Environmental Education as an Instrument for awareness creation on the Health Effects of Water Contamination in Saburi Community of Federal Capital Territory (FCT) , Abuja, Nigeria

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Abstract

This study investigated the role of Environmental Education as an instrument in the sensitization of the effect of water contamination on human health in Saburi Community, FCT, Abuja. The study made use of four research questions. The descriptive survey design was adopted for the study. The population of the study comprised of the entire Saburi Community of Gwagwa Ward 1 in Abuja Municipal Area Council (AMAC) which has an estimated population of about five thousand people (5,000). The stratified random sampling technique was used to select a sample size of 100 residents of Saburi Community. The research instrument used for data collection was a self-developed 15-item questionnaire rated on a 4-point Likert scale. The analysis was done using both qualitative and quantitative tools which were illustrated in tables, charts, percentages, Mean and Grand Mean. The findings of the study revealed that the Saburi's community agreed that Environmental Education (EE) has created a level of awareness on water borne diseases in the community. It was recommended that the dwellers of Saburi should be enlightened through Environmental Education on the adverse effect of contaminated water in their environment.

Keywords: *Environmental Education (EE), Human Health Effects, Water, Sensitization and Sustainable Development Goals (SDGs).*

Introduction

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions. Environmental education should result in the knowledge, desires and ability necessary to direct one's conduct to it for improving the quality of life. It should enable the individual to perceive the problems that exist and to devise solutions to them. Environmental Education has a place in the sensitization of the environment as a whole and the dwellers of the environment both human and animals.

According to Sijuwade, (2010) Environmental Education is a process that promotes the awareness and understanding of the environment, its relationship with man and his activities. It is also aimed at developing responsible actions necessary for maintenance, preservation and development of the environment and its components. Environmental Education is a learning

process which imbues in the learner the knowledge, attitude, values, belief and skills to work individually and collectively towards solving current environmental problems, while preventing the occurrence of new ones. The Brundtland Commission (1979) defined Environmental Education as an education process which creates in the learner the awareness and knowledge to work towards achieving sustainable exploitation and utilization of world resources to carter for the need of the present without compromising the needs of the future generation. These commission coined the word ‘’sustainable development’’

Ekpo & Aiyedun (2017) see Environmental Education to encompass the creation of awareness on environmental issues, concepts, principles, history, policies, basic human population dynamics, knowledge of biodiversity, sustainable agriculture, forestry, soil conservation, water use, non-renewable mineral resources, non-renewable and renewable energy resources, climate change and ozone depletion, pollution prevention and waste reduction, sustainable cities, environmentally sustainable economic and political systems, environmental ethics and the overall world views of the environment. Arising from the above definition, the main objective of Environmental Education therefore is to induce positive change in the use of our natural resources which include water, so as to meet the need of present generation without jeopardizing the chances of future generations to meet their own needs.

Most studies cite population growth as the principal driver of increases in the global demand for water. Although there are uncertainties surrounding future population projections, research shows that the world population is likely to grow by 30% between 2000 and 2025 and by as much as 50% between 2000 and 2050 (United Nations Secretary-General’s High-Level Panel on Global Sustainability, 2012). At a minimum, the fact that the global population is expected to grow to projections of 9.5 billion by 2050 invites questions as to whether there will be sufficient water to support population increases of this magnitude. The failure to supply adequate water for environmental services could result in a decline in the capacity of the environment to provide food and to support modern agricultural practices.

Unfortunately, however, a full 40% of humanity is already competing directly with nature for water. As a result, we are beginning to see some frightening convergences (Safriel, 2011). If nature is to have the adequate amount of water it needs in order to provide important basic ecological services, then less water will be available for agriculture, which means that there will not be enough food for people. If, on the other hand, priority for water allocation is given to agriculture in order to sustain growing populations, then there will not be enough water to allow nature to sustain its fundamental, long-term, planetary, life-supporting functions and self-regulation. Solomon (2010), have argued that a new world order is about to emerge out of the collision between population and economic growth and our planet’s rapidly changing hydrology.

