food and eighty eight percent (88%) believed this could reduce risk of food contamination (Tan et al., 2013). According to Tan et al. (2013), all respondents agreed that unwrapped food should not be handled by food handlers with abrasions or cuts on their fingers or hands. More than ninety percent of respondents (>90%) practiced various good hand washing practices, with only 36%) of respondents who did not practice washing hands after eating (Tan et al., 2013). Furthermore, more than seventy percent (>70%) of respondents practiced glove use, however more than fifty percent (>50%) did not wash hands with every glove change, after preparing raw material and changing the type of products (Tan et al., 2013).

The study by Yoada et al. (2014), at Medina Urban Accra in Ghana revealed that the number of respondent who cooked at home was high (74.2%), as also the frequency of cooking at home. In the study, seventy seven percent (77.8%) of the respondents indicated that they cooked at home daily and eleven point nine percent (11.9%) cooked

at home every other day (Yoada et al., 2014). 5.5% cooked at home three (3) times a week, and 4.8% cooked at home weekly (Yoada et al., 2014). A study among food handlers working in a food establishment around a Rural Teaching Hospital in India revealed that Klebsiella was found in 56(35%), Pseudomonas in 4, i.e. (2.50%) of the stool cultures, and Staphylococcus in 91(56.87%), E-coli in 28(17.5%), and Klebsiella in 35, i.e. (21.87 %) of the nail cultures (Abhay et al., 2010).

2.2.4 ACCESS TO WATER

The residents of La used these sources of water as their main drinking water: pipe-borne water in- residence forms 31.9%, and outside-residence 30.5%, sachet water 24.0% and public tap 9.2% (GSS, 2014). Similarly, a study by Aderson and Hogas (2008), in Ethiopia revealed that respondents used the same sources of water in different regions with the difference being (spring, lake, river, and rain water in Ethiopia and sachet water in Ghana). The possible sources of water reported in the survey are: tap in household, tap in compound, both shared and private, protected well/spring, unprotected spring/well, rain water (wet season only) and ponds, lakes and rivers.

Abogan (2014) stated in his study that, pollution of water sources with excreta were some of the findings which contributed to cholera outbreaks in the study area. He also mentioned that further findings in the study suggested that most of the hospitalized and disease outbreak that occurred in recent times in the study area was as a result of poor sanitation, environmental and water pollution with excreta (Abogan, 2014). According to Wokekoro and Inyang (2014), most respondents (68.4% in Marine Base and 94.6% in Afikpo) all in Nigeria buy water from owners of private boreholes. Wokekoro and Inyang (2014) stated that the provision of water and sanitation was inadequate.

According to Opare et al. (2012), Environmental Assessment in the East Akim Municipality in Ghana revealed that most of the water bodies were found to be macroscopically dirty due to the indiscriminate mining activities. Documented by Nkongo and Chong (2009), a study conducted in Tanzania among People Living with HIV/AIDS cited majority of the respondents used water sources located within their own houses representing 9.8% and in neighbours' yard, 53.7%. Almost all respondents indicated that they used less than 30 minutes to fetch water (Nkongo and Chong, 2009).

A discussion paper on water and human rights, written by Tripathi et al. (2009), indicates that access to water is a fundamental human right, therefore governments must ensure access to safe drinking water. Government must also ensure that companies do nothing to infringe on such access (Tripathi and Morrison, 2009). According to Adeleke et al. (2009), progress towards target 7C of the MDGs of halving the proportion of people without sustainable access to safe drinking water and improved sanitation facilities remains slow (Adeleke et al., 2009). And the rate of access to improved water sources increased from 49% in 1990 to 60% in 2008, a marginal increase of less than 1% a year (Adeleke et al., 2009). This implies that, in 2008, a significant number of people in the region still lived without access to potable drinking water and 84% of which are in rural areas. According to Adeleke et al. (2009), as expected, access to improved water source is higher in urban than in rural areas. Adeleke et al. (2009) stated that there was however no progress made between 1990 and 2008 with the access to improved water source being stagnated at (82%).

Channels with stagnant water were common around buildings in swampy areas in the East Akim Municipality in Ghana (Opare et al., 2012). The study by Monney et al. (2013), revealed that the Old Fadama community in Accra depended totally on vended water for their daily need of water supply. Apart from being bought at exorbitant prices,

the sources of drinking water were also contaminated with attendant health risks. 80% of the population having access to improved water sources, access to improved sanitation by 2015 however has remained a challenge. Cited by (Monney et al, 2013). According to Opare et al. (2012), traditionally, females were more involved in fetching water for domestic use from the local stream, and possibly drinking directly from the stream, which could expose them further to the infection.

2.2.5 ACCESS TO TOILET FACILITY

According to the district analytical report GSS (2014), forty four point four percent (44.4%) of households used public toilet and about forty three percent (43%) used water closets whilst four point five percent (4.5%) used KVIP. Four percent (4%) of households in the municipality had no toilet facility; they used the bush or beach as places of convenience (GSS, 2014).

A strategic guide entitled, *Improving Public Access To Better Quality Toilet*, mentioned that, customer expectations of council services continue to rise and the increasing population of older citizens and children will mean that even, more people will require toilet facilities that are accessible, clean and safe (Andrews et al., 2008). Andrews et al. (2008), also indicated that places where we live, shop, work, take recreation are more accessible and attractive when toilets are well planned, designed, maintained, clearly signposted, and available when people need to use them. They indicated that toilets are one of a range of amenities that help to attract a more diverse range of visitors, encouraging them to stay longer in towns and city centres, and to visit again (Andrews et al., 2008). This guide also cited that, the location, accessibility and conditions of our toilets are of significant inconvenience, which impacts on public health, the image of the

town, and limits the quality of life for many people (Andrews et al., 2008). Andrews et al. (2008) stated that public toilet provision is also an important issue for areas relying on tourism income, or seeking to develop their profile as a visitor destination. The UK visitor economy was worth eighty five billion pounds (£85) in 2005, 80 per cent of which was from domestic tourism (Andrews et al., 2008). According to Andrews et al. (2008), lack of toilet facilities at the right time in the right place contributes to dirty streets that are unsanitary, unpleasant and can spread infection leading to unhealthy communities. Public toilets in places like parks and promenades help to encourage people who may need regular toilet access to take exercise and stay physically active (Andrew et al., 2008). Toilets that are badly designed, maintained, and poorly located, generate a sense of neglect, attracting vandalism, anti-social behaviour and social disorder (Andrew et al., 2008), These issues, if not tackled effectively, can generate a cycle of decline, leading to more entrenched social problems, and seriously impairing quality of place and quality of life for local people (Andrew et al.,2008).

According to Abogan (2014), some residents also resorted to open defeacation as they claimed that their toilet collapsed due to flood. Wokekoro et al. (2014), mentioned that the commonest type of toilet in the study area was the pier toilet found mostly in the waterfront settlements of Marine Base and Afikpo, while the water closet was also found in Marine Base (Wokekoro et al., 2014). The study by Wokekoro et al. (2014), revealed that about fifty percent (50%) of the respondents in Marine Base and about ninety five percent (95.7%) in Afikpo informal settlements dispose of their excreta (feaces) and urine into creeks which are sources of water pollution (Wokekoro et al.,2014). In Nkongo et al. (2009), study in Tanzania revealed that, at least in terms of basic latrine, accessibility to sanitation facilities was encouraging. The types of toilet facilities were pit 81%, flush 14%, public latrines 2%; contributed to 2% of the toilets. The majority of

these latrines, (eighty-five percent (85%)) were located in household's dwellings and outside dwelling compounds, fifteen (15) percent (Nkongo et al., 2009). Monney et al's. (2013), study in Old-Fadama in Accra, mentioned that household toilet facilities were not available in the community thereby making residents depend exclusively on poorly maintained public toilets whilst others resorted to open defecation. The study also mentioned that lack of space due to high population density prevented residents from constructing household toilets. Opare et al. (2012) also pointed out that, majority of the people used pit latrines which were shallow because of the high water table in most of the communities in the East Akim Municipality where the outbreak occurred. According to Jenkins and Curtis (2005), cited by Monney et al. (2013), access to these unimproved sanitation facilities, results not only in faecal contamination of the environment and transmission of gastro enteric infections, but also loss of dignity and quality of life. Apart from lack of privacy on these facilities, findings from interviews, focus group discussions verified by personal observations, revealed offensive odour, fly nuisance and unsightly conditions around the facilities (Monney et al., 2013).

2.2.6 DRAINAGE SYSTEM

The GSS (2014), cites that liquid waste is mostly disposed into gutters through a drainage system into gutters and through a sewage system. This respectively accounts for the following percentages: thirty four point nine percent (39.4%) in gutters, thirty percent (30.0%) through a drainage system into gutters and eleven point six percent (11.6%) into sewage system. Wokekoro et al. (2014), disclosed that residents in Marine Base and Afikpo Waterfront Settlements in Nigeria dispose off their liquid waste into creeks. A study in Nigeria by Abogan (2014), revealed poor drainage system in the study area which sometimes caused flooding of soak away pits, contributing to the outbreak of

diseases. From1999 to 2008 over the same period, growth in access to improved sanitation facilities was even more disappointing, from 27% to 31% (Adeleke et al., 2009). (Adeleke et al., 2009) also indicated that 567 million individuals still lacked access to improved sanitation. These numbers are significant and a serious cause for concern. In a sub-sample of 21 SSA countries, only 16% of the poorest quintile of the population was found to have access to improved sanitation, compared to nearly 80% of the population in the richest quintile. To make matters worse, the gap between progress in water and sanitation is set to widen. Lamond and Kinyanjui (2012) said that poor sanitation and environmental practice, unprotected water sources and unsafe faecal disposal has generally remained the practice of venerable communities. A study carried out at Old-Fadama, the largest slum community in Accra, Ghana, indicates that access to basic sanitation is a huge challenge to residents in the slum, in that the facilities available are not only inadequate, but also unimproved as per the classification of the WHO/UNICEF Joint Monitoring Programme (Monney et al., 2013). They also mentioned choked drains and pools of stagnant water which posed possible health effects such as diarrhoea and cholera. (Monney et al., 2013).

2.2.7 REFUSE DISPOSAL

Domestic waste disposal practice and perception of private sector waste management in urban Accra a study conducted by Yoada et al. (2014), indicates that sixty one percent (61.0%) of households disposed of their waste at community bins or picked up from their homes by private contractors. The remaining 39.0% disposed of their waste in gutters, streets, holes and nearby bushes (Yoada et al., 2014). According to Yoada et al. (2014), about sixty three percent (62.9%) of those who paid for the services of the private sector were not pleased because of the irregular collection and cost (Yoada et al., 2014). The

study also revealed that about eighty three percent (83%) of the respondents were aware that improper waste management contributed to diseases such as malaria and diarrhoea (Yoada et al., 2014). The district analytical report GSS (2014), indicated that waste collected from homes is the most common disposal method accounting for seventy seven (77) percent and by public container about sixteen (15.6) percent (GSS,2014).

