



## Prevalence of Water Borne Diseases within Households in the Bamendankwe Municipality-North West Cameroon

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### Abstract

In the developing countries four-fifth of all the illnesses are caused by water-borne diseases with diarrhea leading to dehydration being the leading cause of childhood death. Cholera, typhoid fever and hepatitis A are caused by bacteria, and are among the most common diarrheal diseases. Other illnesses, such as dysentery, are caused by parasites that live in water contaminated by the feces of sick individuals. The most common manifestation and cause of mortality in water borne diseases were as result of dehydration due to loss of copious amounts of electrolytes either in vomiting or diarrhea. The research question for the study was: What knowledge do households in Bamendankwe village possess in the practice of the prevention of water-borne diseases and what measures are employed in the prevention of the occurrence of water-borne diseases?

The general objective was to assess the knowledge and practices of households in Bamendankwe village in the prevention of the occurrence of water-borne diseases; identify the problems encountered in its prevention and ascertain practical measures to be employed to resolve their occurrence. The specific objectives were: to assess the knowledge of households on the causes of water borne diseases; to determine the practical measures put in place to prevent the occurrence of water borne diseases; to identify the problems they face in the practice of the preventive measures against water borne diseases and to ascertain opinions of households on how to resolve difficulties/constraints in the implementation of preventive measures against water borne diseases.

The descriptive cross-sectional study design was employed for the study where-in primary data was collected at one point in time from inhabitants of Bamendankwe municipality in order to collect responses on their knowledge and practices in the prevention of waterborne diseases as well as the constraints encountered in the prevention of its occurrence. The target population for this study comprised of youths, men and women who have lived in this village within the past 6 months irrespective of their sex, religion, occupation, nationality and socio-economic status.

A sample size of 120 respondents was recruited for the study. Results show that out 120 respondents, 44 (37%) had basic education, 40(33%) went to secondary school and 36 (30%) attained university education. Eighty (67%) said water borne diseases were diseases transmitted by pathogenic micro-organisms, 40(33%) said that water borne diseases were diseases caused by drinking water from doubtful sources.

They gave diverse responses as to the different types of waterborne diseases; with 18 (18%) out of the 60(60%) knew of typhoid, 15(25%) named cholera, 12(20%) talked of diarrhea, 10(17%) point out malaria and 5(8%) of the 60 knew of dysentery. Concerning the complications that ensue from waterborne pathologies, 40(33.3%) said severe dehydration can result as a complication of water borne diseases, 32 (26.6%), 40(33.3%) said death can result while 08 (6.6%) said it can result to hypovolemia.

Thirty-six (30%) of respondents both faced financial and educational constraints in the prevention of water diseases, 30(25%) said they lack time, and 18 (15%) said it was difficult due to lack of community water project. Diverse proposal were made to salvage the encountered problems; 20% proposed frequent hand-washing, 25% proposed keeping containers always clean, 22% proposed the construction of pipe-borne stand-pipes, 17% proposed health educational lectures on waterborne diseases while 6% wished filters be provided in homes.

From the data collected, and analysis made it be can be concluded that there exist knowledge deficit on the causes of water-borne diseases as well as the practical measures employed in the prevention of their occurrence as evidenced by the diverse responses gotten from them. Their understanding of the notions of hygiene and sanitation, the knowledge and practices on the prevention of water-borne diseases were not based on the level of education but on how much information they got via public health education concerning the causes and preventive measures of water-borne diseases.

So, an up-to-date knowledge and practices on the prevention of the occurrence of water-borne diseases through corporate approach by stakeholders is necessary for the wellbeing of the Bamendankwe community. The Bamendankwe Council hygiene and sanitation officers should take it a responsibility to organize regular household checks for the availability of properly constructed toilet facilities in homes and equally provide public health education lectures in social institutions in order to enlighten the community on the importance of constructing appropriate toilets with lids at a satisfactory distance from the households to avoid flies contaminating foodstuffs.