Already, he claims, the divide is growing globally between those nations that have adequate water supplies to meet the current and projected needs of their people and the landscapes upon which they live, and those that that are unable to meet these needs on a consistent basis.

Growing population, changing diets, increased urban, agricultural and industrial water demands and a growing understanding of nature's need for water. Water needs to be on the global political agenda not only in order to feed the projected 9 billion people that will inhabit the earth by 2050 with less agricultural water than is available today, but also in order to address the critical development challenge of doing so in a safe, sustainable way without compromising water resources that are essential to ecosystem services and functions World Bank, (2010). The environmental impacts of the water crisis are equally alarming. Multiple, cumulative and compounding problems with water supply and quality are converging globally. Increasing population growth is already competing with nature for finite water resources. A growing number of rivers do not make it to the sea, and there is widespread surface and groundwater contamination that makes valuable water supplies unfit for other uses. A growing number of contaminants, such as endocrine-altering substances, will demand higher wastewater treatment standards and more exhaustive monitoring of water contaminants.

Water, the only substances on earth that exists as vapour, liquid and solid is the most abundant substance in the human body. It is the most essential nutrients, everybody cell, tissue, organ and life sustaining body processes need water to function. Safe drinking water should be free from pathogens and contaminants. Water contamination is the term used to portray dangerous materials of any sort that contaminates any water source. This could incorporate both ecological and compound substances and the water source might be lakes, ponds, streams, rivers, tap, boreholes, spring, etc. used for drinking and bathing by humans (Lerh, Grass & John, 2011). Water in poor quality and inadequate quantity, continues to pose a major threat to human health.
The 70% of the rural community depend mainly on unsafe sources such as rivers, streams, open wells, dams etc. Also millions of people worldwide do not have access to this most basic need, and are dying of thirst and water borne diseases. The surest confirmation of serious and widespread water pollution in Nigeria is, in fact the level of incidence of water borne diseases. The most serious of these include Dysentery, Cholera, Typhoid fever and guinea worm (Nuhu, 2015). Over half a million people die from malaria, river blindness or oncocerchiasis, cholera, giardiasis, amoebiasis, dracunculiasis, etc every year because they drink polluted water (WHO, 2011). There is evidence of wide spread contamination of water resources in many areas of country. The National Water Quality Inventory of 1994 identified agricultural urban runoff/storm water, and municipal point source as the largest pollutant source for river. Contamination from

these sources includes pesticides, heavy metals, nitrates, solvent and leachates from waste dump other wastes.

Saburi community of Gwagwa ward 1 in Abuja Municipal Area Council as the area of study has an estimated population of about five thousand people Field work, (2017). The inhabitants of the area are predominantly farmers in low scale with few traders. Saburi community is bounded in the East by Deidei community, West by Karimo, and South by Kargini and Karba community while to the North by Filindanbo community.

Water (H_2O) is a natural compound of hydrogen and oxygen combined chemically in ratio of two atoms of hydrogen to one atom of oxygen; 2:1 (Geoffrey & French, 2010). According to Oluwande, (2011) portable water is that which is considered safe and fit for human consumption. Water should be free from pathogenic microorganism and poisonous substances. Water is mostly used for domestic, industrial and irrigation purposes, and of these, irrigation often account for more withdrawal than all other uses combine. Water from lake, streams, rivers, seas and dam can be used for transportation, recreation and the generation of hydro electrical power (Lyster, 2010). Water can simply be referred to as a liquid that is odourless, colourless and tasteless for human use. Several sources of water supply can be identified and these include:

Rain Water: This source is used in many parts of the world where rainfall permits. The rain water is usually collected directly by households from the roof of building and stored in barrels or tanks. This source can only supplement water supplies and provide a modest reserve. However, the rain collects impurities particularly from the atmosphere like the industrial pollutant likes nitrate, sulphides, carbon oxides, etc., bird droppings and other impurities, this implies some form of treatment is desirable before it can be declared safe for drinking (Fawell & Standfield, 2010).