A study carried out in Port Harcourt in Nigeria entitled, *Waste Disposal Practices in Informal Settlements and its Impact on Health: The Case of Port Harcourt, Nigeria* cited that, about sixty nine percent (69.4%) of the respondents in Marine- Base and eighty-one percent (81.7%) in Afikpo waterfront in the informal settlements disposed their waste into streams, roads and drains (Wokekoro et al., 2014).

Cited in Wokekoro et al. (2014), 19.4% of the respondents in Marine-Base dump waste at collection points, for collection by Government contractors and subsequent disposal at final open dumping disposal sites. The study in Port Harcourt discovered that the method of refuse collection and disposal in the city and neighbourhoods was poor (Wokekoro et al., 2014). Furthermore, the study disclosed that 68.4% of the respondents in Marine Base and 89.2% in Afikpo water front, specified that the city council never picked up garbage from their neighbourhoods (Wokekoro et al., 2014). Also, twenty percent (20.4%) and eleven percent (10.8%) of the respondents in Marine – Base front and Afikpo water front said that the government picked up garbage occasionally (Wokekoro and Inyang, 2014). In the waterfront settlements, garbage was tipped into water bodies or dumped near the pier toilets (Wokekoro and Inyang 2014). The study by Wokekoro and Inyang (2014), specified that forty eight percent (48%) disposal of human waste in water closets in the study area (Wokekoro and Inyang, 2014). Monney et al. (2013), revealed there was indiscriminate waste disposal in Old-Fadama, which contributed to choked

gutters. Refuse disposal was poor with rubbish heaps near dwellings in the East Akim Municipality, Ghana (Opare et al., 2012).

2.3 SOCIO ECONOMIC FACTORS

Opare et al. (2012), indicates that cholera is a key indicator of lack of social development. Risk factors for cholera outbreaks include poor access to safe drinking water, contaminated food, inadequate sanitation, and large numbers of refugees or internally displaced persons (Opare et al., 2012). The study revealed that, the outbreak especially affected young adult males (probably due to the involvement of some of them in the small scale mining activities in the area which exposed them to the index case through direct contact or sharing of the same water source) (Opare et al., 2012). According to Opare et al. (2012), a number of females were also affected especially those aged between 20-49 years. This age group corresponds to the primary part of the population involved in mining activities. This observation could be due to the fact that some of the females were miners, a few as food vendors at the mining sites and also members of the household of the miners (Opare et al., 2012).

As indicated by GSS (2014), the economically active population falls within age fifteen (15) years and above. This forms about seventy percent (70.3 %) whereas about twenty nine percent (29.7%) are not economically active (GSS, 2014). Noted in the report, about ninety one percent (91.4%) of the economically active population were employed whereas about eight percent (8.6%) were unemployed (GSS, 2014). The GSS (2014), mentioned that a larger percentage of those who were not economically active were students, i.e. about fifty percent (50.7%), twenty point seven percent (20.7%) performed household duties and two point eight percent (2.8%) were disabled or too sick to work. About five out of ten which constitute (57.6%) unemployed are seeking work for the first time (GSS, 2014). Other age groups not directly involved in mining were minimally

affected. Household contacts with affected small scale illegal miners could be the underlying factor for the communitywide transmission of this outbreak (Opare et al., 2012).

2.3.1 EDUCATION

A survey conducted by Fening and Edoh (2008), in Akim Oda, Ghana, to relate socio-economic differences, as a measure among residents in three communities to diarrhoea prevalence revealed that residents from Old-town and Aduasa who belonged to the low social class reflected in their high illiteracy rate as well as the highest prevalence of diarrhoea diseases (Fening and Edoh, 2008). However, the Quarters residential areas were found to belong to high social class, which was reflected in their high literacy and as such they had no case of diarrhoea (Fening and Edoh, 2008).

The GSS (2014), cited in its report that ninety four percent (94%) of the citizenry eleven (11) years and above in the municipality were literates, whilst six percent (6%) were non-literate. The analytical report of the GSS (2014), also denoted the number of female non-literates, being six thousand, seven hundred and twelve (6,712), which was over three times higher than the number of males, which were one thousand, eight hundred and eighty seven (1,887). It was also noted that female literates were sixty nine thousand, seven hundred and forty six (69,746) in the municipality were more than males who were sixty four thousand, three hundred and eighty eight (64,388)(GSS, 2014). Sixty one percent (61.0%) indicated they could speak and write both English and Ghanaian language (GSS, 2014). About one hundred thousand, four hundred and sixty eight (100,468) constituted those who had attended school in the past. This was made up of females being fifty two thousand, five hundred and ninety two (52,592) and males, forty

seven thousand, eight hundred and seventy six (47,876), district analytical report (GSS, 2014).The following were the distributions: Middle school, 20.6%, JSS/JHS 18.9%, SSS/SHS, 15.1%.

- In the Yoada et al. (2014) study, almost half of the respondents forty eight point one percent (49.1%) had basic education, whilst 38.2% attained a senior/high and the rest, 12.6% had no formal education (Yoada et al. 2014).

2.3.2 OCCUPATION

Unemployment rate was higher in the residents of Old-Tafo and Aduasa at Akim Oda in Ghana who were in the low social class as well as high prevalence of diarrhoea than the quarters area who were found to be in high social class (Fening and Edoh, 2008). The GSS (2014), signifies that the private informal sector was the largest employer in the La municipality, employing about sixty percent (60.7%), followed by the private formal sector with nineteen (19.0) percent (GSS, 2014). About thirty eight (38.7) percent of citizens aged fifteen (15) years and above were self-employed and about two percent (1.9) helped their families in working (GSS, 2014). Over one percent (1.6%) were casuals and about one percent (1.2%) house helps. Only about three percent (3.1%) of households in the municipality were engaged in agricultural activities (GSS, 2014). Of the employed population, only one percent (1.5%) were engaged as skilled agricultural, forestry and fishery workers, about thirty four percent (34.8%) in service and sales, eighteen percent (18.8%) in craft and related trade, and nineteen percent (19.0) were engaged as managers, professionals, and technicians (GSS, 2014). About seventy three percent (73.4%) were employed whilst the remaining twenty six point six percent (26.6%) were unemployed (Yoada et al., 2014).

2.3.3 INCOME

According to Yoada et al. (2014), most respondents, forty eight percent (48.1%), received monthly earnings ranging from one hundred Ghanaian Cedis (GH¢100) (equivalent to sixty seven US Dollars (US$67) to three hundred and nine Ghana Cedis (GH¢399) (which is also equivalent to two hundred and sixty six US Dollar (US$266)). Twenty one percent (21.7%) of the respondents received less than a hundred Ghanaian Cedis (GH¢100) which was equivalent to sixty seven US Dollars (US$67) (Yoada et al., 2014). Approximately, Yoada et al. (2014), said that out of 10 respondents, four (39.6%) lived in compound houses, a common type of housing in Ghana (Yoada et al., 2014). The Fening and Edoh survey revealed that residents from Old-town and Aduasa who belonged to the low social class, reflected in their high unemployment and income rates as well as the highest prevalence of diarrhoea diseases (Fening and Edoh, 2008). However the Quarters residential area were found to belong to high social class, which was reflective in their high employment and income rates, as such they had no case of diarrhoea (Fening and Edoh, 2008).

2.3.4 ACCESS TO RADIO/TELEVISION AND OTHERS

According to GSS (2014), about seventy eight percent (77.9%) of the population twelve (12) years and above, had mobile phones. Men who owned mobile phones constituted forty eight percent (48.1%) as compared to fifty one percent (51.9%) of females (GSS, 2014). The population, twelve (12) years and older, who used internet facilities in the district was twenty six percent (26.2%) compared to eighteen percent (18.6%) in the region (GSS, 2014). Only twelve thousand, three hundred and fifty six (12,356) households representing twenty four percent (24.2%) of the total households in the municipality had desktop/laptop computers (GSS, 2014). According to GSS (2014),

about thirty-seven percent (37%) of the dwelling units in the municipality were owned by members of the household.

A study by Olago et al. (2007) mentioned that the Eastern Africa Region Cholera epidemics have a recorded history dating back to 1836. Cholera is now endemic in the Lake Victoria basin, a region with one of the poorest and fastest growing populations in the world (Olago et al., 2007). The health and socioeconomic systems that the lake basin communities rely upon are not healthy enough to cope with cholera outbreaks. This report argues that communities living around the Lake Victoria basin are vulnerable to cholera that is aggravated by the low socioeconomic status and lack of an adequate health. The report concludes that persistent levels of poverty have made these communities vulnerable to cholera epidemics (Olago et al., 2007).

Velimirovic et al. (1975), studied the environmental health factors relevant to the occurrence of cholera in an urban milieu (Manila). They found out that cholera was a disease significant in areas with lowest environmental and several socioeconomic conditions such as population density, water and sewer connections in squatter/slum dweller. The association between cholera and the low levels of socioeconomic conditions has been examined in a detailed study by Velimirovic et al. (1975), of patients during the cholera season 1971-72. The socioeconomic profile of the sample places the patients in the least affluent part of the community. The paper points out the need for priority of urban redevelopment in areas of maximum health risk.

CHAPTER THREE

METHODOLOGY

3.1 TYPE OF STUDY

The study type employed was a cross sectional descriptive one. A structured questionnaire was administered amongst community members of La within the period of one month. The tool consisted of both open and closed-ended questions with options.

3.2 STUDY AREA

The study was conducted at La where most of the cholera cases in the Greater Accra Region were reported. La Dade-Kotopon is one of the newly created districts which was carved out from the Accra Metropolitan Assembly in the year 2012. It has a total land area of 36.033 square kilometres (GSS, 2014). La Dade-Kotopon shares boundaries with the Accra Metropolitan to the West, Ledzokuku-Krowor Municipality to the East, La-Nkwantang-Medina Municipality to the North and the Gulf of Guinea to the South (GSS, 2014). The municipality is densely populated with the total population being 207,361, projected from the 2010 Ghana Population and housing census (GSS, 2014). The political head of the municipality is the Municipal Chief Executive whilst the head of the administrative affairs is the Municipal Coordinating Director. Administratively, it has ten (10) electoral areas (GSS, 2014). The Paramount chief of the traditional area is called La "Mantse" also known as the La "Nii". He is assisted by eight (8) clans. The eight clans have seventy-seven (77) family houses that are headed by sub chiefs who represent their people at the traditional council (GSS, 2014). According to the people of La, they believe that they migrated from the Middle East through a town in Nigeria called Bone (GSS, 2014). They also have a religious belief under the deity of "La-Kpa" who they believe

fought for them throughout their migration and continue to worship it even in their present location (GSS, 2014). They are noted for the celebration of the "Homowo" (means hoot at hunger) festival every year, in the month of August. Their staple food is kenkey, pepper and fish known in their mother tongue as "komi ke shito" cited in the population and housing census (PHC) district analytic report (GSS, 2014). The main ethnic group of the municipality is Ga-Adamgbe and they speak the Ga language. It is also a patrilineal society. There are other ethnic groups from various parts of Ghana and outside Ghana who reside in the municipality (GSS, 2014). Noted by the district analytical report of the PHC, the main economic activity for the indigenous people is fishing. Most men in the municipality are professional drivers who drive "trotro" (i.e. commercial mini-buses) and the majority of women are petty traders (GSS, 2014). The municipality in addition has notable economic centres and industries located within it. Such centres include the Accra Koala and Marina Shopping Malls, the Kotoka International Airport and the International Trade Fair Centre (GSS, 2014). Communication flow in the municipality is easy due to the availability of the present communication networks. FM and television stations are also accessible as well as print media and internet to residents (GSS, 2014). The GSS (2014) cited in its report that ninety-four percent (94%) of the citizens eleven years and above in the municipality are literates whilst six percent (6%) are non-literate.