**Keywords:** Waterborne diseases; Cholera; Typhoid fever; Dysentery; Purification; Chlorination; Dehydration; Diarrhea

## Introduction

Around 1.1 billion people worldwide do not have access to improved water supply sources, where as 2.4 billion people do not have access to any type of improved sanitation facilities. About 2 million people die every year due to diarrheal-related diseases most of whom are children less than 5years of age. The most affected are people of the developing countries living in extreme condition of poverty, normally peri- urban dwellers or rural inhabitants.

According to WHO (2014) [1], every year more than 3.4 million people die as a result of water-related diseases, making it the leading cause of morbidity and mortality around the world. Most of the victims are young children, the vast majority of whom die of illnesses caused by organisms that thrive in water sources contaminated by raw sewage. A report published recently in the medical journal *The Lancet*, (2005) concluded that poor water sanitation and lack of safe drinking water take a greater human toll than war, terrorism and weapons of mass destruction combined. Among the main problems which are responsible for this situation were;

Lack of priority given to the sector;

Lack of financial resources;

Lack of water supply and sanitation services;

Poor hygiene behaviors and inadequate sanitation in public places including hospitals, health centers and schools providing access to sufficient quantities of safe water.

The provision of facilities for sanitary disposal of excreta and introducing sound hygiene behaviors, are of capital importance to reduce the burden of disease caused by these risk factors.

According to an assessment commissioned by the United Nations, 4,000 children die each day as a result of diseases caused by ingestion of filthy water. The report says four out of every 10 people in the world, particularly those in Africa and Asia, do not have clean water to drink.

Cholera, typhoid fever and hepatitis A are caused by bacteria, and are among the most common diarrheal diseases. Other illnesses, such as dysentery, are caused by parasites that live in water contaminated by the feces of sick individuals. The most common manifestation and cause of mortality in water borne diseases were as result of dehydration due to loss of copious amounts of electrolytes either in vomiting or diarrhea.

Lakes and streams which people use for drinking water, bathing and defecating are sources of disease, as is water left by natural disasters.

People can also contract a diarrheal disease by eating food that's prepared by sick individuals who have not washed their hands, or

touching something handled by an infected person and then putting their own hands into their mouths.

Water borne diseases occurrence was observed to follow a seasonal pattern with peaks occurring between the months of January and May followed by drops between June and October and rose again in November. Children below 5 years were found to be more vulnerable to diarrhea of viral origin, gastro-enteritis and amoebic dysentery while persons between 15-44 years were more vulnerable to typhoid and cholera [2].

Physical and chemical analysis revealed that water samples had turbidities varying between 5.5-86 NTU, pH values between 4.2 and 7.1 and zero residual chlorine. Bacteriological analysis showed that the total coli forms count was averagely 74/100 ml, the fecal coli form count was 43/100 ml and the fecal streptococci count was 27/100 ml. Lack of access to portable water, absence of sanitation facilities and environmental factors could be advanced as the probable causes of water borne diseases spread.

In the developing countries four-fifth of all the illnesses are caused by water-borne diseases with diarrhea leading to dehydration being the leading cause of childhood death. An estimated 246.7 million people worldwide are infected with schistosomiasis and of this; 20 million suffer severe consequences of the infection while 120 million suffer neither symptom. An estimated 80% of the transmission takes place in Africa south of the Sahara.

The United Nations has set a goal of cutting in half by the year 2015 the number of people without access to safe drinking water and basic sanitation. Independent experts say that a concerted effort on the part of wealthier nations is necessary if that goal is to be reached.

A study carried out in the Bamendankwe municipality, revealed that out of 2124 people who were consulted from March to June 2013, 1200 (56.5%) were cases of water borne diseases. Besides, absence of adequate toilet facilities, poorly constructed latrines with no lids to prevent flies from visiting the toilets and picking faecal matter on their appendages to contaminate foods and cooking utensils is another problem faced in the prevention of water borne diseases. This is because most families do not have good toilets facilities; the hygiene and sanitation officers of the rural municipalities do not do regular checks in homes to identify defaulters who do not have good toilet facilities or with toilets too close to households and judicious sanctions meted on them. In the hinterlands some inhabitants used pig fence as their toilets, others used rivers as their toilet thus polluting water thereby causing water borne infections for those using it downstream [3].

