

## **Hygiene and Sanitation Practices in the Collection, Treatment and Preservation of Potable Water in Santa Town, North West Cameroon.**

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### **Abstract**

*Access to safe drinkable water has improved over the last decades in almost every part of the world, but approximately one billion people in Africa still lack access to safe water and over 2.5 billion lack access to adequate sanitation. In large parts of the world, humans have inadequate access to potable water and use sources contaminated with disease vectors, pathogens or unacceptable levels of toxins or suspended solids. Drinking or using such water in food preparation leads to widespread acute or chronic illnesses and it is a major cause of death and misery in many countries. As such prevention of water borne diseases is a major health goal in developing countries (Fawell J & Chipman K, 2010).*

*The health burden of poor water quality is enormous with an estimated 37.7million individuals affected by water-borne diseases; annually 1.5 million children are estimated to die from diarrheal-related diseases each year (WHO, 2012).*

*The developing countries in the world still face the problem of water scarcity with Africa having the largest number of countries encountering these problems. Due to water scarcity, many families tend to store water in their home for long term use. Most families have inadequate knowledge or are ignorant on the duration of the storage and the type of container or vessel used in the collection and storage of drinkable water.*

*Inhabitants in Santa town in North West region of Cameroon experience inherent episodes of water shortages all round the year prompting household to fetch, store and consume water from doubtful sources.*

*A study was carried out to assess the knowledge and practices of the inhabitants of Santa town in the collection and preservation of potable water in order to avert the occurrence of water-borne diseases.*

*Primary data was collected with the use of 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 cluster sampling. A sample size of 110 households was recruited for the study.*

*Results show that 68 (58.18%) of respondents defined drinkable water as water safe enough to be consumed with low risk of harm, 24 (21.8%) defined it as water which originates from pipe borne water while 16 (14.5%) said that it is water from any natural source.*

*On the criteria used in the identification of unsafe water, 68 (58.18%) said they identified water which is not safe for drinking from its color, taste and odor; on the issue of water protection and preservation from contaminants, 58(52.7%) of the responses were that they lacked containers for their drinking water, 32(29.5%) said they lacked chemicals and filters to treat their water, while 14(12.9%) did not have knowledge in the protection and preservation of potable water while 06 (5.5%) said that the problem they encountered was the presence of children playing around drinkable water sources and water storage containers.*

*From the data collected, and analysis made it be can be concluded that there exist inadequate knowledge on the protection and preservation of potable water. Their understanding of the notions of hygiene and sanitation, the knowledge and practices on the collection and preservation of potable water are not based on the level of education but on how much public health information they got about drinking water collection, treatment and preservation. So, an up-to-date, knowledge and practices on the collection, treatment and preservation of potable water is necessary for the wellbeing of the Santa community. The Council's hygiene and sanitation service should take it as duty function*

*to organize regular public health education lectures in social institutions in order to enlighten the community.*

## **Introduction**

Access to safe drinkable water has improved over the last decades in almost every part of the world, but approximately one billion people worldwide still lack access to safe water and over 2.5 billion lack access to adequate sanitation. In large parts of the world, humans have inadequate access to potable water and use sources contaminated with disease vectors, pathogens or unacceptable levels of toxins or suspended solids. Drinking or using such water in food preparation leads to widespread acute or chronic illnesses and it is a major cause of death and misery in many countries. Reduction of water borne diseases is a major health goal in developing countries (Fawell J & Chipman K, 2010).

WHO/UNICEF Joint Monitoring Program for Water Supply and Sanitation (2012), released in early 2013 that in 36% of world population, 2.5 billion people lack improved sanitation facilities and 768 million people still use unsafe drinkable water sources. Inadequate access to safe water and sanitation services coupled with poor hygiene practices, kills and sickens thousands of children every day, and leads to impoverishment and diminished opportunities for thousands more.