Ground Water: These include wells, boreholes and springs. Large scale of regular supplies comes from ground water; ground water depends on the existence of an aquifer, and a saturated layer of ground resting on an impermeable stratum preventing the seepage of water, when they are not subjected to deeds that will contaminate them like cemeteries, suck-away, dumpsite, etc., the water is relatively clean and normally does not require treatment (Fawell et al, 2010).

Surface Water: These include streams, rivers, ponds, lakes and sea. This source is easily polluted by direct contamination by human beings and animals, or indirectly when rain washes faeces and other pollutants from the banks into the streams and rivers, surface water must therefore, be purified before use (Fawell et al, 2010).

The cause of water pollution could be attributed to various chemical elements and compounds that may be present in ground and surface water. The sources of these chemicals are associated with either natural processes or anthropogenic (human) activities. Two important natural processes contributing chemical to water are weathering and soil leaching. Also, rainwater infiltrating through the soil may pick up available chemical that affect its quality. Likewise runoff resulting from rainfall may transport chemicals to surface water (Lerh et al, 2011).

According to WHO report (2010), the major causes of water pollution includes; leakage from septic tanks, cesspools, accidental spills of hazardous materials, waste piles and stockpiles, mining activities, agricultural activities, infiltration of polluted surface water and landfills. Most of the health problems that arise from this type of pollution are caused by recycling of sewage effluent through nearby water supply system. Water supplies degraded by effluent are likely to contain abnormal concentrations of nitrate, chloride, sulphate, hardness, dissolved solids, detergents, and bacteria. The greatest danger in consuming untreated water polluted by sewage effluent is the potential for epidemics of water borne diseases, such as typhoid, hepatitis, gastroenteritis and dysentery (WHO report, 2014).

Mining is responsible for a wide variety of water pollution problem. Some of the activities as identified by EPA report (2010), which create these problems, are pumping of mine to the surface water, the leaching of the soil material, and the outpouring of mining wastes. Sanitary landfill is generally considered to be those disposal landfill or dumps which are covered with soil daily. In many instance, they are a potential hazard to ground water quality (Avery, 2011).

According to Environmental Protection Agency (EPA) report of 2015, main sources of water contamination are described to include the following: discharge of untreated raw sewage from household and factories; human littering of the river; industrial waste release; agriculture; air pollution; Land waste flow; and oil spills. The impact of contaminated water on human health in many developing countries like Nigeria results in contamination and transmission of infections (Helmer, 2010). The author further stated that the interaction between water and human health are complex. Human health may be affected by the ingestion of contaminated water either directly, through food or by the use of contaminated water for purposes of personal hygiene and recreation (Valeria, 2015).

According to Whah (2010), water borne diseases account for the death of 3,575000 people a year due to unsafe drinking water, dirty environment and improper disposal of excreta. However, the morbidity and mortality rate of water related diseases can be reduced dramatically, depending on the nature of the disease through the provision of safe drinking water supply and adequate sanitation. Water borne diseases are diseases that are spread through water containing human and animal faeces and urine, either when you drink such water or you eat food that has

been washed with it. They includes cholera, diarrhoea, typhoid fever, poliomyelitis, round worm, whip worm (Nuhu, 2015). These are spread as a result of poor personal hygiene and skin and eye contact with contaminated water. Other effect of using polluted or contaminated water is trachoma, which can cause blindness in later life and skin diseases like scabies, typhus and lice (Hunter, 2010).

Excess of fluoride (above 1.5 milligrams per litres) leads to dental fluorosis and fluoride levels below 0.5 milligrams per litre pose the risk of dental carries. A certain amount of nitrates in water may come from natural sources, but excess is likely to occur in water as a result of sewage discharges or farm effluents, or the use of nitrogenous fertilizers on the land. Nitrates in drinking water may cause methahaemoglobin anaemia in infants (EPA Report, 2016). Mercury has been found to interfere with the development of the central nervous system in foetuses and young children; chlorides can cause reproductive and endocrinal damage; Lead can accumulate in the body and damage the central nervous system; Arsenic causes liver damage; skin cancer; Vascular diseases; and petrochemicals even with very low exposure can cause cancer, (WHO Report, 2012).