More so, the lack of trained personnel to carryout health education on its prevention is another problem. This is because communities lack educators to educate them on the dangers of water borne diseases there by influencing the health status of the people [4].

Besides, another problem faced in the developing countries is that of lack of water project schemes; since most communities do not have

water projects they turn to use water from doubtful sources there by increasing the rate of water borne diseases in Africa [5].

Furthermore, poor hand washing method is another problem faced in the prevention of water borne diseases. People tend to transmit infection from one another through the faeco-oral route as they do not master the appropriate method of hand washing after visiting the toilet [3].

The community water catchment site are not fenced rendering easy access by stray animals that ended up contaminating sources of water supply. This was the main source of motivation for the researcher to carry out research on the knowledge and practices of families in the proper handling measures of portable water in order to prevent the occurrence of water-borne diseases [6,7].

## Research Question

What knowledge do households in Bamendankwe village possess in the practice of the prevention of water-borne diseases, and what measures are employed in the prevention of the occurrence of water-borne diseases?

## Research objectives

**General objective:** To assess the knowledge and practices of households in Bamendankwe village in the prevention of the occurrence of water-borne diseases; identify the problems encountered in its prevention and ascertain practical measures to be employed to resolve their occurrence.

### Specific objectives

1. To assess the knowledge of households on the causes of water borne diseases.
2. To determine the practical measures put in place to prevent the occurrence of water borne diseases.
3. To identify the problems they face in the practice of the preventive measures against water borne diseases.
4. To ascertain opinions of households on how to resolve difficulties/constraints in the implementation of preventive measures against water borne diseases.

## Methodology

### Study design

The descriptive cross-sectional study design was employed for the study where-in primary data was collected at one point in time from inhabitants of Bamendankwe village in order to collect responses on their knowledge and practices in the prevention of waterborne diseases as well as the constraints encountered in the prevention of its occurrence.

The target population for this study comprised of youths, men and women who have lived in this village within the past 6 months irrespective of their sex, religion, occupation, nationality and socio-economic status.

**Sample size:** The sample size was calculated using the formula below:

$$N = \frac{(z)^2 \times p(1-p)}{(e)^2}$$

N=the required sample size

Z=confidence interval of 95% (z=1.96)

p=the population of households (15%)

e=random error of 5% (type 1 value of 0.05)

N=120 respondents.

## Primary data collection instrument

The instrument employed for primary data collection was a structured questionnaire with open and close-ended questions, administered by the researcher and co-researchers to the study population in the randomly selected quarters using the cluster sampling method.

**Data analysis tools:** Data was coded using a coding guide developed for the study and entered in CsPro, cleaned and exported to SPSS windows version 16.0 for analysis.

- Descriptive statistics was employed to analyze the households' perceptions and practices.
- Bivariate analysis was used to evaluate the association between explanatory and outcome variables;

**Method for data presentation:** Data collected was analyzed using the above software and presented in graphics and frequency tables.

In Figure 1 above, out of 120 respondents, 88(73%) were within the age range 61–70 years, 20(17%) within the range 30–40 years, 8(7.0%) within the range 51–60 and 4(3.0%) within the age range 41–50 years.

In Figure 2 out of 120 respondents, 80(67%) were females, and 40(33%) were males

From Figure 3, 56 (47%) were single, 52 (43%) married 8 (7%) divorce and 4.0 (3%) were widows.