Poor sanitation, water and hygiene have many other serious repercussions; children and particularly girls are denied their right to education because their schools lack private and decent sanitation facilities. Poor water quality is deadly and some 5 million deaths a year are caused by polluted drinking water. WHO Report (2012), estimates that safe drinking water could prevent 1.4million children from dying from diarrhea, cholera and other water borne diseases.

The health burden of poor water quality is enormous. It is estimated that around 37.7million individuals are affected by water borne diseases annually 1.5 million children are estimated to die of diarrheal-related diseases each year (WHO, 2012).

The developing countries in the world still face the problem of water scarcity with Africa having the largest number of countries with problems. Due to water scarcity, many families tend to store water in their home for long term use. Most families have inadequate knowledge or are ignorant on the duration of the storage and the type of container or vessel used in the collection and storage of drinkable water.

In Ethiopia, there is limited access to drinking water and basic sanitation, only 24% of the population has access to drinkable water in spite of the large number of water resources available in the country. And only 13% have basic sanitation services as documented by the 2006 United Nations Development Program Report. Due to this situation, hundreds of people fall ill and die daily as a result of drinking contaminated water (WHO/UNICEF, 2010).

Cameroon got fully engaged with the activities toward the attainment of the Millennium Development Goals (MDGs) since their inception in 2000. She has made notable progress, and much more needs to be done to improve the situation especially in rural areas. In 2006, 70% of the population had access to safe drinkable water and the coverage in urban centers was 88%, significantly better than the 47% in rural areas (MDGs, Potable Water, 2001).

This study therefore assesses the situation of access to potable water and sanitation of a Health District in Cameroon within the context of MDGs and ascertains whether she is on the tract to meeting the MDGs in these domains and proposes actions to be taken to bring it closer to these objectives.

Water Wiki-net (2012) reports that the Cameroon government, although endowed with abundant fresh water sources, still faces a lack of comprehensive information, weak enforcement capacity and poor coordination amongst agencies to sustainable water management. The biggest problem in Cameroon is not the availability of water but it is the poor management and development of water resources coupled with inadequate political will and commitment. This results in the shortage and scarcity in some areas in Cameroon. Also the patchiness of information available on the quality and methods of preservation of drinkable water is the major cause of diseases in some regions of Cameroon (Wiki-net, 2012).

In the North West Region and particularly in the Santa community, potable water has been a night mare over the years. The unavailability of potable water has led to an increase in diarrheal-related conditions; as out of 141 patients who came in for consultation during the researcher's public health

placement in the Santa Health District for two months, 65 patients (30.80%) were diagnosed with diarrheal-related diseases. This was due to limited water supply at certain points in time. Hence people here use water from streams, wells and springs for drinking and this water contains leaves, amoebae, spirogyra and debris with poor environmental sanitation. They also store water collected from these sources for long term use in utensils and different kinds of vessels. This led the researcher to hypothesize that there was deficit knowledge on the quality of drinkable water and on the frequency at which they have to wash their utensils and vessels before its collection and preservation.

**Research Question:**

What is the knowledge and practices of the inhabitants of Santa Health District in the collection and preservation of potable water so as to avert water borne diseases?

**Study Objectives:**

The general objective of the study was to assess the knowledge and practices of the inhabitants of Santa Health District in the collection and preservation of potable water.

The specific objectives of the study were:

1. To assess the knowledge of the inhabitants of Santa Health District on the collection, treatment and preservation of potable water.
2. To determine the practical measures employed in the collection, treatment and preservation of potable water.
3. To identify the problems faced in the collection, treatment and preservation of potable water.
4. To ascertain the information they need from health personnel to complement the practice in the collection and preservation of potable water.

**Study Design:**

A descriptive cross sectional study design was employed for the study where-in primary data was collected at one point in time from inhabitants of the Santa health area in order to collect responses on the collection, treatment and preservation of portable water.

The target population for this study comprised of youths, men and women who have lived in this area for 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:

Where,

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

- 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= 110 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 cluster sampling.