3.3 NUMBER OF HEALTH FACILITY IN THE LA MUNICIPALITY

TYPE OF FACILITY	**NUMBER**
Private Clinic	10
Private Maternity Homes	2
Private Hospital	1
Quasi Institutions	2
District Hospital	1
CHPS ZONES	3
Total	**19**

Source: Ghana Health Service, (2014).

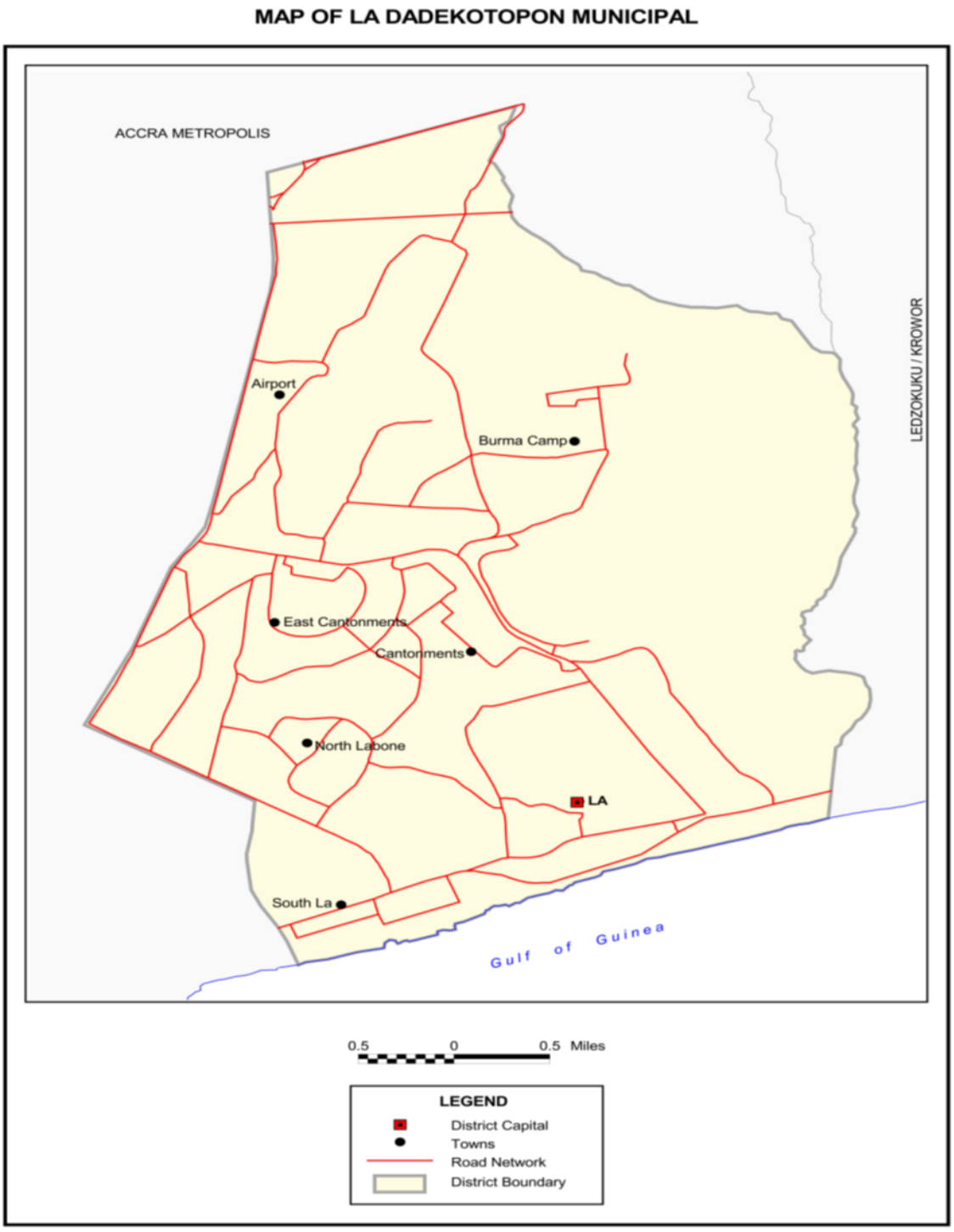


Figure 1: Map of La Dade-Kotopon Municipality

Source: (GSS, 2014).

3.4 STUDY VARIABLES

The variables of this study include dependent and independent variables and other covariates.

3.4.1 DEPENDENT VARIABLE (OUTCOME VARIABLE)

Cholera infection

3.4.2 INDEPENDENT VARIABLES

The independent variables included knowledge, hygiene practices and socio-economic status of the community members of La Dade-Kotopon. The covariates encompassed age, gender, religion, marital status and ethnicity.

3.5 STUDY POPULATION

The study population covered the community members of La Dade-Kotopon with a total population of 207,361, projected from the 2010 PHC (GSS, 2014).

3.6 INCLUSION AND EXCLUSION CRITERIA

Only individuals aged 18 years and above were part of the study, regardless of gender or other socio-demographic characteristics. All persons under the ages of 18 years were not part of this study regardless of gender or other demographic characteristics.

3.7 SAMPLING

3.7.1 SAMPLE SIZE CALCULATION

The sample size was calculated by using the Cochran formula.

- $N=Z^2\ pq/d^2$ $Z=1.96^2$
- p= assumed prevalence (0.5)
- q=1-p and d is the level of precision (5% or 0.05).
- ($N=1.96^2$ x 0.5 x 1-0.5/0.05^2 =3.816 x 0.5x 0.5/0.0025 =0.9604/0.0025=384)
- 384 x non respondents of 0.05= 19 + 384 = 403.

3.7.2 SAMPLING METHOD

Simple random sampling was employed in selecting participants. The sampling area, La Dade-Kotopon municipality, has three zones (GSS, 2014). Tenashie, La South and La North, which were all sampled. Tenashie had a population of 45, 205 which forms 21.8% of the total population, La South: 78, 797, forms 38% of the municipality's general population and La North formed 40.2% with 83, 356 as its population (GSS, 2014). As in any community, La Municipality has enumerated and non-enumerated areas and for the purpose of this study, the enumerated areas of the municipality represented the population. The sample size of these zones were proportionately calculated based on the total sample size which is 384. The following is the calculation:

- Tenashie: 22/100x384= 84
- La South: 38/100x384=146
- La North: 40/100x384=154.

Non respondents represented 0.05= 19, making a total of 403 which was used as the sample size.

There were 19,175 houses in the municipality with 51,154 households (GSS, 2014). In selecting a participant, each house was allocated a number. Using a randomizer, random numbers were generated till there were 403 numbers, based on the calculated proportion-by-zone. The houses whose numbers were generated were sampled. In the houses, a household was picked through the yes and no ballot and a resident individual, 18 years and above, who voluntarily consented to the study was also selected through the same means as a study respondent. Participants were sampled within a duration of four weeks.

3.8 DATA COLLECTING TECHNIQUES/METHODS

A quantitative tool with structured questionnaire was the major tool used in eliciting data from the respondents. The questionnaire were both self-administered among those who could read and write and non-self-administered to those who could not read and write. Appendix 2 has the questionnaire which contained both open and closed ended questions with multiple choice answers. All questions were in the English language and translated especially to those that did not understand English in the local language to participants (Akan and Ga). The questionnaire was divided into four sections: demographic data, knowledge, hygiene practices and socio-economic factors. Jargon and double negation was avoided.

3.9 QUALITY CONTROL ISSUES

Four research assistants were employed and trained on how to collect quality data from respondents by administering the data collection tool. They were monitored and

supervised, to ensure that quality work was produced. Data seen to be inaccurate was excluded from further processing and analysis as it would affect the validity of the processed data.

3.10 PRETESING OR PILOT STUDY

A pilot study of the questionnaire was conducted in Dome which has the same characteristic as La to ensure the quality of the questionnaire and also ensure that, the design of the study and the methodology were likely to produce the information required. The questions were reviewed to suit the design of the research and understanding of the participants.

3.11 DATA PROCESSING AND ANALYSIS

For easy classification, the answered questionnaire was sorted for completeness, accuracy and the responses were coded with numbers. The information elicited from participants was saved on a computer and other accessory such as storage devices. Confidentiality was ensured by securing the information with a password. The hard copies were stored in a cabinet under lock and key for future reference, should the need arise. The data elicited from participants, were processed and analysed by the use of data processing and analyzing software's, Excel 2013 and Stata/SE12.0. The data was first entered into Excel and imported to Stata. The collected data was descriptively summarized by using frequency tables and charts. Chi-Square was used to compare the association between the variables and the strength of association of the variable was tested with odds ratio. Respondents' knowledge was rated low, average or high based on

the percentage score of responses (below 50%=low, equal to 50%=average and above 50%=high knowledge); adopted by own rating classification.

3.12 ETHICAL CONSIDERATION

Ethical clearance was sought from the Ghana Health Service Ethical Review Committee, of the Research and Development Division, Accra. Permission to carry out the study was sought from the Municipal Health Directorates, and the Municipal Assembly of the study area. A consent form was attached to the questionnaire. The questionnaire was administered to respondents after verbal consent was sought from them. The purpose of the study and questionnaire was explained to participants in a language that they understood and were informed that participation was voluntary. They were also informed that the researcher had no conflict of interest in the study, and that it was purely academic work. For confidentiality, respondents were not required to write their names on the questionnaire. They were also informed that they had the right to withdraw from participating, even after they had consented to do so, without it affecting them in any way. Data elicited from respondents was treated as private and confidential by securing the software with a password and the hard copy under lock and key. Verbal consent was also sought from participants and relevant others to take pictures.