## Presentation and Analysis of Results

### Age distribution of respondents

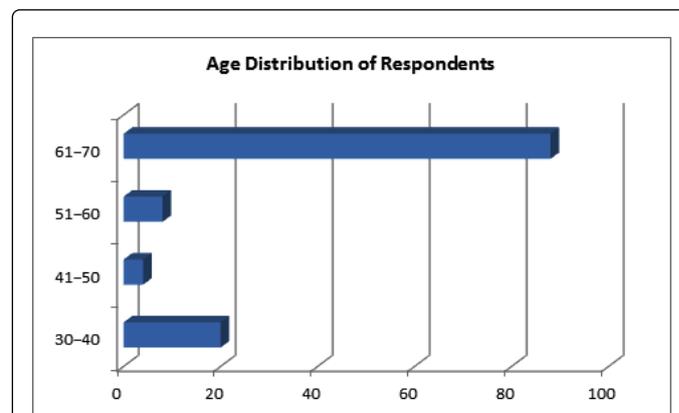


Figure 1: Age distribution of Respondents

### Sex distribution of respondents

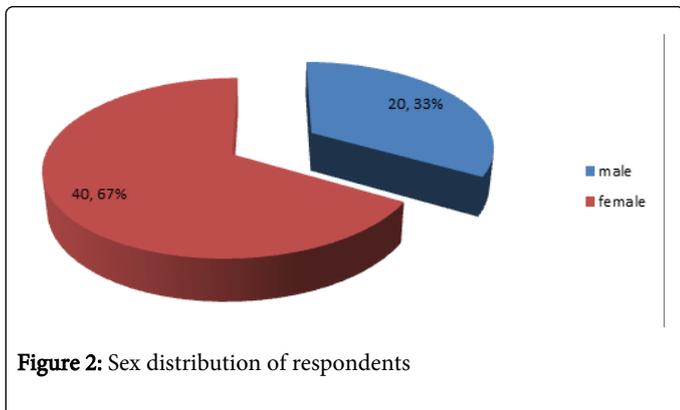


Figure 2: Sex distribution of respondents

### Distribution of respondents according to marital status

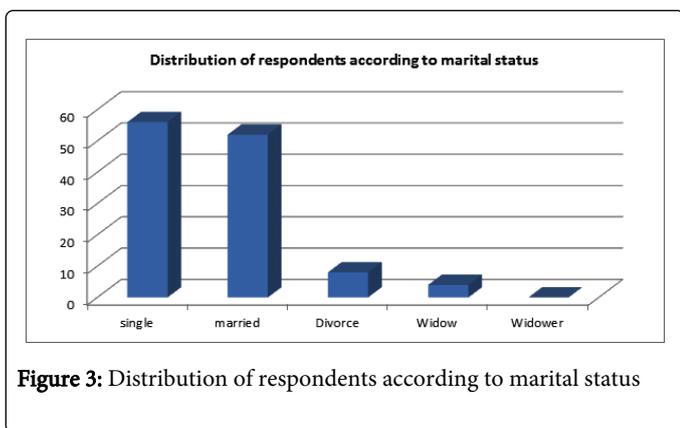


Figure 3: Distribution of respondents according to marital status

### Distribution of respondents according to educational level

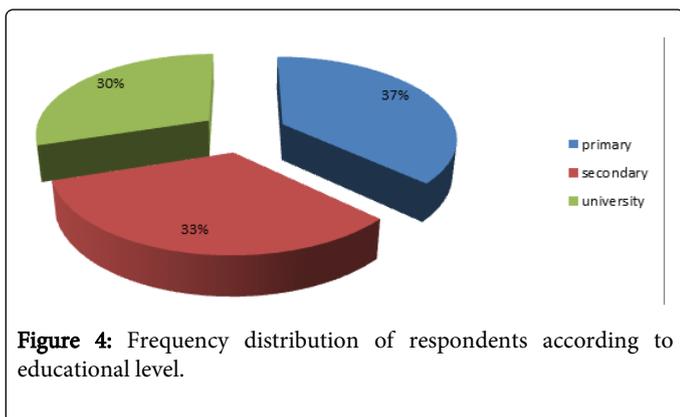


Figure 4: Frequency distribution of respondents according to educational level.

From Figure 4, out 120 respondents, 44 (37%) had basic education, 40(33%) went to secondary school and 36 (30%) attained university education.