**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.

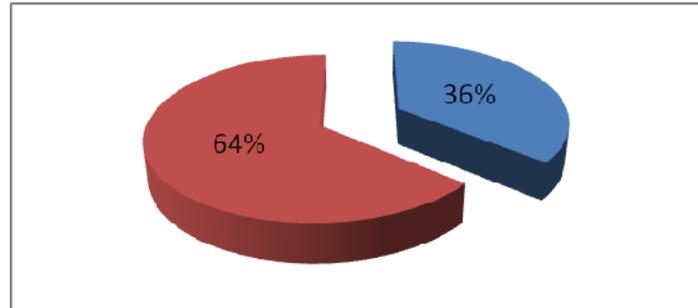
**Presentation and Analysis of Results:**

Results show that concerning respondents' knowledge of drinking water, 68 (58.18%) defined drinkable water as water safe enough to be consumed with low risk of harm, 24 (21.8%) defined it as water which originates from pipe borne water while 16 (14.5%) said that it is water from any natural source.

On criteria used in the identification of unsafe water, 68 (58.18%) said they identified water which is not safe for drinking from its color, taste and odor, 32 (29.1%) said only the color of water while 6 (4%) said from its taste and odor and 3(2.7%) said it is from the odor of water.

On their sources of potable water when there is shortage of water supply, 58 (52.72%) said they got water from springs, 22(20%) get their water from well while 8(16%) got theirs from streams and 6(5.4%) said they got water from different taps around the municipality.

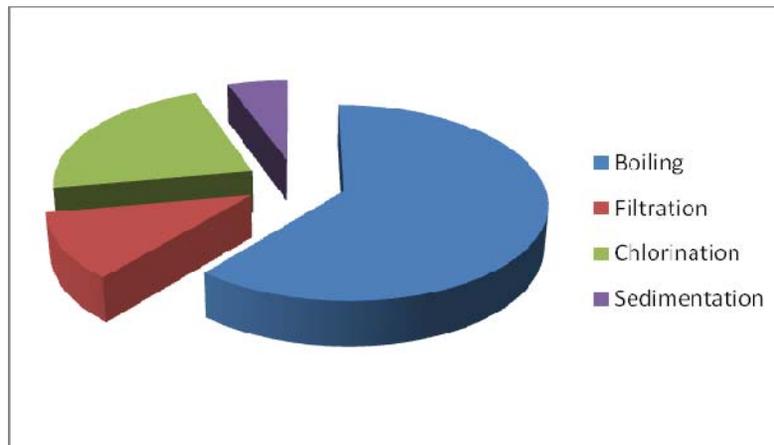
**Treatment of water collected from others sources before consumption.**



**Figure 1:** Distribution of respondents according to whether they treat water collected from other sources before consumption.

Out of the 110 respondents 54 (49.1%) acknowledged that they treated their water before consumption while 56(50.1%) said they don't treat.

**4.2.5: Water treatment techniques used.**



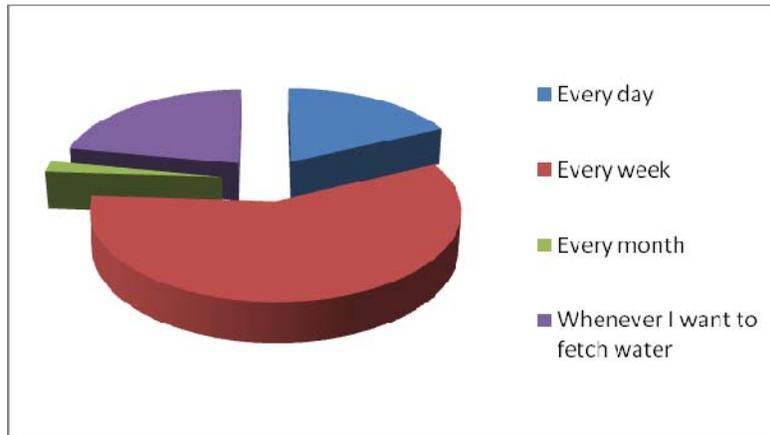
**Figure 2:** Frequency distribution of respondents on the treatment techniques they use.