According to Nuhu (2015), the following steps should be maintained in order to keep the stream clean: There should be no washing of clothes or bathing upstream from the watershed or draw off point; all washing and bathing should be done downstream; A reasonable distance of land upstream should be free from human and animal activities; The catchment area should be fenced; Fishing should be prohibited in the catchment area; weeds and vegetable around the banks of the river should be cleared; and Health Education of the masses on the need for protection of water. Much more, the people were enlightened on the important of purify water and that polluted water can lead to several diseases as mention above. They were also schooled that polluted water can be related to diseases encompass illnesses resulting from both direct and indirect exposure to water, whether by consumption or by skin exposure during bathing or recreational water use. They should endeavor on their own to keep their river clean by avoiding dumping of refuses, stop defecating, and avoid the use of chemical to kill fish and other harmful activities to water bodies. Also their wells should well cover and water for domestic consumption should be treated by boiling, shivering or adding of alum in moderate portion to purify it.

United Nations General Assembly (2017) stated that some human induced problems such as water pollution is expected to be increased by 2030 if drastic action is not put in place. Environmental Education is considered as an essential tool for combating these problems that impact on the socio-economic and socio-cultural development, especially in rural areas of the developing countries such as in Gwagwa Abuja, Nigeria. Its appraisal is therefore necessary in this study.

Research Questions

Specifically, four research questions were raised in line with the purpose of the study, thus:

1. To what extent has Environmental Education created a level of awareness on water borne diseases in the community?
2. To what extent has the Government made effort to combat water borne diseases in the Saburi?
3. To what extent has Environmental Education created a desirable change in the attitude of the people towards water sanitation and hygiene?
4. What are the types of waterborne diseases prevalent among the people of Saburi at the time of the research?

Methodology

The descriptive research design was used to access environmental education as an instrument for awareness creation on the health effects of water contamination in Saburi Community. Stratified random sampling technique was used to select the sample size of 100 residents of Saburi Community that is above twenty years of age form each strata. The instrument used for data collection was a self-developed questionnaire, and 100 copies were made and distributed. The questionnaire was divided into three sections. Section 'A' consist of general information; Section 'B' consist of perception on water use and associated health problems; and Section 'C' consist of people's awareness of environmental education in their surrounding. The questionnaires were administered on a face-to-face basis. The respondents were given two weeks to study and respond to the research instrument after which, they were collected back by the researcher. However, only 95 copies out of the 100 copies distributed were returned. The analysis was done using both qualitative and quantitative tools.

Results and discussion

From the table 1 above demographic characteristic were considered in the questionnaire administration which includes: sex, marital status, age, educational status and occupational status.

Research Question One

1. To what extent has Environmental Education created a level of awareness of water borne diseases in the community?

Table 1: Demographic Characteristic of Respondent

Sex	Male	Female		
	45(47%)	50 (53%)		
Marital status	Married	Single		
	65 (68%)	30 (32%)		
Age	10 - 20 years	21 – 30 years	31 - 40 years	41 above
	10 (11%)	25 (26%)	40 (42%)	20 (21%)
Educational status	FSLC	GCE/WAEC	Higher Education	None
	20 (21%)	25 (26%)	10 (11%)	40 (42%)
Occupational status	Civil servant	Farmers	Business	Students
	5 (5%)	45 (47%)	30 (32%)	15 (16%)
Years lived in the community	1 – 5 years	6 – 10 years	11 – 20 years	21 above
	15 (16%)	20 (21%)	35 (37%)	25 (26%)
Sources of water used	Well	Rivers	Borehole	Others
	9 (9%)	76(80%)	10 (11%)	None
Water from rivers is used for what?	Drinking	Washing	Cooking	Others
	20 (21%)	35 (37%)	40 (42%)	None