### Knowledge on the causes and occurrence of water borne diseases

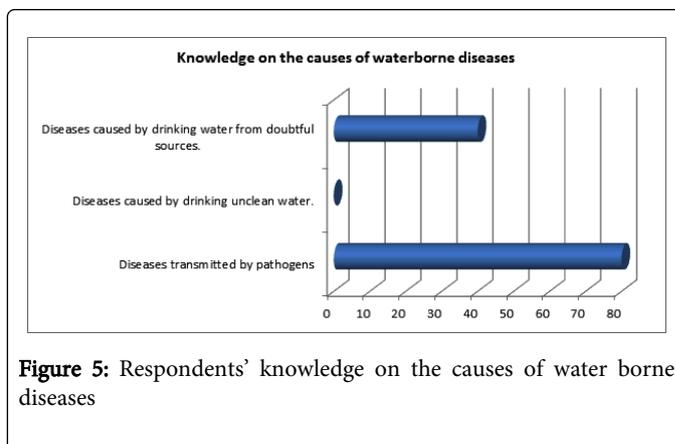


Figure 5: Respondents' knowledge on the causes of water borne diseases

From Figure 5, 80(67%) said water borne diseases were diseases transmitted by pathogenic micro-organisms, 40(33%) said that water borne diseases were diseases caused by drinking water from doubtful sources.

### Knowledge on the transmission of water borne diseases

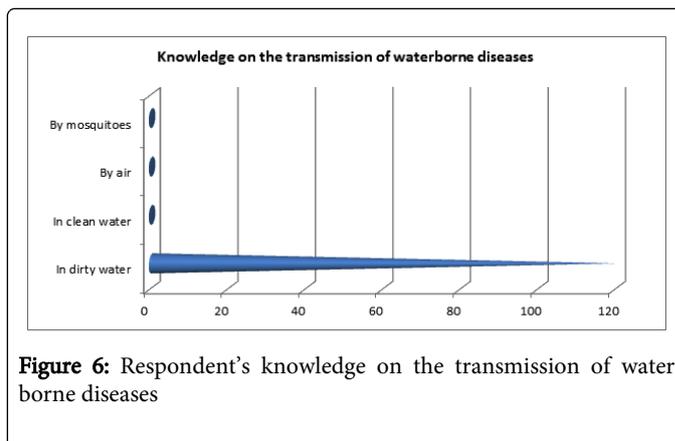


Figure 6: Respondent's knowledge on the transmission of water borne diseases

In Figure 6 All the 120 respondents said water borne diseases were transmitted by consuming water contaminated by pathogenic micro-organisms.

Respondents gave diverse responses as to the different types of waterborne diseases; 18 (18%) out of the 60(60%) knew of typhoid, 15(25%) named cholera, 12(20%) talked of diarrhea, 10(17%) point out malaria and 5(8%) of the 60 knew of dysentery.

According to Figure 8, 40(33.3%) said severe dehydration can result as a complication of water borne diseases, 32 (26.6%), 40(33.3%) said death can result while 08 (6.6%) said it can result to hypovolemia.

From Figure 9, 50% of respondents prevent water borne diseases by treating their water with chlorine before drinking, 33% prevent it by regular hand washing and 17% said water borne diseases can be prevented by eating clean food and drinking clean water.

Figure 10 presents the respondents' sources of drinking water; 52(43%) of respondents consumed water from springs, 28(23%) consumed water from rivers, 24(21%) used water from taps while 16(13%) relied on well water as a source of drinking water.

### Knowledge on the types of waterborne diseases

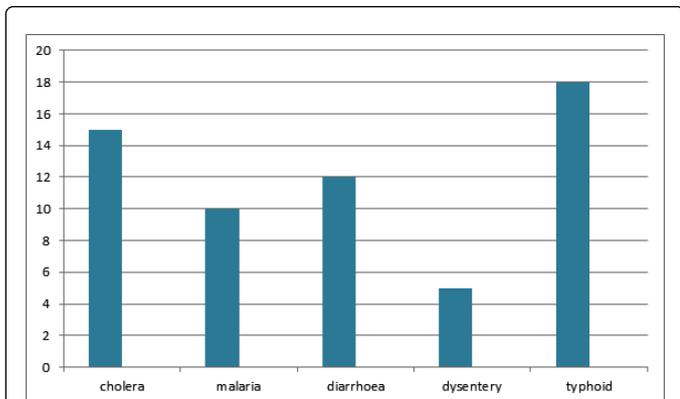


Figure 7: Respondents' knowledge on the types of waterborne diseases.