3.13 EXPECTED OUTCOME

It is expected that findings, recommendations and conclusion of this study will be communicated to the relevant stakeholders of the study community as well as the general public for the necessary interventions to be taken to prevent future outbreaks of cholera and also to improve the livelihood of the community members of the La Dade-Kotopon

Municipality, Ghana and the Global Community as a whole. The dissemination of the information will be in the forms of presentations and publications for others to reference.

CHAPTER FOUR

RESULTS

4.1 DEMOGRAPHIC CHARACTERISTICS

Table 1 summarizes the background characteristics of the respondents. As shown in the table, most of the respondents (43.0%) are in the age range of 21-30 years, only 10% and 9.3% were <20 years and >60 years respectively. About half of the respondents were males (51.5%) and females were about (48.5%). The dominant ethnic group was Ga (45.2%) whilst the minor ethnic group was Fante. Findings also suggested that, more than a quarter of the respondents were Christians (87.5%) and the least religious group were the traditionalist and spiritualist (3.7%). The marital status of respondents indicated that singles formed the majority (55.7%), the married (26.1%), cohabitation (8.0%) widowed (4.3%), separated (3.3%), and divorce (2.5%) respectively.

Table 1: Background characteristics of respondents

Characteristic	Frequency	Percentages
Age	(n=394)	
< 20 years	40	10.0
21-30 years	172	43.0
31-40 years	70	17.5
41-50 years	48	12.0
51-60 years	33	8.3
60 years and above	37	9.3
Sex	(n=400)	
Male	206	51.5
Female	194	48.5
Ethnicity	(n=396)	
Akan	90	22.7
Ga	179	45.2
Ewe	62	15.7
Fante	28	7.1
Hausa	37	9.3
Religion	(n=401)	
Christian	351	87.5
Muslim	35	8.7
Spiritualist	1	0.2
Traditionalist	14	3.5
Marital status	(n=402)	
Married	105	26.1
Single	224	55.7
Divorce	10	2.5
Separated	12	3.3
Widowed	19	4.7
Cohabitation	32	8.0

4.2 KNOWLEDGE ON CHOLERA

4.2.1 Respondents' Knowledge of Cholera

Table 2 shows the respondents' knowledge of the causes of cholera. Almost all (98.2%) of the respondents think that cholera is caused by germs and 0.8% think it is a curse. Some respondents (0.1%) indicated they did not know the causes of cholera. Thus, majority of the respondents agreed that cholera was caused by germs.

The table also shows the signs and symptoms of cholera. Majority, i.e. 329 (82.3%) of the respondents suggested that diarrhoea is suggestive of cholera and 61 (15.3%) said that vomiting is suggestive of cholera. However a few (1.5% and 1.0%) also said severe loss of fluid and chills are suggestive to cholera respectively.

The same table shows the various ways in which cholera can be transmitted. As shown in the table, majority of the respondents (66.7%) indicated that eating food that is contaminated can lead to the transmission of cholera and 33.3% indicated that drinking contaminated water can lead to the transmission of cholera.

Table 2: Respondents' knowledge on the causes, signs and symptoms and transmission of cholera

	Frequency	Percentages
Cause	(N=394)	
Germ	387	98.2
Curse	3	0.8
Don't know	4	1.0
Signs and Symptoms of cholera	(N=400)	
Chills	4	1.0
Diarrhoea	329	82.3
Vomiting	61	15.3
Severe loss of fluid	6	1.5
Transmission of cholera	(N=400)	
Drinking contaminated water	133	33.3
Eating contaminated food	267	66.7

Table 3 shows the ways by which cholera can be prevented. As shown in the table, 92.2% of the respondents indicated that frequent washing of hands can help in the prevention of cholera, 6.8% said using hand sanitizer can help prevent cholera, and 0.4% indicated eating with dirty hands and indiscriminate dumping of refuse can prevent cholera respectively. Thus, majority of the respondents indicated that cholera can be prevented by washing hands frequently.

As shown in table 3, when the respondents were asked about the first place to go for treatment of cholera, 98.0% said hospital, 1.5% indicated prayer camp and 0.5% indicated spiritualist. Thus, majority of the respondents agreed that the hospital was the first place to go for cholera treatment.

As also shown in table 3, when the respondents were asked about the first aid treatment for cholera, 97.2% said ORS, 1.0% said corn dough and 1.8% said porridge. Thus, majority of the respondents indicated that the first aid treatment for cholera was ORS.

Table 3: Prevention of cholera, First place of cholera treatment and First aid treatment for cholera

	Frequency	Percentages
Prevention of cholera	(N=244)	
Using hand sanitizers	17	6.97
Frequent washing of hands	225	92.2
Eating with dirty hands	1	0.4
Indiscriminate dumping of refuse	1	0.4
First place of cholera treatment	(N=399)	
Prayer camp	6	1.5
Spiritualist	2	0.5
Hospital	391	98.0
First aid treatment for cholera	(N=399)	
ORS	388	97.2
Corn Dough	4	1.0
Porridge	7	1.8

Table 4 shows the relationship of level of knowledge of respondent and cholera infection. The results on the chi² indicate statistical insignificance. The various p-values are >0.05% (cause >0.812, symptom >0.924, transmission >0.730, treatment >0.726 and prevention >0.346). Thus regardless of respondent's knowledge of cholera, they are at risk of cholera**.**

Table 4: Relationship between level of knowledge of respondents and risk of cholera

Variable	Cholera, n (%)		X^2	P-value
	Yes	No		
Cause of cholera			1.5	0.812[a]
Germ	277 (72.7)	104 (27.3)		
Curse	3 (100.0)	0		
Don't know	2 (66.7)	1 (33.3)		
Symptoms of cholera			0.5	0.924[a]
Chills	3 (75.0)	1 (25.0)		
Diarrhoea	44 (72.1)	17 (2.9)		
Vomiting	8 (66.7)	4 (33.3)		
Severe dehydration	5 (83.3)	1 (16.7)		
Transmission of cholera through contaminated water and food			0.1	0.730
Yes	280 (73.1)	103 (26.9)		
No	4 (80.0)	1 (20.0)		
Treatment of cholera			2.3	0.726[a]
ORS	227 (72.3)	106 (27.7)		
Corn dough	4 (100.0)	0		
Porridge	5 (83.3)	1 (16.7)		
Prevention			3.9	0.346[a]
Hand sanitizer	13 (76.5)	4 (23.5)		
Frequent handing washing	174 (78.7)	47 (21.3)		
Eating with dirty hands	0	1 (100.0)		
Indiscriminate dumping of refuse	1 (100.0)	0		

a. Fishers exact P-value

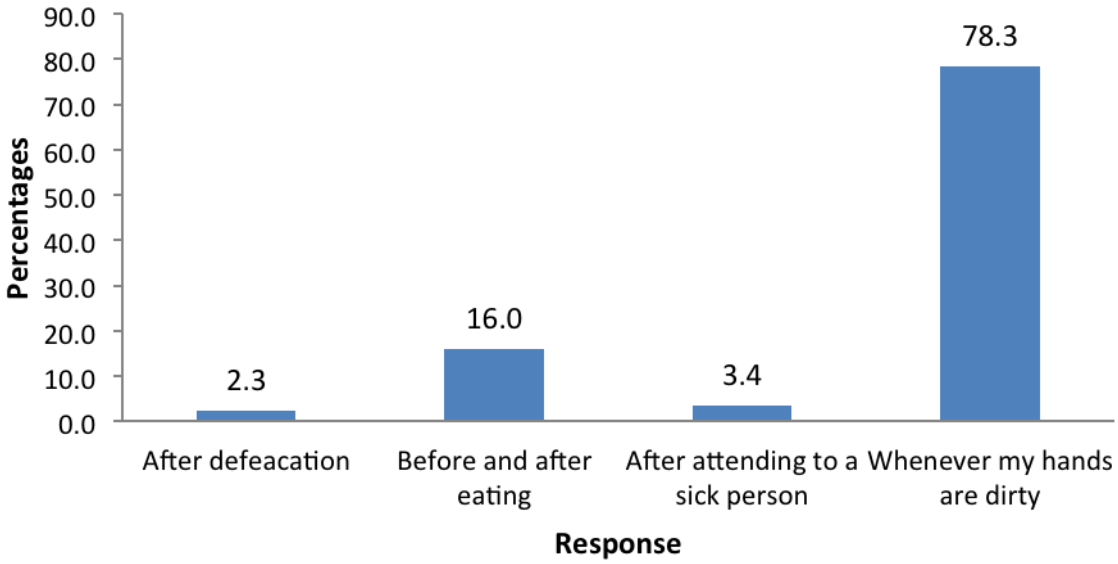
4.3 HYGIENE PRACTICES OF RESPONDENTS

4.3.1 Hand Hygiene Practices of Respondents

Figure 2 shows the hygiene practices of the respondents. The results revealed that more than three-quarters of the respondents (78.3%) washed their hands whenever they were

dirty, (16.0%) washed their hands before and after eating, but only (2.3%) washed their hands after defecation.

Figure 2: Hand hygiene practices of the respondents



As shown in table 5, almost all of the respondents (96.0%) said they regularly washed their hands and 4.0% did not regularly wash their hands.

Table 5 shows how often the respondents washed their hands. 92.0% of respondents indicated they washed their hands whenever they were dirty, 3.9% washed their hands two times a day, 2.8% once a day and 1.3% said they did not often wash their hands. Thus, majority of the respondents said they washed their hands whenever they were dirty.

As shown, 92.6% of the respondents used soap and water in washing their hands, 4.0% used plain water, and 3.7% used hand sanitizers. Thus, majority of the respondents used soap and water in washing their hands.

Also shown in table 5, 95.2% of respondents believed that keeping of long finger nails could harbour disease organisms including cholera and 4.8% of respondents did not believe that keeping of long finger nails could harbour cholera organisms. Thus, majority of the respondents agreed that the cholera germ is harboured in long nails.

About ninety-two percent (92.4%) of respondents said they would educate others to avoid keeping long finger nails and about seven percent (7.6%) of respondents said they would not educate others to avoid keeping long finger nails.

