

Sanitation Practices on Students Health: A Case Study of Students of Vocational and Technical Education in the University of Nigeria, Nsukka

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Abstract

This study was designed to examine the effects of sanitation practises on students' health. A case study research design was adopted for the study. It was done in the University of Nigeria, Nsukka. Four research questions guided the study. The population for the study was 197 students in the Faculty of Vocational and Technical Education. Non stratified ransom sampling technique was used to select 100 students comprising of 20 students each from the five departments in the faculty of Vocational and Technical Education. Questionnaire consisting of 30 items was used to elicit information from the respondents. The questionnaire was validated by three experts. Cronbach alpha was used to determine the reliability of the instrument which yielded 0.76 coefficients. The data collected was analysed using mean statistics. The study identified various causes of poor sanitation, the effects of sanitation on student health, the ways in which the school management has provided equipment/facilities to enhance sanitation as well as the strategies for improving school sanitation so as to reduce the negative effects of poor sanitation on student health. The study recommended the following; the school management has to ensure that the various ways of improving sanitation within the institution are used in synergy, the school management has to ensure that those in charge of cleaning the school environment are adequately monitored as well as adequate provision of funds by the Government for the procurement of facilities that will enhance proper sanitation.

Keywords: Sanitation, School sanitation, Basic sanitation, Sanitation types/ systems

1. Introduction

Sanitation can be seen as the policy and practice of protecting health through hygienic measures. In the view of the World Health Organization (WHO) (2007), sanitation generally refers to the provision of facilities and services for the safe disposal of human urine and faeces. It has been realized that improving sanitation is known to have a significant impact on health both in households and across communities (WHO, 2007). Similarly, Iheke (2010), sees sanitation as the process of keeping places clean and hygienic especially by providing a sewage system and a clean water supply. Sanitation refers to all conditions that affects the health of people in a geographical area. The word sanitation operationally refers to the maintenance of hygiene conditions, through services such as garbage collection and waste water disposal so as not to endanger the health and welfare of people and also for the social and environmental effects, it may have on people. Throughout the world, an estimated 2.5 billion people lack basic sanitation (more

than 35% of the world's population) (World Health Organization & UNICEF, 2012)

Basic sanitation is described as having access to facilities for the safe disposal of human waste (faeces and urine), as well as having the ability to maintain hygienic conditions, through services such as garbage collection, industrial/hazardous waste management, and wastewater treatment and disposal.(World Health Organization & UNICEF, 2012).According to WHO and UNICEF (2012), without immediate acceleration in progress, the world will not achieve the United Nations' Millennium Development Goal (MDG) sanitation target (i.e., to halve the proportion of people without sustainable access to basic sanitation by 2015). Basic Sanitation is very important in all places and environments especially schools.

School sanitation refers to hygienic practices that occur in schools. Coppens (2005) consider School Sanitation and Hygiene Education as the combination of hardware and software components that are necessary to produce a healthy school environment to develop or support safe hygiene behaviour. The author is of the view

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that hardware components include supply of drinking water and facilities for hand washing and safe disposal of excreta and solid waste in and around the school compound. The software components are the activities that promote hygienic conditions at schools as well as practices of school staff and children that help to prevent water and sanitation related diseases and parasites. Poor sanitation in school environment will have certain negative influences on learning

Learning in an unhygienic environment can affect learning in a lot of ways. Snel (2004) and Water Aid Uganda (2013) indicate that "health influences learning and education influences health which is indicated in the fact that poor sanitation causes diarrhoea which keeps students in hospitals rather than in schools". They also noted that diarrhoea kills 1.5 million children each year. It is obvious that a sick person cannot learn properly. Poor sanitation could also lead to waterborne diseases (like typhoid, cholera,), infections with intestinal worms, stunted growth and malnutrition. (Sharma, 2015). More than five million people die each year from diseases related to inadequate waste disposal systems (WHO, 2007). There are so many indications of poor sanitation in most institutions.

The promises of school health and hygiene education programmes have not always been fulfilled by either the government or stakeholders in education (Danida, 2007). Many school environments in most institutions are not safe for students due to neglect of the operation and maintenance of health facilities. Danida further states that schools often suffer from non-existent or insufficient water supply, sanitation and hand washing facilities, dirty and unsafe water supply, toilets or latrines that are not adapted to the needs of students particularly girls; nonexistence of hygiene education, unhealthy and dirty classrooms/school compounds among others. Also, lack of sanitation, unsafe disposal or storage of waste in/around houses and streets, and in undesignated containers may provide habitats for vectors of diseases that cause various infectious diseases including typhoid fever and diarrhoeas (Ogawa, 2005). WHO (2007) estimates that 88% of diarrhoeal disease is caused by unsafe water supply and inadequate sanitation and hygiene. This has led to the need for measures to be evolved that will enhance proper sanitation in schools.