### Knowledge on the complications of waterborne diseases

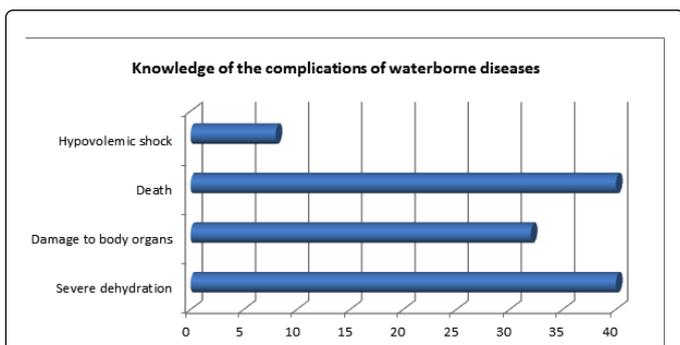


Figure 8: Knowledge of the complications of waterborne diseases.

### Knowledge on the prevention of water borne diseases

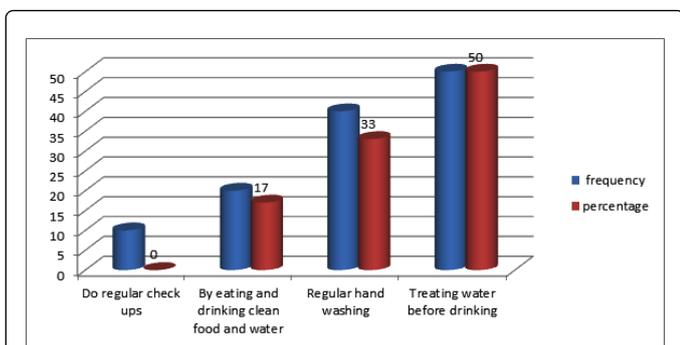


Figure 9: Respondents' preventive measures against water borne diseases.

### Respondents' sources of portable water

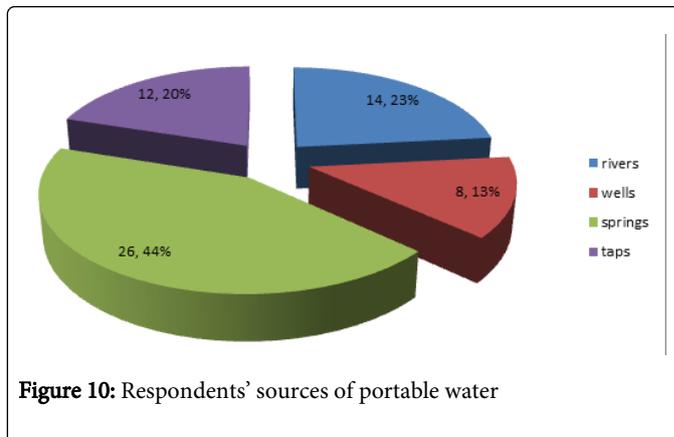


Figure 10: Respondents' sources of portable water

### Water purification measures employed by respondents

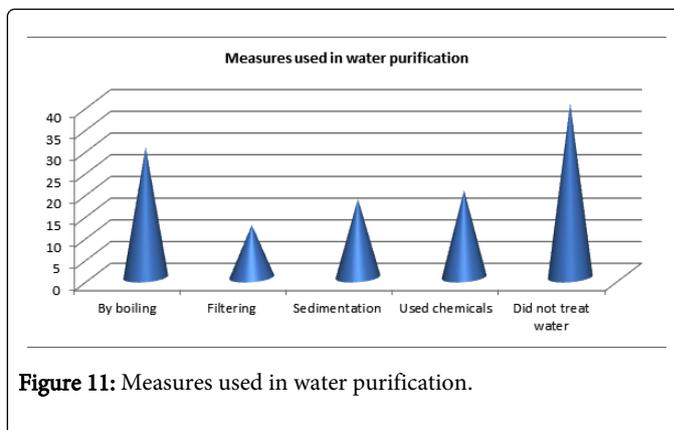


Figure 11: Measures used in water purification.