Figure 2 above indicates the various techniques used by those who treat their water; 61% of the respondents treated their water by boiling followed by chlorination (22%). Five households (4.5%) used sedimentation.

**Knowledge of Respondents on the protection and preservation of Potable Water.**

All the respondents acknowledged that portable water should be kept in containers and covered.

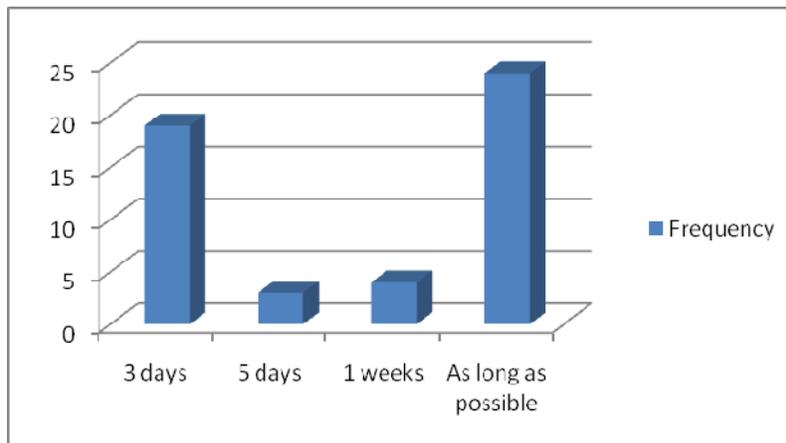
**Frequency of cleaning (washing) the containers.**



**Figure 3:** Distribution of respondents according to how often they wash their containers or vessels before collection of potable water.

Figure 3 shows that the majority 62 (56.3%) washed their containers every week, 24(21.8%) said they washed their containers whenever they wanted to fetch water while 19(17.2%) washed theirs every day and 5 (4.5%) said they washed containers every month.

**Storage duration of drinkable water by households.**



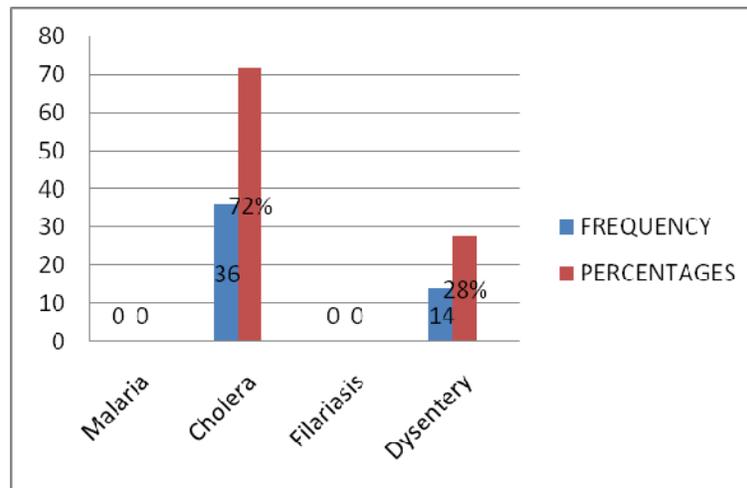
**Figure 4:** Storage duration of drinking water by households.

From figure 4 above, 52(47.2%) stored drinkable water as long as possible, 38(34.5%) said they stored drinking water for 3 days while 9(8.2%) said they stored water for 1 week and 6(5.4%) stored it for 5 days.

The responses as to why they stored water for the chosen length of time, the following reasons were advanced:

- Stored drinkable water as long as possible because of the shortage of water supply.
- Stored drinkable water for 3 days reason being that after 3 days water contains some micro organisms.
- Those who stored for 5 days to one week did not give any reasons for doing so.