Source: Field Study 2018

Table 2: People's response on the level of awareness of water borne diseases

S/N	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean ($\bar{x}$)	Decision
1	Environmental Education personnel do sensitize the residents about waterborne disease	40(42%)	38(40%)	10(11%)	7 (7%)	3.17	Agreed
2	Environmental Education personnel create awareness of how to treat waterborne disease to the residents	33(35%)	30(31%)	15(16%)	17(18%)	2.83	Agreed
3	Environmental Education personnel advise the residents how to prevent waterborne diseases	45(47%)	30(32%)	12(13%)	8(8%)	3.18	Agreed
4	Environmental Education personnel work with the locality to reduce the rate of occurrence of water borne diseases	35(37%)	40(42%)	11(12%)	9 (9%)	3.06	Agreed
			Grand Mean ($\bar{x}$) =	3.06			

Source: Field Study 2018

Table 2 revealed the opinion of respondents on research question One; the 4 questionnaire items were agreed upon with mean ($\bar{x}$) scores ranges from 2.83 to 3.18. The grand mean ($g\bar{x}$) was 3.06

which denote that the respondents agreed to the statement that Environmental Education creates a level of awareness on water borne diseases in the community.

Research Question Two

To what extent has the Government made effort to combat water borne diseases in the Saburi?

Table 3: People's response on Government effort to combat water borne diseases

S/N	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean ($\bar{x}$)	Decision
5	The government has provided enough facilities that help in the prevention of water borne diseases	15 (16%)	17 (18%)	30 (31%)	33 (35%)	2.15	Disagreed
6	The government has provided adequate water supply to the community	11 (12%)	9 (9%)	32 (34%)	43 (45%)	1.87	Disagreed
7	The government has done little or nothing to address the problem of inadequate supply of wholesome water to this community	45 (13%)	30 (8%)	12 (32%)	08 (47%)	2.87	Agreed
					Grand Mean ($\bar{x}$) =	1.94	

Source: Field Study 2018

Table 3 revealed the respondents' opinion to research question Two; the 3 questionnaire items were disagreed upon with mean ($\bar{x}$) scores ranging from 1.80 to 2.15. The grand mean ($g\bar{x}$) was

1.94 which denotes that the respondents disagreed to the statement that government has provided sufficient facilities to combat waterborne diseases.

Research Question Three

To what extent has Environmental Education created a desirable change in the attitude of the people towards water sanitation and hygiene satisfactory?

Table 4**:** People's response on the attitude of the people towards water sanitation and hygiene

S/N	Questions	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean ($\bar{x}$)	Decision
8	Environmental Education personnel do explain how water pollution or contamination is caused by the improper disposal of human waste	42 (44%)	30(31%)	12(13%)	11(12%)	3.08	Agreed
9	Regular sensitization by Environmental Education personnel to Saburi has helped the residents to know that well near toilet and refuse dumps could result in water pollution or contamination	44 (46%)	40 (42%)	7 (7%)	5 (5%)	3.74	Agreed
10	Creation of campaign to purify water by Environmental Education personnel help the localities to know that unwholesome water must be treated either by boiling or chlorination method before use to avoid water borne diseases	35 (37%)	32(32%)	16(17%)	12(13%)	2.95	Agreed
11	Environmental Education personnel advise them to disabuse the disposal of human excreta into the river/ stream because it is an important vehicle for the domestic transmission of infections and diseases	50 (53%)	30 (32%)	10 (10%)	5 (5%)	3.32	Agreed
				Grand Mean ($\bar{x}$) =	3.27		

Table 4 revealed the opinion of respondents on research question Three; the 4 questionnaire items were agreed upon with mean ($\bar{x}$) scores ranges from 2.95 to 3.74. The grand mean ($g\bar{x}$) was 3.27 which denote that the respondents agreed to the statement that Environmental Education creates a level of awareness on water borne diseases in the community.