Table 5: Reported hand washing and other personal hygiene practices

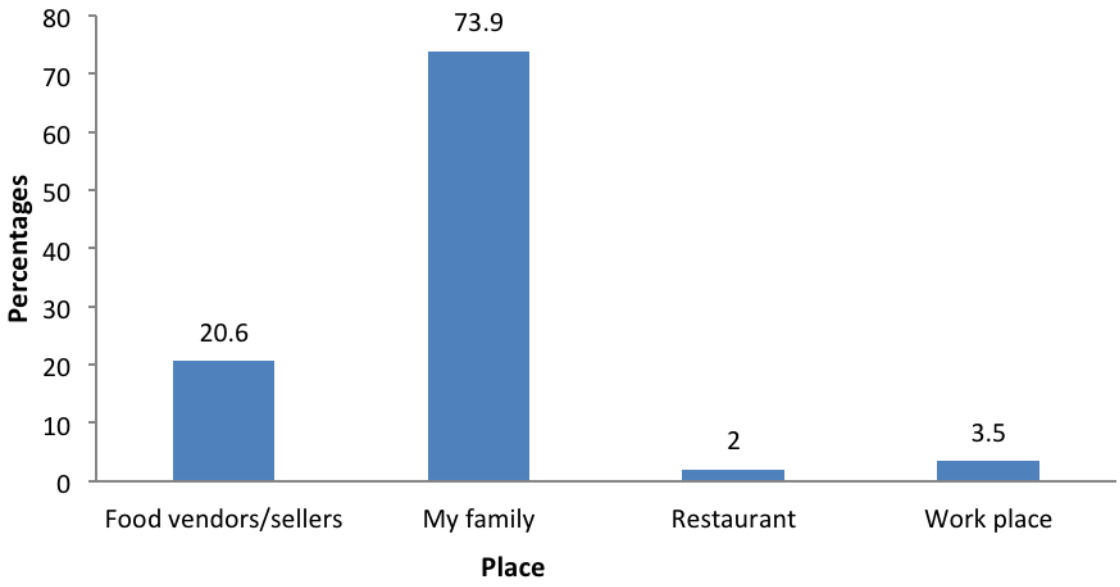
Practice	Frequency	Percentage
Regular hand washing	(N=403)	
Regular	387	96.0
Not regular	16	4.0
Frequency of hand washing	(N=403)	
Once a day	11	2.8
Two times in a day	15	3.9
Whenever my hands are dirty	356	92.0
Don’t often wash my hands.	5	1.3
Hand washing methods	(N=326)	
Plain water	13	4.0
Soap and water	302	92.6
Hand sanitizer	12	3.7
Cholera germ harboured in nails	(N=399)	
Yes	380	95.2
No	19	4.8
Avoiding long nails	(N=394)	
Yes	364	92.4
No	30	7.6

4.3.2 Food Hygiene Practices

In figure 3, about a quarter of respondents (73.9%) ate food prepared by their families, 20.6% ate from the food vendor, 3.5% ate from the workplace and 2.0% ate from the restaurant.

When the respondents were asked if eating foods that were not hot predisposed a person to cholera infection, 99.2% said yes and 0.8% said no. Thus, majority of the respondents agreed that eating foods that were not hot predisposed a person to cholera infection.

Figure 3: Where respondents ate food from



As shown in table 6, 95.7% of the respondents had access to water and 4.3% did not have access to water. Thus, majority of the respondents had access to water. Table 6 also shows the water storage facilities of the respondents. Most respondents (41.7%) used gallons and 'Polytank' (40.9%) for water storage, 11.8% said they used barrels and (4.7%) used underground concrete tanks. It also shows the various domestic treatment methods adopted by the respondents. Almost half of the respondents used boiling as a treatment method whereas the rest used methods such as filtration and alum.

Also, shown is the respondent's main source of drinking water 89.1% was sachet water, 5.1% said bottled water and 5.4% said pipe water. Thus, the main source of drinking water of majority of the respondents was sachet water.

Table 6: Reported domestic water access, storage and treatment methods

	Frequency	Percentage
Access to water	(N=395)	
Yes	378	95.7
No	17	4.3
Water storage facility	(N=395)	
Underground concrete tank	6	4.7
Polytank	52	40.9
Barrel	15	11.8
Gallon	53	41.7
Do not have a storage facility	1	0.8
Main source of drinking water	(N=380)	
Sachet water	246	89.1
Boiled water	14	5.1
Pipe water	16	5.4
Domestic water treatment methods		
Boiling	27	49.1
Filtration	21	38.2
Use of alum	3	5.5
Not treated	4	7.3

4.3.3 Access to Toilet

As shown in table 7, (86.1%) of respondents had access to toilet facility and (13.9 %) had no access to toilet facility. Thus, majority of the respondents had access to a toilet facility with almost a quarter of respondents (72.6%) indicating they had toilet facility in their homes and (27.4%) said they had no toilet in their house. Thus, majority of the respondents had a toilet facility in their homes.

As shown in table 7, (92.3%) of the respondents agreed that unavailability of toilet facilities led to open defecation and (7.4%) disagreed. Thus, majority of the respondents indicated that open defecation was due to no toilet facilities.

Table 7 also shows the type of toilet facilities used by the respondents. As shown in the table, (65.2%) used water closets, (25.7%) used KVIP, (5.1%) use public latrine and (4.0%) used improved pit latrine (4.0%). Thus, majority of the respondents used water closets.

Table 7: Toilet Availability in the Homes

	Frequency	Percentage
Access to toilet facility	(N=396)	
Yes	341	86.1
No	55	13.9
In house toilet facility	(N=350)	
Yes	254	72.6
No	96	27.4
Open defecation due to no toilet	(N=365)	
Yes	337	92.3
No	27	7.4
Type of toilet facility	(N=373)	
Improved Pit latrine	15	4.0
Water closet	243	65.2
KVIP	96	25.7
Public latrine	19	5.1

As shown in table 8, when the respondents were asked if they have ever had cholera, (73.0%) said no and (27.0%) said yes. Thus, majority of the respondents indicated that they had never had cholera before.

Table 8 shows that there is no relationship between hygiene practices of respondents and cholera infection at a 0.05 significance value. This is shown by the P-value of the various hygiene practices and cholera being >0.05% significance level.

Table 8: Relationship between reported hygiene practices and cholera infection

Variable	Cholera infection, n (%)		X^2	P. value
	No	Yes		
Incidence of cholera	289 (73.0)	107 (27.0)		
Hand washing			0.2	0.770[a]
Regular	278 (72.8)	104 (27.2)		
Not regular	11 (78.6)	3 (21.4)		
Frequency of hand washing			4.1	0.280[a]
Once a day	6 (54.5)	5 (45.5)		
Two times a day	12 (80.0)	3 (20.0)		
Whenever my hands are so dirty	257 (73.2)	94 (26.8)		
Don't often wash hands	5 (100.0)	0		
Hand washing method			1.4	0.631[a]
Plain water	8 (88.9)	1 (11.1)		
Soap and water	214 (71.5)	85 (28.4)		
Hand sanitizer	9 (75.0)	3 (25.0)		

a. Fisher's exact P-value

4.4 SOCIO-ECONOMIC FACTORS AND CHOLERA INFECTIONS

Table 9 shows community members' socio-economic factors and the relationship with cholera. The table indicates there were no statistical significant at 0.05 of socio-economic factors of community members and cholera. Respondents who had the opportunity of attending school could be predisposed to cholera infection as well as those who did not have the opportunity of attending school. Regardless of the socio-economic characteristics, the various p-values were >0.05 as indicated in table 9

Table 9: Association between socio-economic factors and reported cholera

Socio-economic variable	Ever had Cholera, n (%)		X^2	P-value
	No	Yes		
Education			0.2	0.769[a]
Ever educated	269	100		
Never educated	(72.9)	(27.1)		
	11	3 (21.4)		
	(78.6)			
Educational level			4.8	0.302
Primary	15	6 (28.6)		
JSS/JHS/Middle	(71.4)	23		
Secondary/SSS/JHS	62	(27.0)		
Vocational/Technical	(72.9)	44		
University	87	(33.6)		
	(66.4)	22		
	82	(21.2)		
	(78.9)	11		
	35	(23.9)		
	(76.1)			
Employment status			0.8	0.359
Yes	159	53		
No	(75.0)	(25.0)		
	106	44		
	(70.7)	(29.3)		
Occupation			3.9	0.415[a]
Agricultural	2 (40.0)	3 (60.0)		
Cleaner/Labourer	16	6 (27.3)		
Artisans	(72.7)	11		
Self-employed/Trader	30	(26.8)		
Civil servant	(73.2)	26		
	91	(22.2)		
	(77.8)	15		
	47	(24.2)		
	(75.8)			
Income			2.9	0.386[a]
2000+	20	4 (16.7)		
1,000 – 1,999	(83.3)	13		
500 – 999	29	(31.0)		
<500	(69.1)	7 (35.0)		
	13	37		
	(65.0)	(23.4)		
	121			
	(76.6)			

a. Fisher's exact P-value

Table 10 displays odds ratios with 95% confidence intervals and p-values of the socio-economic factors of study participants and cholera infection using logistic regression.

The results revealed that those who have never had education before have a lower odd ratio (0.73) of getting cholera. Also those with SSS/JHS have a higher odds ratio (1.26) of getting cholera. Similarly, those with no employment have a higher odds ratio (1.25) of getting infected with cholera. Compared to agriculture, the respondents who are in other occupations have a lower odds ratio of getting infected with cholera. Likewise, the men who are have incomes below GH¢2,000 have a higher odds ratio of being infected with cholera. However, there was no statistical significance in the odds of participants and their socio-economic factors. Ever educated (p=0.631), employment status (p=0.360), income (p= 0.402).Thus regardless of respondents socio-economic status, they were predisposed to cholera. There was therefore no need for adjusted odds ratios due to this insignificance.

Table 10: Logistic regression analysis showing key factors to reported cholera

Socio-economic variable	Crude OR (95% CI)	P-value
Education		0.631
Ever educated	1	
Never educated	0.73 (0.20, 2.68)	
Educational level		0.300
Primary	1	
JSS/JHS/Middle	0.93 (0.32, 2.68)	
Secondary/SSS/JHS	1.26 (0.46, 3.48)	
Vocational/Technical	0.67 (0.23, 1.93)	
University	0.79 (0.25, 2.52)	
Employment status		0.360
Yes	1	
No	1.25 (0.78, 1.99)	
Occupation		0.497[a]
Agricultural	1	
Cleaner/Labourer	0.25 (0.03, 1.89)	
Artisans	0.24 (0.04, 1.66)	
Self-employed/Trader	0.19 (0.03, 1.20)	
Civil servant	0.21 (0.03, 1.40)	
Income		0.402[a]
2000+	1	
1,000 – 1,999	2.24 (0.64, 7.88)	
500 – 999	2.69 (0.66, 11.06)	
<500	1.53 (0.49, 4.76)	

a. Fisher's exact P-value

CHAPTER FIVE

DISCUSSIONS

5.1 KNOWLEDGE ON CHOLERA

The study in La Dade-Kotopon Municipality revealed that a high percentage (99%) of respondents had heard about cholera. This finding corresponded with a report by UNICEF (2012), which stated that cholera emergency has been responded to through interpersonal communication and reaching about 245,000 people. However, the finding does not conform to study carried out in Cameroon which indicated a great handicap in information flow during and prior to the cholera outbreak by (Njoh, 2010). About sixteen percent (16.7%) mentioned that they heard it from the television whilst about 4 percent (3.5%) that they heard it from Health Institutions. Respondents who heard it from Health Institutions and Television accounted for 23.3%. This shows that television stations are doing well in cholera education and the health institutions would need to intensify their education on cholera. Though respondents who owned radio were 78% and television 50.3%, majority of respondents (82%) said that they received their news from the television. The evidence of good knowledge of hand washing in the community was confirmed by the high percentage of respondents who washed their hands often (96.5%) as shown in table three. This confirms the UNICEF (2012), report that one million people were reached with priority behaviour change messages through radio and television, which was significantly mentioned by the respondents of this study as their sources of information.