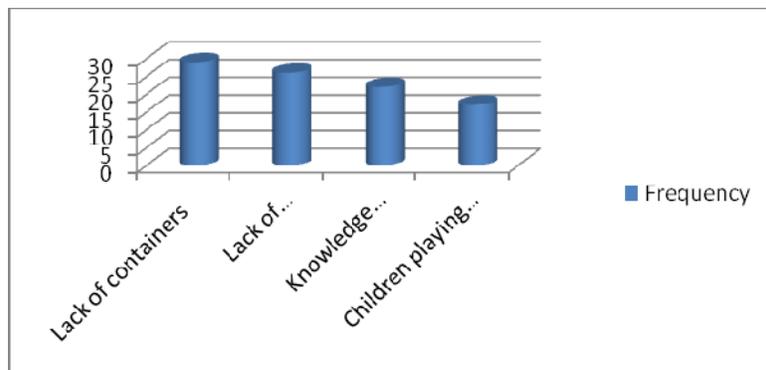
**Water-borne diseases that result from drinking water from doubtful sources.**



**Figure 5:** Respondents' knowledge on diseases that arise as a result of consuming unsafe water.

Out of 110 respondents, 72% said cholera can be contracted after consuming unsafe water while 28% said that it was dysentery that is contracted after consuming unsafe water.

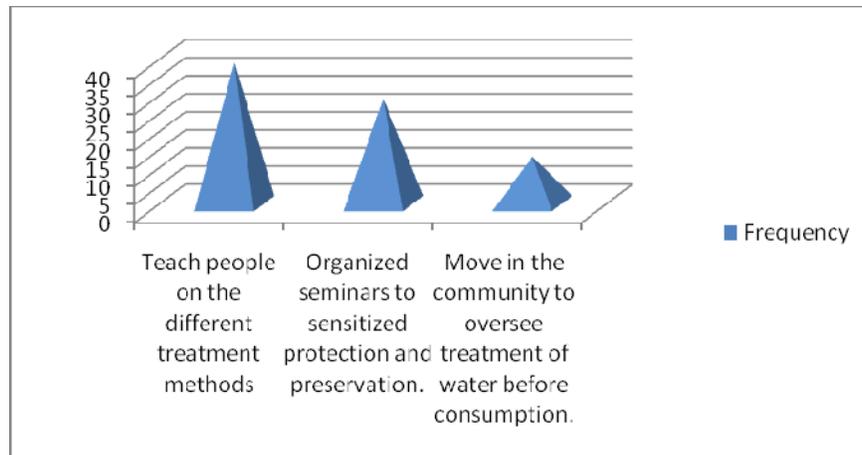
**Problems Faced in Protecting and Preserving Potable Water.**



**Figure 6:** Respondents' notions about the problems encountered in protecting and preserving potable water.

From the above figure, 58(52.7%) of the responses were that they lacked containers for their drinking water, 32(29.5%) said they lacked chemicals and filters to treat their water, while 14(12.9%) do not have knowledge in the protection and preservation of potable water while 06(5.5%) said that the problem they encountered was the presence of children playing around drinkable water sources and water storage containers.

**Practical Guidelines Needed from Care Providers to Compliment the Practice of Protection and Preservation of Potable Water**



**Figure 7:** Responses of respondents according to the information needed from nurses to prevent people from drinking unsafe water.

From figure 7 above, 58% said that nurses should teach people on the different methods to treat water while 29% said nurses should organize seminars to sensitize the population on the protection and preservation of water and 13% of respondents said nurses should move in the community to oversee how people treat their water before consumption.

## Discussion of Findings.

### Knowledge on the quality of potable water.

Looking at the knowledge that respondents had on the quality of potable water, 58.13% said potable water is water safe enough to be consumed with low risk of harm while 21.8% said it is water which originates from pipe-borne water and 14.5% said is water from any natural source. Concerning the measures employed by respondents to identify water which is not safe for drinking, 90% said they identified unsafe water from its color, taste and odor while some said only from the color of water and others said only from its taste and odor. According to Fawell J.K (2010) the complexity of water quality is a subject in the many types of measurements of the water quality indicators. And these indicators are color odor and taste, that is, water should not have color, odor and taste. Also, the majority of households intimated that during shortage of water supply they collected their potable water from the springs (58%) and the minority collected theirs from the wells (10%), streams (16%) and pipe borne water from quarters where it is available (6%).