In Figure 11, 40(33%) did not treat their water, 30(25%) treated water by boiling, 20(17%) used chemicals to treat their water, 18(15%) managed to sediment their water and 12(10%) said they filtered their water before drinking.

### Constraints encountered in the prevention of waterborne diseases

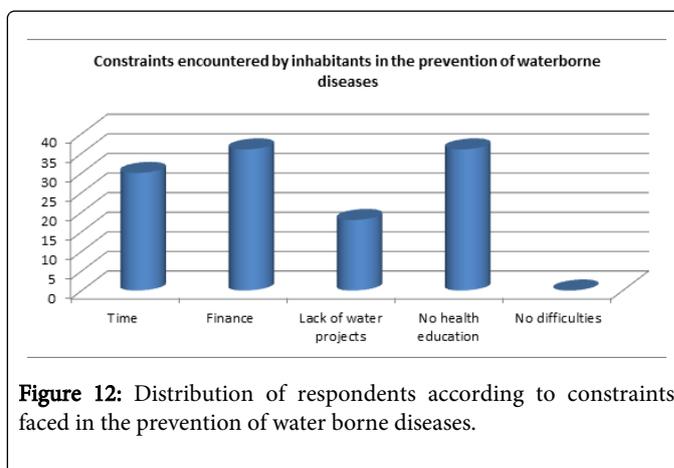
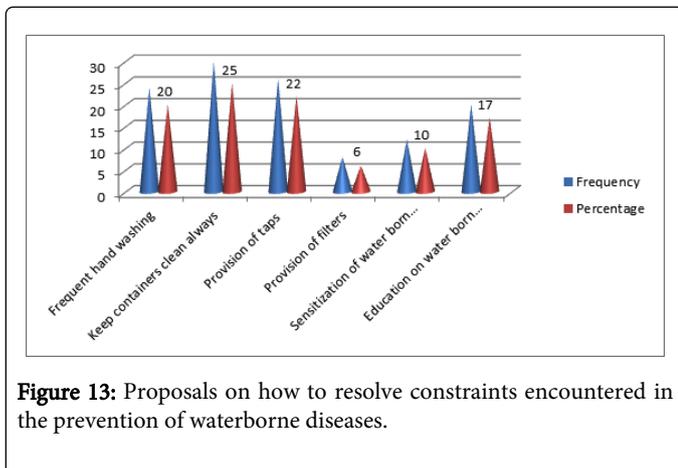


Figure 12: Distribution of respondents according to constraints faced in the prevention of water borne diseases.

In Figure 12, 36(30%) of respondents both faced financial and educational constraints in the prevention of water diseases, 30(25%)

said they lack time, and 18 (15%) say it was difficult due to lack of community water project.

### Respondents' opinions on how to resolve the identified problems



**Figure 13:** Proposals on how to resolve constraints encountered in the prevention of waterborne diseases.

From the Figure, 20% proposed frequent hand-washing, 25% proposed keeping containers always clean, 22% proposed the construction of pipe-borne stand-pipes, 17% proposed health educational lectures on waterborne diseases while 6% wished filters be provided in homes.

## Discussion of Findings

### Respondents' level of education

Out of the 120 respondents, 44(53%) of them had attended basic education, 40(33%) went to secondary school and 36(14%) went to the university. From this information, one can therefore deduce that knowledge deficit is really a serious problem faced by the community in the prevention of water borne diseases. This is due to the fact that, the majority of the population with only basic education cannot really understand what water borne diseases are as well as measures geared at preventing them.