5.1.1 Causes, Transmission, Symptoms, Treatment and Prevention of Cholera

Though the frequency tables on the level of knowledge of respondents revealed a high level of knowledge on the causes of cholera (98.2%), signs and symptoms (83.3%), treatment (97.2%) and the prevention being (92.2%) based on own rating scale as shown in data processing and analysis, the relationship between knowledge and cholera was statistically insignificant. The p-value of variables on knowledge was greater than >0.05 as seen in table 4. The knowledge of respondents on the cause of cholera affirms the earlier studies of (WHO, 2001; Opare et al., 2012; Alam et al., 2006) who stated that the cause of cholera is the bacteria, *Vibro cholerae* but contradicts with the few who stated the cause was a curse. The WHO report (2004), also mentioned the fact that cultural concepts of illness, in the treatment and prevention cannot be over looked because, it has a practical implications for behaviour, public health, and disease control that need to be considered (WHO, 2004). This statement holds greatly with those who thought the cause of cholera was a curse.

Majority of the respondents (390), were of the view that diarrhoea and vomiting were suggestive of cholera; diarrhoea was indicated by 83.3% of the respondents and vomiting as 15.3%. This also confirmed the findings by (WHO, 2004; Penguele, 2011; Obeng, 1997). Also respondents were of the view that eating of contaminated food and drinking contaminated water could contribute to the infection of cholera. They were also of the view that frequent hand washing could prevent cholera (92.2%). These responses corresponded with earlier studies by (WHO, 2004; Opare et al., 2012; Obeng, 1997).

Ninety eight percent (98.0%) of respondents also suggested that a person with cholera should be rushed to the hospital for treatment whilst 97.2% of respondents were of the view that ORS should be given to someone who is infected with cholera before going to the hospital. This also affirms with (WHO, 2001; Opare et al., 2012) in previous studies.

UNICEF however, asserted that implementing certain interventions in high-risk groups with poor knowledge of and attitudes toward cholera may not be appropriate. It is therefore important to understand the current levels of knowledge, attitudes, and practices of a given community before implementing campaign programmes and other preventive measures.

5.2 HYGIENE PRACTICE OF RESPONDENTS

There was no relationship between hygiene practices of respondents and cholera at a 0.05 significance value. This is shown by the P-value of the various hygiene practices and cholera being >0.05% significance level this affirm an earlier study by Penguele et al. (2011).

5.2.1 Hand Hygiene Practice of Respondents

The hand hygiene practices of respondents signifies that 96.0% of respondents often washed their hand and 92% washed their hands whenever their hands were dirty, and as to when they washed their hands, 16.0% said before and after eating whilst only 2.3% washed their hands after defecation. This study is indicative of Tan et al. (2013), who affirms that food handlers in Malaysia have basic knowledge on hygiene practices, but hand washing among food handlers in Malaysia was poor. Nkongo et al. (2009) realized that, a total of thirty eight (38) households out of forty two (42) reported that, they washed their hands after visiting toilets. This contradicts Nkongo et al. (2009) earlier study because only 2.3% of respondents indicated that they washed their hands after defeacation. This practice could be a signal for disease transmission such as

cholera, diarrhoea and typhoid as mentioned in (Nkongo et al., 2009) that households do not have good hygiene practices. Six (6) out of the thirty nine (39) households had suffered one of these conditions: cholera (38), typhoid (34), diarrhoea (33), skin disease (31) and others (Nkongo et al., 2009). Ninty five percent (95%) of respondents agreed that long finger nails could harbour disease organisms including cholera germs. This affirmed the study at India among food handlers which revealed various disease organisms in a nail culture of food handlers (Abhay et al., 2010).

5.2.2 Food Hygiene Practices

Majority of the respondents, 73.9% indicated they usually ate food prepared by their family. 20% ate food from vendors and a few from work places (3.5%) and restaurants (2.0%) respectively. This confirmed the study by Yoada et al. (2014), at Medina urban Accra in Ghana which revealed that, the number of respondents who cooked at home was high as well as frequent cooking at home. Yoada et al. (2014), indicated that seventy seven percent (77.8%) of the respondents cooked at home daily. Ninety nine percent (99%) of respondents also agreed that eating foods that were not hot could predispose one to cholera infection and about ninety-six percent (96.4%) agreed that exposed food could be infected with cholera germs which corresponds with WHO, 2003, who indicated that human behaviour related to personal hygiene and food preparation contributed greatly to the occurrence and severity of outbreaks. 92.5% agreed that flies settling of food could also spread cholera affirms (Penguele et al., 2011; WHO, 2004), study who said contaminated food was a major vehicle of transmission of cholera during an outbreak. A majority (83.0%) of respondents treated their fruit and vegetables with salt solution or vinegar which correspond to the (WHO, 2004) way of treating fruit and

Vegetables. WHO (2004), also suggested an alternative way of using lime which could inactivate the cholera germ.

5.2.3 Access to Water

Accessibility of water by respondents was not a problem because 95.7% responded that they had access to water: 96.5%) to pipe borne, 1.5% to boreholes and 1.2% to vendor water. The study corresponds with Adeleke et al. (2014), who stated that access to improved water was higher in urban areas than in rural areas. The main drinking water, as indicated by respondents, was sachet water (89.1%) this finding is in contrast to Aderson and Hogas's (2008), findings in Ethiopia. Most respondents, (84.7%) did not treat their water before drinking. This contradicts with WHO, 2004's, idea of water treatment, because most respondents used sachet water as their source of drinking water. The 15.3% of respondents who treated their water before drinking however conform to WHO (2004), recommended methods of water treatment. Boiling, (49.1%); filtration (38.2%) and alum (5.5%).

5.2.4 Access to Toilet Facilities

About fourteen percent (13.9%) of respondents had no access to toilet facility. This led to open defaecation which affirms Abogan (2014's), study in Nigeria. Respondents who answered yes to having access to toilet facilities were 86.1%. This also corresponded to GSS, 2014 which indicated that almost all the households in the municipality had access to toilets. Respondents who had ever had toilets in their homes also affirmed that the toilets were either converted to a shop or rooms.

This led to opened defeacation by some respondents as they verbally confessed to the researcher. This did not contradict the study by Abogan (2014), in Nigeria. The types of toilets also used by respondents were not different of that of the GSS (2014), recordings. Water closet (65.2%) KVIP (25.7%) public latrine (5.1%) by the researchers own observation some personal connection of the water closets to septic tanks were laid without any covering this also conformed to Wokekoro et al. (2009), in Marie Base and Afipko Settlement, Nigeria.

5.2.5 Drainage System and Refuse Disposal

Though the responses revealed that respondents have an improved drainage system, 91% disposed of their waste water into the gutters and 25% into sinks which were also connected into the open gutters. Findings conformed to that of the (GSS, 2014; Wokekoro, 2014) which cites liquid waste in Nigeria was mostly disposed into gutters and creeks. The researcher strongly believes from the responses that it is everybody's responsibility to clean the drain. This will help in improving sanitation and prevent health hazards. A study in Nigeria by Abogan (2014), revealed a poor drainage system in the study area which sometimes caused flooding of soak away pits, contributing to the outbreak of diseases.

According to the findings 76.0% said that refuse was picked up by Zoom Lion in their homes and 22.7% said it was disposed of into AMA Bins, bushes and gutters contributing to 1.4% and 1.0% respectively. The study corresponded to Yoada et al., 2014; Wokekoro et al., 2014) study in Medina Accra, Ghana and Port Harcourt in Nigeria.

The results also showed that there is no significant relationship between hygiene practices and cholera infection at a 5% significance level.

5.3 SOCIO – ECONOMIC FACTORS OF RESPONDENT

There were no statistical significant at 0.05 of socio-economic factors of community members and cholera. Respondents who had the opportunity of attending school could be predisposed to cholera as well as those who did not have the opportunity of attending school. Regardless of their socio-economic characteristics, the various p-values were more (0.05). Table 9 displays odds ratios with 95% confidence intervals and p-values of the socio-economic factors of study participants and cholera infection using logistic regression. The results revealed that those who had ever had education before had a higher odds ratio (1.0000) of getting cholera. Also, those with SSS/SHS had a higher odds ratio (1.264368) of getting cholera. Similarly, those with no employment had a higher odds ratio (1.245283) of getting infected with cholera. The respondents who were in fishing had a higher odds ratio (4.592593) of getting infected with cholera. Likewise, the men who are have incomes below 1000 have a higher odds ratio (2.692308) of being infected with cholera. However, there was no statistical significance in the odds of participants and their socio-economic factors. Ever educated (p=0.639), employment status (p=0.686), income (above Gh¢ 2000, p=1.0, below Gh¢2000, p= 0.2, below Gh¢ 1000p=0.1, below Gh¢ 500, p= 0.4). Thus regardless of respondent's socio-economic status they 'were predispose to cholera.

In the study, respondents who had had the opportunity of attending school formed 96.4%. 3.6% did not attend school, which contradicts Yoada et al. (2014), study which stated that only 49.1% had basic education. The educational level of respondents up to

secondary/SSS/SHS constituted 34.3%: 26% vocational/technical; 22.0% JSS/Middle School Leavers. University/Polytechnic respondents was 11.8% and 5.4% indicated primary education. The educational level in the study is similar to GSS (2014), analytical report who cited that ninety four percent (94%) of the respondents eleven (11) years and above in the municipality were literates whilst six percent (6%) are non-literate. The following educational levels were indicated by respondents: Middle school (20.6%), JSS/JHS eighteen point nine percent (18.9%); SSS/SHS (15.1%) and Tertiary (14%). This also contradicts with the Yoada et al. (2014), study in Medina.

Fifty nine percent (58.7%) of respondents indicated that they were employed whilst forty-one percent (41.3%) indicated that they were unemployed. The employed population of this study is lower than the employed population in Yoada et al. (2014), study. The unemployed figure is higher in this study than Yoada et al's. (2014), study, which stated that about three quarters (73.4%) were employed whilst the remaining 26.6% were unemployed. Of those who were employed.,58.7% were self-employed and civil servants constituted 24.8% which conforms to the district analytical report of (GSS 2014). The monthly earnings of majority of the respondents falls within GH¢200 and below (99%) this similar to Yoada et al. (2014), whose study revealed respondents received monthly earnings ranging from 100 Ghana Cedis (GH¢100) to GH¢399, while 21.7% of the respondents received less than GH¢100.