Figure 2 shows the findings on the treatment of water collected from other sources and treatment techniques employed; 46% of them acknowledged that they treat water while 64% said they drink it as such after collection with no treatment subjected to it. This will predispose them to the occurrence of water-borne diseases since the water contains micro-organisms and other chemical compounds.

WHO (2003) stated that the public in general, judge the quality of water supplied based on the appearance, taste and odor at the point of its use. Although appearance, taste, odor are useful indicators of the quality of potable water; their presence may not necessarily make water unsafe to drink. In the same way, the absence of any unpleasant qualities does not guarantee water to be safe for consumption. It is evidently true that drinking water should be aesthetically pleasing, ideally looking clear, colorless and well aerated with no taste and odor.

### 5.1.3 Knowledge on the Protection and Preservation of Potable Water

Concerning the protection and preservation of potable water, all the 110 respondents were aware that containers and vessels should be covered with a good lid. This will help to prevent contamination of water by house flies and other vectors that carry fecal matter on their appendages from nearby latrines.

Figure 3 presents findings on the practice of washing of containers and vessels before collection of potable water. 17.2% and 4.5% of the respondents said they washed their containers and vessels every

day and every month respectively before collection of water while 56.3% washed theirs every week. This indicates that they knew that it is important to wash their containers but they did not know that they have to wash them whenever they have to collect water.

Concerning the maximum duration of storing potable water, 47.2% of the respondents said they stored drinking water as long as possible, reason being that they always have shortage of potable water supply. Others said they stored theirs for 1 week, 3 days and 5 days respectively.

According to Extension Water Quality Specialist, Dorothy L. Miner, storing water at least for three days for drinking is recommended. When the duration of shortage is long, there will be an increased growth of anaerobic micro organisms. This is detrimental to the health of the household. Concerning diseases that arise as a result of consuming unsafe water, 72% said cholera and 28% dysentery can result. This indicates that they knew relatively much about the consequences of consuming unsafe water and potential diseases that accrue.

#### **5.1.4: Problems Faced in the Protection and Preservation of Potable Water**

Concerning the problems faced by the respondents in the protection and preservation of potable water, 52.7% complained that they do not have containers or vessels to keep their potable water; 29.5% said they lacked chemicals like chlorine to treat their water; also they lack filters to filter their water as well as firewood to boil water.

Out of 110 respondents, 44% had deficit knowledge on collection, treatment and preservation of water and 34% said their problem in preserving and protecting drinking water was the fact that children played around drinkable water sources. According to the respondents the government should deploy hygiene and sanitation technicians to the community to provide health education lectures and distribute containers, chemicals and filters to treat their water since they always have shortages of water supply. Also in different households, family members should keep water away from children and always be around when a child wants to drink water or the elderly one should practice giving water to the younger ones; to avoid children play with the preserved water or sending fingers or putting strange objects inside water containers that can end up contaminating the water. That is why Gleick, P.H (2006) stipulated that lack of containers to keep potable water is a real problem in the rural areas and people in these settings drink unsafe water; this predisposes them to water borne diseases.

#### **Practical Guidelines needed to Complement the Practice on Protection and Preservation of Potable Water**

Looking at table 7, out of 110 respondents, 58% proposed that health personnel should teach people on the different methods to treat water; 29% proposed that nurses should organized seminars to sensitize them on the protection and preservation of water, so people should be aware of the importance of drinking potable water, 13% underlined that nurses should move in the community to see if people treat their water before drinking and to educate them on the importance of potable water to their lives.

Health personnel can take an active role in the protecting and preserving their community's drinkable water by understanding where their drinkable water comes from and finding out about its quality and teach them ways to prevent their water from becoming contaminated. Also regular sanitation campaigns lay strong emphasis on information, education and communication for effective behavior change. (Pandve, H.T, 2008).