Research Question 4

What are the types of waterborne diseases prevalent among the people of Saburi at the time of the research?

Question12 from Section C: Common sickness among the people of the village

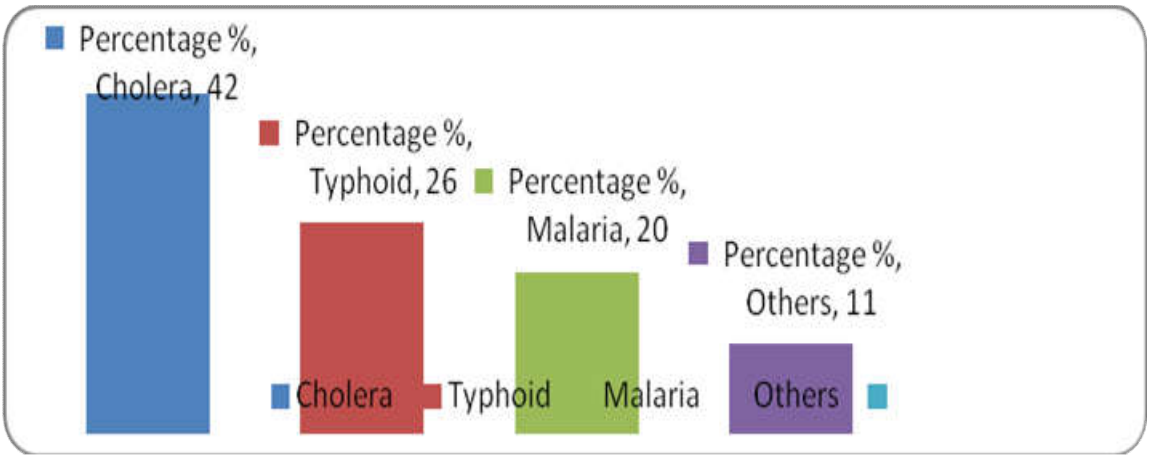

Figure 1: Series Chart showing the Common Sickness among the People of the Village

Source: Field Study 2018

The chart above represents the data collected from the respondent on the common sickness among the people of the village. Their responses are; 42% (40) for cholera, 26% (25) typhoid fever, 21% (20) malaria and others 11% (10) Common sickness among children in the community