A good number of respondents, (82.6%), said they obtained news from the television. 15%.6% stated that the obtained cholera information from radio and 0.6% from the newspapers whilst only 1.2% used the internet as their source of news. This really suggest why respondents have a high knowledge on cholera .Seventy eight (50 3%) owned a television, (18.5%) a house (10.0%) a car, motor bike account for (8.7%) radio (7.7%) and a bicycle (4.6%) as their possession. A similar study by GSS 2014, based on

the population and census report 2010, stated in the district analytic report only revealed that about 37% of the dwellings in the municipality are owned by members of the households which is on the other hand higher than the percentage of respondents (10.0%) who owned houses in this study. As revealed in earlier study by Yoada et al. (2014) most respondents lived in a compound house. The other possessions like car, radio, television and others were not part of the report of (GSS, 2014). Likewise in this study, the use and possession of mobile phones were not measured as it was done by (GSS, 2014). Also stated by GSS 2014, the population twelve (12) years and older who used internet facilities in the district was (26.2%) as compared to this study in which only 1.2% used internet as their source of news.

The results revealed that those who have ever had education before, those with SSS/SHS, no employment, who are into fishing and have incomes below GH¢1000 have a higher odds ratio of getting cholera. However, there was no statistical significance in the odds ratio of participants and their socio-economic factors.

5.4 LIMITATIONS

The study was a cross-sectional one and did not cover the whole population but a subset of the total population in La Dade-Kotopon Municipality. Bias in sample technique, data collecting tools, respondent bias, limitations in resources such as time and funding were also limitations.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study found that, there was no relationship between knowledge of cholera, hygiene practices and socio-economic factors of respondents and cholera infection among respondents in the La Dade-Kotopon Municipality. Regardless of educational status, all were at risk of cholera infection. The study concludes that cholera is caused by a germ and also diarrhoea and vomiting are some of the symptoms of cholera. The study concludes that there is no significant relationship between hygiene practices and cholera infection at a 5% significance level. Also, those who have ever had education before, those with SSS/SHS, no employment, who are into fishing and have incomes below Ghc1000 have a higher odds ratio of getting cholera. However, there was no statistical significance in the odds ratio of participants and their socio- economic factors.

6.2 Recommendations

From the findings of this study, the researcher would like to make the following recommendations:

- The health promotion unit of the Ghana Health Services and of the Ministry of Health needs to intensify their information and education on behaviour change and communication to help prevent the future occurrence of cholera.
- Metropolitan and Municipal Assemblies, Departments and Agencies as the major stakeholders should promote, finance and ensure local ownership of water and sanitation issues.

- The community via opinion leaders such as chiefs, queen mothers, pastors, imams and other responsible people in the community, should partner to promote water and sanitation practices.
- The ministry of local government needs to reposition environmental and sanitation issues as a priority within the national development strategies and plan commitment and financial support which will greatly enhance sanitation programs.

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APPENDICES

APPENDIX 1: INFORMED CONSENT

Name of Principal Investigator: Rita Adjoa Ansong (MPH Student)

Tel: 0246448933/0207687791

Institution: School of Public Health, College of Health Sciences, University of Ghana, Legon - Accra.

Tittle of Project: "Assessing factors contributing to the recent high cases of cholera in the La Dade-Municipality, Accra.

Contact Person: The administrator Ethical Review Committee, Ghana Health Service, Research and Development Division. .Madam Hanna Frimpong.

Tel: 0507041223.

Purpose: The main aim of this study is to assess the factors contributing to the recent high cases of cholera in the La Dade- Kotopon Municipality, which will be communicated to authorities for interventions to be taking to prevent future occurrence. It is also purely academic, for the partial fulfilment of the award of Master of Public Health (MPH) Degree.

Process: It involves answering a questionnaire on your background in formation, hygiene practices and socio-economic factors. This will take about 10 to 15 minutes of your time. You may feel uncomfortable with some of the questions you may be answering. You can also clear your concerns by asking questions.

Privacy and confidentiality: No name is expected to be written on the questionnaire and participatory is voluntary. Any information given will be treated as private and confidentiality.

Right to Participant: You have the right to withdraw from participating after you have consented to participate in this research without it affecting you.

Risk/Benefits: No invasive procedure will be performed, your views and decisions are highly respected. Findings will be communicated to authorities for interventions to be taking to prevent future occurrence.

CONSENT FORM

I have read all the information/ all the information has been read to me. I have had the opportunity to ask questions and it has been explained to my satisfaction. I voluntarily consent to participate in this study and understands l have the right to withdraw from the study without it affecting me in any way.

Sign/thumb print of respondent…… Date……

Sign/thumb print of witness……. Date……

Signature of PI……...Date……..

APPENDIX 2: QUESTIONNAIRE

SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

FACTORS CONTRIBUTING TO THE RECENT HIGH CASES OF CHOLERA IN LA DADE-KOTOPON

RESEARCH QUESTIONNAIRE

	SECTION A:SOCIO – DEMOGRAPHIC DATA Please be sincere in answering these questions	**RESPONSES**	**CODE**
1	Please what is your age on your last birthday **Fill in your years**	Years…….	QI Age
2	What is your gender A. Male…….. …….1 B. Female……... …….2	☐	Q2 Gender
3	What is your ethnicity A. Akan…….. 1 B. G…….2 C. Ewe…….3 D. Fante……...4 E. Others (Specify)……..5 Please **tick** as appropriate	☐ ☐ ☐	Q3 Ethnic
4	What religion do you belong to A. Christian……...1 B. Spiritualist……2 C. Traditionalist……....3 D. Buddhist……...4 E. Others (Specify).....5	☐ ☐ ☐	Q4 Rel
5	What is your marital status A. Married ……....1 B. Single……....2 C. Divorce…….3 D. Never Married……..4 F. Widowed…….....5 G. Cohabitation……6 F. Others (Specify)……7	☐ ☐ ☐	Q5 MarSt
	SECTION B : KNOWLEDGE ON CHOLERA **Scores:** less than 50% denotes low knowledge	☐	**CODE**

	equal to50% average knowledge more than 50% high knowledge Please **tick** as appropriate	☐	
6	Have you heard about cholera A. Yes……..1 B. No (if **No**, **Skip** to **Q8**)……....2	☐	Q6 Info
7	**SOURCES OF INFORMATION** If yes where did you hear about it A .Health institution……..1 B .Radio station…….2 C. Relative…….3 D. Television…….4 E. Fiends……5 F. Others (Specify)……6 You can **tick** more than one **(Skip to Q9)**	☐ ☐ ☐	Q7Sinfo
8	Where do you think you will hear about cholera A. Radio……1 B. Health institution……...2 C. Television……..3 D. Friends……...4 E. Relative……..5 F. Don't know……6 G. Others (Specify)……7 You can **tick** more than one	☐ ☐ ☐ ☐	Q8Sinfo
9	What do you think is the cause of cholera A. Germ……..1 B. Curse……..2 C. Witches……..3 D. Don't know……4 E. Other (Specify)……...5	☐ ☐ ☐	Q9Cau
10	Which of this symptoms is suggestive of cholera (please **tick** as many as possible) A. Chills……..1 B. Diarrhoea……2 C. Vomiting…….....3 D. Headache……....4 E. Severe loss of fluid (dehydration)……...5 F. Others (Specify)……..6	☐ ☐ ☐ ☐	Q10Sym
11	How does one get infected with cholera by A. Drinking contaminated water……..1 B. Eating contaminated food……2 C. Curses……..3 D. Witches……4 E. Other (Specify)……6 You can **tick** more than one	☐ ☐ ☐	Q11Spr
12	Do you think one can get infected with cholera by eating food or drinking water contaminated with faecal matter A. Yes……1 B. No……..2	☐	Q12Spr
13	Cholera can be prevented by		

	A. Eating with dirty hands…… .1 B. Using hand sanitizers…… .2 C. Frequent washing of hands…… 3 D. Indiscriminate dumping of refuse……4 E. Others (Specify)……...5		Q13Prev
14	A person with cholera should be rushed to…….for treatment A. Prayer camp……1 B. Spiritualist……...2 C. Hospital……...3 D. Mallam……4 E. Others (Specify)……..5		Q14Treat
15	What first aid treatment will you give to someone who is infected with cholera before going to the hospital A. ORS……..1 B. Corn Dough……..2 C. Porridge……3 D. Charcoal solution……....4 E. Others (Specify)……5		Q15Faid
	SECTION C: PERSONAL FACTORS Please **tick** as appropriate		**CODE**
	HAND WASHING		
16	Do you often wash your hands A. Yes……1 B. No……..2		Q16Hdw
17	How often do you wash your hands A. Once a day…… 1 B. Two times in a day…… 2 C. Whenever my hands are dirty…… 3 D. Don't wash my hands at all……4 E. Others (Specify)…….5		Q17HdNum
18	When do you often wash your hands A. After defeacation……1 B. Before and after eating……2 C. After attending to a sick person……...3 D. Whenever my hands are dirty……..4 E. Others (Special)……..5 You can **tick** more than one		Q18When
19	What do you use in washing your hands A. Plain water……1 B. Soap and water…….....2 C. Hand sanitizer……3 D. Others (Specify)……4		Q19HdType
20	It is believed that keeping of long finger nail can habour disease organism including cholera do you agree A. Yes……1 B. No……2		Q20LonNail
21	Will you educate others to avoid keeping long finger nails A. Yes……1		Q21NailK

	B. No……...2		
	FOOD HYGIENE Please **tick** as appropriate		**CODE**
22	I usually eat food prepared by A. Food vendors…….,,,,,,1 B. My family……2 C. Restaurant……3 D. Work place……..4 E. Others (Specify)……5	☐ ☐	Q22Fodpre
23	Is it true that eating foods that are not hot can predispose a person to cholera infection A. Yes……1 B .No……2	☐	Q23Fodhot
24	Is the housefly able to spread cholera A. Yes……1 B. No……..2 If **No. Skip** to **Q26**	☐	Q24Hfly
25	In which way can the housefly spread cholera A. Flying over food…….. ……1 B. Settling on food…….. ……..2	☐	Q25HflySet
26	Can exposed food be infected with cholera germ A. Yes……...1 B. No……2	☐	Q26Exposfod
27	Do you like eating fruits and vegetables A .Yes……1 B. No……..2 If **No. Skip** to **Q30**	☐	Q27Fveg
28	Do you treat them before eating A. Yes……....1 B. No…….....2	☐	Q28Ftret
29	Which of these do you use to treat them before eating A. Cleaning with a piece of cloth……..1 B. Don't treat them……2 C. Washing with soap and water……3 D. Treat with salt/vinegar……...4 E. Others (Specify)……5	☐ ☐ ☐	Q29FMeth
30	Do you believe that eating fruits and vegetables without washing them can spread cholera A. Yes ……1 B. No……2	☐ ☐	Q30BeWash
31	What do you think is the appropriate way to treat fruits and vegetables before eating A. Washing with water……1 B. Cleaning with a piece of cloth……2 C. Treating with salt/vinegar,……..3 D. Don't know……4 E. Others (Specify)……..5	☐ ☐ ☐	Q31AppWash
32	Have you ever been attack by Cholera A. Yes……..1 B. No……2	☐ ☐	Q32AttCho