### Knowledge on the occurrence of waterborne diseases

It was illustrated in Figure 5 that 60 out of the 120 respondents said waterborne diseases were acquired from contaminated water. From this information, it is clear that respondents are not completely ignorant about the occurrence of water borne diseases. Figure 7 illustrated the various types of water borne diseases enumerated by respondents in which typhoid; cholera, malaria, diarrhea and dysentery were mentioned. With respect to respondents' knowledge on the complications of water borne disease; all respondents enunciated that water borne diseases had major complications such as severe dehydration (33.3%), damage to tissue organs (26.6%), death (33.3%) and hypovolemic shock (6.6%), just like any other disease condition [8].

### Knowledge on the prevention of water borne diseases

Analyzed data according to respondents' knowledge on the prevention of waterborne diseases; Figure 9 shows that 60(50%) make efforts to treat water before drinking, 40(33%) said they practiced

regular hand washing and 20(17%) believed that eating clean food and drinking clean water is the best method in preventing water borne diseases. From this information, it can be deduced that respondents are not knowledgeable enough on the practical measures towards the prevention of water borne diseases, which go in line with what Gerba et al. (2010) intimated that literacy level influences hygiene and sanitation practices in our communities [5].

On respondents' knowledge on the sources of portable water, 52(43%) fetched drinking water from springs, 28(23%) fetched theirs from rivers, 24(21%) consumed tap water and 16(13%) drank well water. It can therefore be concluded from this information that the high prevalence of water borne diseases resulted mainly from the water consumed in the community.

Based on respondents' knowledge on water purification measures as illustrated in Figure 11, 40(33%) did not purify their water, 30(25%) purified after boiling, 20(17%) used chemicals to purify water and 18(15%) practiced sedimentation. From this information, it can be concluded that, the majority of people affected by water borne disease are those who do not treat their water, especially as nobody use chlorination for water purification [9].

### Difficulties in the prevention of water borne diseases

With the constraints faced in the prevention of water borne diseases by respondents as illustrated in Figure 12, lack of health education 36 (30%), lack of finances 36 (30%), 30(25%) said they lacked time with 18(15%) emphasizing on the absence of water projects to construct pipe-borne water stand-pipes in the community. This is in line with Straus Baugh's (1997) assertion that community participation and appropriate technology in handling community oriented projects ensures sustainability and their complete embrace of the project as having a baseline origin [4].

### Opinions on how to resolve the encountered difficulties

The difficulties in preventing water borne diseases could be resolved through regular sensitization (10%), health education on water borne diseases (17%), regular hand washing (20%), keeping of water container clean (25%) and creating time for water preservation (6%). This ties with Sam Malone (2014) who indicated that it is very vital to change or ensure proper hygiene in order to avoid water borne diseases.

## Conclusion

This research was geared at assessing the knowledge and practices of households of Bamendankwe village on their knowledge in the practice of the prevention of water-borne diseases and identifies the constraints encountered in the prevention of the occurrence of water-borne diseases.

From this study, it was found out that; respondents are not well educated on the proper treatment of water from doubtful sources as well as its protection and preservation for onwards consumption; 43% of respondents do not treat water collected from streams or springs which is the main reason for the pledge for health education campaigns to be organized in communities for the prevention against waterborne diseases.

From the data collected, and analysis made it be can be concluded that there exist knowledge deficit on the causes of water-borne diseases as well as the practical measures employed in the prevention of their

occurrence as evidenced by the diverse responses gotten from them. Their understanding of the notions of hygiene and sanitation, the knowledge and practices on the prevention of water-borne diseases were not based on the level of education but on how much information they got via public health education concerning the causes and preventive measures of water-borne diseases. So, an up-to-date knowledge and practices on the prevention of the occurrence of water-borne diseases through corporate approach by stakeholders is necessary for the wellbeing of the Bamendankwe community. The Bamenda-1 Council's hygiene and sanitation officers should take it a responsibility to organize regular household checks for the availability of properly constructed toilet facilities in homes and equally provide public health education lectures in social institutions in order to enlighten the community on the importance of constructing appropriate toilets with lids at a satisfactory distance from the households to avoid flies contaminating foodstuffs [10].

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