Respondents recommended that the Santa Rural Council should construct more taps in the different quarters; they should treat water in the water catchment before supplying it to the different areas in the municipality. Since the Santa locality relies principally on the community water catchment which is not enough for all the community, the council should solicit for assistance from the government for another catchment to be constructed to satisfy the population desires.

## Conclusion

This research was geared at assessing the knowledge and practices of inhabitants of Santa Health District on the collection, treatment and preservation of potable water, and how these practices influences the occurrence of water-borne diseases.

From this study, it was found out that:

- Respondents are not well educated on the protection and preservation of potable water;
- 72% of respondents do not treat water collected from streams or springs which is the main reason for public health education for the prevention against water borne diseases.
- 64.2% of the respondents stored their potable water as long as possible well above the stipulated duration for the preservation of drinking water.

From the data collected, and analysis made it be can be concluded that there exist deficit knowledge on the collection, treatment and preservation of potable water as evidenced by the diverse responses gotten from them. Their understanding of the notions of hygiene and sanitation, the knowledge and practices on the collection, treatment and preservation of potable water are not based on the level of education but on how much information they got via public health education concerning drinking water collection, treatment and preservation. So, an up-to-date, knowledge and practices on the collection, treatment and preservation of potable water is necessary for the wellbeing of the Santa community. The Council's hygiene and sanitation service should take it as duty function to organize regular public health education lectures in social institutions in order to enlighten the community.

## References

- [1]. Dorothy. L. Miner (1996) .Water Quality and Waste Management.
- [2]. Fawell J, Stanfield G (2010). Drinking water quality and health <http://www.wikipedia.org/drinking>
- [3]. Fawell J, Chipman K.(2010). Endocrine Disrupters, Drinking Water And Public Reassurance. Water environ manage;
- [4]. Folifac. F. (2013). Integrated Watershed Management in Cameroon. <http://projets.tiguets.org/watermngmt>
- [5]. Gleick, P.H *et al* (2007). The world's water: Biennial Report on Fresh Water Resources. Chicago: Island Press.
- [6]. Goss.M, Richard C (2008). Source Water Protection Planning, which supports the education of pathogens from agricultural activity entering water resources.
- [7]. Harrigan-Farrelly J. (2012). Status of Source Water Protection, Ground Water Monitoring And Remediation.
- [8]. Hillie, T. *et al*. (2006). Nanotechnology, water, and Development. Dillon, Meridian institute.
- [9]. Hoxie NJ, Davis JP *et AL* (1997) cryptosporidiosis-associated mortality following a massive waterborne outbreak in Milwaukee, W isconsin.*AMJ Public Health*.
- [10]. Hunter P. (1997), Waterborne Diseases. *Epidemiology and Ecology*. Chichester: Wiley. <http://www.everpure.com/issues/iow9000.htod>
- [11]. Kumar.S.G, Jayarama.S (2009). Issues related to sanitation failure in India and future perspective 2009; 13-104.
- [12]. Mackenzie *et al* (1994). A massive outbreak in Milwaukee of cryptosporidium infection transmitted through the public water supply. *New England Journal of Medicine* 331,161-167.
- [13]. Meinhardt, P.L. (2010). Recognizing water borne disease and the health effects of water pollution: American Water Works Association and Amot Ogden Medical center (Accessed on October 1, 2004 at [www.water health connection.org](http://www.water health connection.org))
- [14]. Pandve, T. (2008). Environmental Sanitation: An ignored issue in India. *India J.Occup Environ Med*.2008, page 12-40.
- [15]. World Health Organization (2003).Guidelines for Drinking water Quality, 3<sup>rd</sup>edn. [www.who.int/water\\_sanitation\\_health/GDWQ/draftchemicals/list.htm](http://www.who.int/water_sanitation_health/GDWQ/draftchemicals/list.htm). Last accessed June 2003.Geneva: WHO.