	If **No. Skip** to **Q34**		
33	If yes, What did you do first before going to the hospital A. Took coconut juice……1 B. Took ORS……..2 C. Took mashed kenkey……..3 D. Took corn dough……4 E. Charcoal solution……5	☐ ☐ ☐	Q33FaidHo
	ACCESS TO WATER Please **tick** as appropriate		**CODE**
34	Please do you have access to water A. Yes……..1 B. No…….2	☐	Q34AccW
35	What is the source of water available to you A. Improved well……1 B. Unimproved well…….....2 C. Vendors water…….....3 D. Borehole……4 E. Pipe…….5 F. Harvested rain water……6 G. Others (Specify)……..7	☐ ☐ ☐ ☐	Q35SoW
36	Which source of water do you usually depend on A Improved well……1 B. Unimproved well……..2 C. Vendor water……...,.3 D. Borehole……4 E. Pipe……5 F. Harvested rain water……..6 G. Others (Specify)……7	☐ ☐ ☐	Q36SoWdep
37	How often do you get water from your tap A. Everyday……1 B. Weekly……2 C. Monthly …….....3 D. Not applicable……..4 E. Others (Specify)……5	☐ ☐	Q37Wtap
	WATER STORAGE FACILITY Please **tick** as appropriate		**CODE**
38	Do you have a storage facility A. Yes……1 B. No……..2	☐	Q38StoF
39	What type of storage facility do you have A. Underground concrete tank……1 B. Polytank……..2 C. Barrel……..3 D. Gallon……4 E. Don't have a storage facility……5 F. Others (Specify)……6 **Find out if** 1- covered 2- uncovered	☐ ☐ ☐	Q39StoType

40	How often do you fill your container for storage A. Every day……1 B. Weekly……2 C. Monthly…….....3 D. Don't have a particular time……...4 E. Others (Specify)……..5	☐ ☐	Q40StoTime
	WATER TREATMENT Please **tick** as appropriate		**CODE**
41	What is your main drinking water A. Sachet water……1 B. Bottled water……2 C. Tap water……..3 D. improved well……...4 E. Unimproved well……..5 F. Harvested rain water……6 G. Others (Specify)……7	☐ ☐ ☐	Q41DrinkW
42	Do you treat your water before drinking A. Yes……1 B. No……..2 If **No. Skip** to **Q44**	☐	Q42Wtreat
43	How do you treat your water A. Boiling……1 B. Filtration……...2 C. Use of alum……..3 D. Chlorination……4 E. Not treated……5 F. Use of lime……6 G. Others (Specify)……7	☐ ☐ ☐	Q43WtreatM
	ACCESS TO TOILET FACILITY Please **tick** as appropriate		**CODE**
44	Do you have access to toilet facility A. Yes……..1 B. No……2 If No. skip to **Q46** & **Q47**	☐	Q44Toi
45	Is there toilet facility in your house A. Yes……1 B. No……..2	☐	Q45ToiHse
46	Was there ever a toilet in this house A. Yes……1 B. No……..2		Q46everToi
47	What happened to it A. Converted into a shop…….. 1 B. Converted into a room……..2 C. Spoilt……3 D. Others (specify)……4		Q47ToiCon
48	Do you think the conversion of toilet our homes can contribute to open defaecation A. Yes……..1 B. No……2	☐ ☐	Q48Opdef

49	What type of toilet facility do you use A. Improved Pit latrine……1 B. Water closet…… 2 C. KVIP……3 D. Open defaecation……..4 E. Pan latrine……5 F. Unimproved pit latrine……..6 G. Public latrine……7 H. Others (Specify)……8	☐	Q49Toitype
50	Will you advocate that landlords add toilet facility in their building plan A. Yes……1 B. No……2	☐	Q50ToiPlan
	DRAINAGE SYSTEM Please **tick** as appropriate		**CODE**
51	Do you have an improved drainage system in your residence? A. Yes……..1 B. No……2	☐	Q51DrainS
52	Where do you dispose of your waste water? A. Gutter……1 B. Sink……2 C. Floor……3 D. Others (Specify)……..4	☐	Q52Wwdis
53	Is the drain often cleaned/distilled A. Yes……..1 B. No……2		Q53DrainC
54	How often is the drain cleaned A. Daily…….....1 B. Weekly……..2 C. Monthly…….....3 D. Don't remember……....4 E. Others (Specify)……5	☐	Q54DoftenC
55	Whose responsibility is it to clean the drain A. AMA……...1 B. Zoom lion……2 C. Everybody……3 D. Government……..4 E. Others (Specify)…….5	☐	Q55ResC
56	Do you agree that good drainage system will prevent food and water pollution A. Yes……..….1 B. No…….2	☐	Q56DfodP
	REFUSE DISPOSAL Please **tick** as appropriate		**CODE**
57	Where do you dispose off your waste A. AMA bin……1 B. Bush……2 D. Zoomlion……..……..3 D. Gutter……..4	☐	Q57Rdis

	E. Others (Specify)……..5		
58	How often are the waste containers picked by the assembly? A. Daily……1 B. Weekly……..2 C. Monthly……3 D. Don't know……4 E. Others (Specify)……5	☐ ☐ ☐	Q58Rpic
	PERSONAL OPINION ON CHOLERA OUTBREAK		
59	In your opinion do you think something went wrong with the recent cholera outbreak? A. Yes B. No	☐	Q59
60	What did you think went wrong A. Health system failure……1 B. Failure of government responsibility……2 C. Individual attitude……3 D. The assembly not doing a good job……..4 E. Others (specify)……5	☐	Q60
61	In your opinion what could you have done to prevent cholera A. Strengthen health system……..1 B. Ask government to take up responsibilities…….2 C. Change individual attitude……....3 D. Ask assembly to do a good job……4 E. Others (specify)……..…5	☐	Q61
	SOCIO – ECONOMIC FACTORS Please **tick** as appropriate		**CODE**
62	Have you ever had the opportunity of attended school A. Yes……1 B. No……2	☐	Q62Edu
63	What is your educational level A .Primary……1 B.JSS/Middle……2 C. Secondary/SSS/SHS……..3 D. Vocational/Technical……4 E. University/Poly……..5 F. Others (Specify)……6	☐ ☐ ☐	Q63EduL
64	Do you work A. yes B. No If No. **Skip** to **Q67**	☐	Q64Work
65	What is your occupation A. Fishing……1 B. Trading……2	☐	Q65Occ

	C. Unemployed……3 D. Self-employed……..4 E. Hair dresser……..5 F. Seamstress……...6 G. Cleaner…….....7 H. Labourer……..8 I. Farmer……...9 J. Others (Specify)……	☐ ☐ ☐	
66	How much do you earn a month A. Above GHC2000……1 B. Below GHC2000……..2 C. Above GHC1000……..3 D. Below GHC1000……..4 E. Below GHC500…….5 F. GHC200 & Below……..6 G. Others (Specify)……7	☐ ☐ ☐ ☐	Q66income
67	Do you listen to news A. Yes……1 B. No……...2	☐	Q67News
68	From which of the following sources do you get your news A. Television……1 B. Radio……2 C. Newspaper……3 D. Internet……...4 E. Others (Specify)……5 You can **tick** more than one	☐ ☐	Q68NewsS
69	Which of the following do you own A. Car……1 B. Motor bike……2 C. Bicycle……..……3 D. House……4 E. Television……..….5 F. Radio……6	☐ ☐ ☐	Q69S-econ

APPENDIX 3: ETHICAL COMMITTEE APPROVAL LETTERS

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

...me of reply the ...mber and date of this ...r should be quoted.

...Ref. :GHS-ERC: 3
...r Ref. No.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: *Hannah.*
Frimpong@ghsmail.org

19th May, 2015

Rita Adjoa Ansong
University of Ghana
School of Public Health
Legon, Accra

ETHICS APPROVAL - ID NO: GHS-ERC: 19/04/15

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol titled:

"Assessing Factors Contributing to Recent High Cases of Cholera in the La Dadekotopon Municipality, Accra"

This approval requires that you inform the Ethics Review Committee (ERC) when the study begins and provide Mid-term reports of the study to the Ethics Review Committee (ERC) for continuous review. The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Please note that any modification without ERC approval is rendered invalid.

You are also required to report all serious adverse events related to this study to the ERC within seven days verbally and fourteen days in writing.

You are requested to submit a final report on the study to assure the ERC that the project was implemented as per approved protocol. You are also to inform the ERC and your sponsor before any publication of the research findings.

Please note that this approval is given for a period of 12 months, beginning May 19th 2015 to 18th May 2016.

However, you are required to request for renewal of your study if it lasts for more than 12 months.

Please always quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....

DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

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eply the number and the date of
hould be quoted.

GHS/LDKMHD/5/15/08

o: ....

LA DADE-KOTOPON MUNICIPAL HEALTH DIRECTORATE
GHANA HEALTH SERVICE
PMB –
LA, ACCRA

20 May 2015

Tel: 030277644

ues
- PEOPLE-CENTRED
- PROFESSIONALISM
- TEAMWORK
- INNOVATION/EXCELLENCE
- DISCIPLINE
- INTEGRITY

<u>OM IT MAY CONCERM</u>

<u>G RITA ADJOA (ID: 10506861</u>

introduce to you Rita Adjoa Ansong, an MPH student in the School of Public Health ent who is currently pursuing a degree leading to the award of Master of Public Health, y of Ghana, Legon. As part of the requirement for the award of MPH Degree, she is ng a research on the topic; " **Assessing factors contributing to the Recent High Cases ra in La Dade-Kotopon Municipality , Accra.** "

icipal Health Directorate acknowledge the presence of the above name mentioned in the il and request the support and cooperation of those concern in the research to help her ccessful research work done.

GUSTA DOE)
Y DIRECTOR OF NURSING SERVICES
UNICIPAL DIRECTOR OF HEALTH SERVICES
E – KOTOPON

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APPENDIX 4: FIELD PICTURES

Training of Research Assistants

A Research Assistant with a Respondent

Principal Investigator Interviewing a Respondent

A Respondent Being Interviewed by an Assistant.

An Assistant Interviewing a Respondent

The Principal Investigator with some Research Assistants