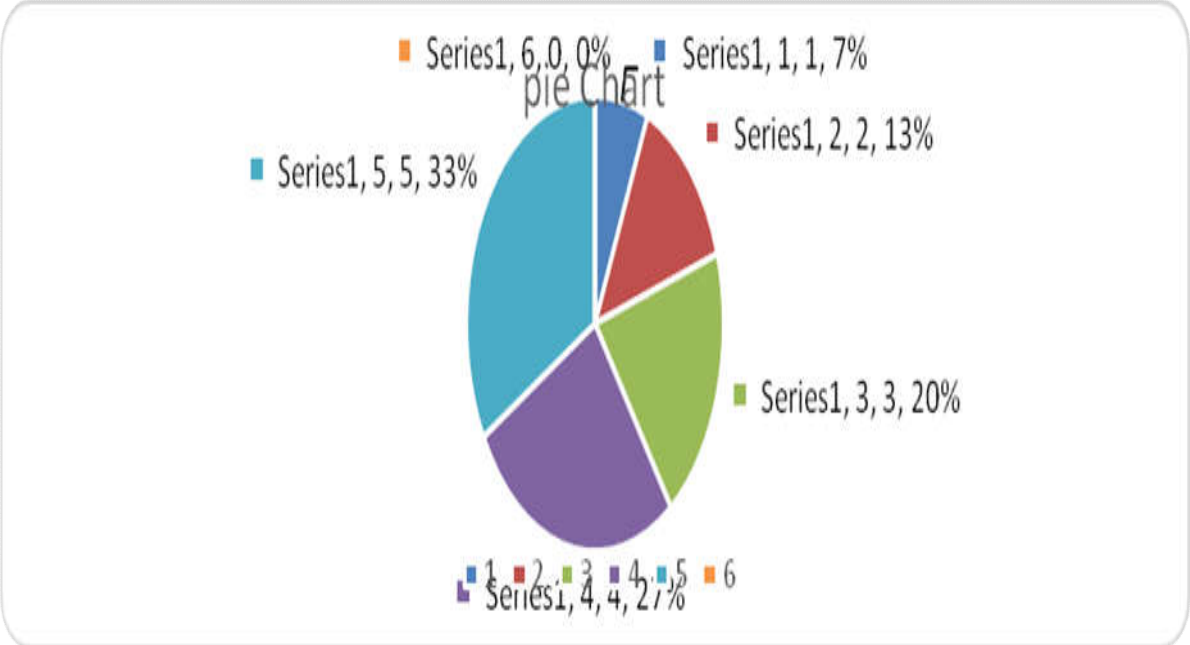

Fig.2: Pie chart showing data on common sickness among children

1-Diarrhea 2-Dysentery 3-Malaria 4-Measles 5-Others (Source: Field Study 2018).

From the pie chart, the data collected from the respondent showed that diarrhoea has the highest number, second by measles and malaria. This shows that they are the most prevalent.

Question 14

Do you normally experience skin problems after bathing with water from the river?

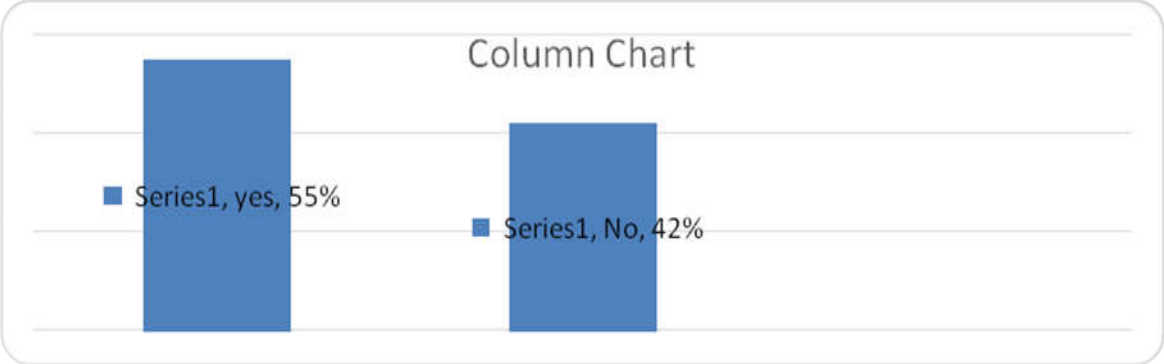

Figure 3: Column Chart (Source: Field Study 2018)

From the Column chart, the data collected showed that 57% (55) of the respondent said Yes and 42% (40) said No.

Question 15

What are the symptoms of the skin problem?

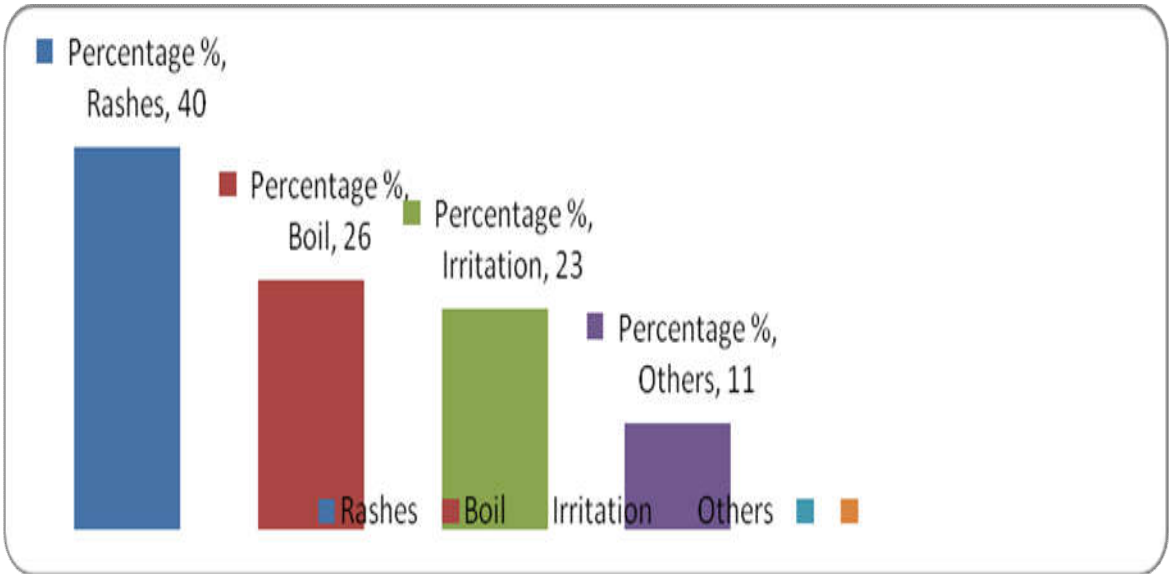

Figure 4: A Series Chart showing the Symptoms of the Problems (Source: Field Study 2018)

From the bar chart, the data collected showed that 40% (38) of the respondent said rashes, 26% (25) said boil, and 23% (22) said irritation while 11% (10) said others.

Discussion of Findings

The results from research question one revealed significantly that the Saburi community agreed that Environmental Education (EE) has created a level of awareness on water borne diseases in the community. This study is consistent with earlier study conducted by Ekpo and Aiyedun (2017) who revealed that the importance of Environmental Education in creating awareness and quality training is essential in the attainment of Sustainable Development Goals in the 21st century Nigeria. The author highlighted that Environmental Education helps in the awareness and sensibility to the environment. The findings from research question two revealed that the Saburi community disagreed with the notion that government made effort to combat water borne diseases in the society. This study is in agreement with UNGA (2017) which found that environmental issues could be addressed effectively with the help of Environmental Education.

The discoveries from research question three discovered that the Saburi community agreed with the notion that Environmental Education created a desirable change in the attitude of the people towards water sanitation and hygiene. This study is in line with the study conducted by Robinson (2013) who revealed that Environmental Education promote positive values and right attitude for the environment, provide the required skills to identify and help resolve environmental issues and survival issues.

The discoveries from research question four discovered that the Saburi community agreed that Environmental Education sensitized the people on the effects of poor water supply and its related diseases. This finding is in agreement with that of Agbor (2016) who noted that EE explores environmental issues and sensitize people on safety measures relating to environmental disasters.

Conclusion

From the findings of the study, it is concluded that Environmental Education can act as an instrument in the sensitization of the impact of water contamination on human health in Saburi Community, FCT, Abuja. It was revealed that creating awareness on the health of the people is really the foundation upon which all their happiness and power depended.

Secondly, government has not made sufficient effort to tackle the problems of contaminated water. There was no provision either for adequate water supply or for facilities that would help in the prevention of water borne diseases in the study area.

Finally, the incidence of water borne diseases such as cholera, dysentery, infective hepatitis, gastroenteritis arose as a result of proper environmental education sensitization on the consequences of contaminated/polluted or doubtful quality water without even caring for the treatment.

Recommendations

The following recommendations are made based on the findings of this study:

1. Environmental Education should be used to create awareness on the increase of the quantity and improvement in quality of water supply that will help to reduce the incidence of water borne diseases among the people of Saburi community, and for the improvement of sanitation and hygiene among people in the study area to increase their health status.
2. The people of Saburi should be enlightened through Environmental Education on the adverse impacts of contaminated water in the environment.
3. Government and social organizations who embark on any water project should provide support for the people of Saburi community in terms of drilling boreholes, provision of technical support for water purification and finance for the clean-up of the community.
4. The Environmental Educationists should educate the masses in Saburi community on the importance of basic sanitation and proper treatment of their water irrespective of the source before using it.

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