Smart investments in sanitation can reduce disease, increase family incomes, keep girls and boys in school, help preserve the environment, and enhance human dignity. Increasing evidence also shows that school sanitation and hygiene education programmes offer high cost benefit (Danida, 2007). In 2008, the world health organization's expert committee on environmental sanitation (as cited by Evans, Vandervoorden & Peal, 2009) said that proper environmental sanitation involves the control of community water supplies, excreta and waste water disposal, refuse disposal, vectors of diseases, housing conditions, food supplies and handling conditions, atmospheric conditions and the safety of the

working environment. Meanwhile the world needs for the basic sanitation services like drinking water supply, excreta and waste water disposal, have greatly increased as a result of rapid population growth and higher expectations (Thor, 2005). Thor further opined that a major way of solving environmental issues is the encouragement of research in environmental sanitation. However, providing sanitation to students requires a system approach rather than only focusing on the toilet or water waste treatment plan. (Tilley, Ulrich, Lüthi, Reymond, & Zurbrügg, 2014).

Sanitation system generally involves faeces collection, transport and treatment (Sustainable Sanitation Alliance, 2008). The main objectives of a sanitation system is to protect and promote human health by providing a clean environment and breaking the cycle of disease. In choosing the particular system to use, a lot of factors have to be considered. The factors to be considered include; experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment and reuse or disposal of wastes. Not minding the type of system chosen, sanitation is of various types.

Sanitation types are many. The various types of sanitation include, community led total sanitation, dry sanitation, ecological sanitation, and environmental sanitation. (AKUT Sustainable Sanitation, 2014 as cited in Sanni, 2015) The author went further to give a brief description of each of the types.

Community-Led Total Sanitation (CLTS) is an approach to achieve behaviour change in mainly rural people by a process of triggering behaviour change, leading to spontaneous and long-term abandonment of open defecation practices. CLTS takes an approach to rural sanitation by ensuring communities recognize the problem of open defecation and take collective action to clean up and become "open defecation free. The second type called dry sanitation usually means sanitation systems with dry toilets which have urine diversion, in particular the urine-diverting dry toilet. The third type called the Ecological sanitation commonly abbreviated to ecosan, is an approach, rather than a technology or a device which is characterized by a desire to "close the loop" (mainly for the nutrients and organic matter) between sanitation and agriculture in a safe manner. Put in other words, Ecosan systems safely recycle excreta resources (plant nutrients and organic matter) to crop production in such a way that the use of non-renewable resources is minimised. When properly designed and operated, ecosan systems provide a hygienically safe, economical, and closed-loop system which converts human excreta into nutrients to be returned to the soil, and water to be returned to the land. Finally, Environmental sanitation encompasses the control of environmental factors that are connected to disease transmission. Subsets of this category are solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control.

In the context of this work, environmental sanitation is used interchangeably with sanitation. This is because it is the particular type of sanitation of particular interest to institutions. Environmental sanitation encompasses four major subsets which include; solid waste management, water and wastewater treatment, industrial waste treatment and noise and pollution control. There has been considerable awareness of water supply in institutions, but the problems of excreta and waste disposal have received less attention (Danida, 2007).

In the University of Nigeria, Nsukka, a lot of places are littered with pure water polythene, pieces of papers and so on. In school hostels, there are problems of overcrowding and these affects the health of the students in the hostel. Many students share few toilets which leads to the spread of diseases among students. As a result learning is usually affected because a sick person only thinks of how to get cured and not what to learn in the classroom.

Therefore, the researchers seek to find out the implication of sanitation practices on students health in University of Nigeria, Nsukka. Due to the fact that poor sanitation could affect not only the student's health but also their attendance to lectures and exams, it became necessary to find out ways in which environmental sanitation can be improved in the University of Nigeria, Nsukka.

2. Statement of the Problem

Waste disposal, refuse disposal as well as inadequate water supply are problems in our environment especially in institutions. It is caused by a lot of factors. These include neglect of the operation and maintenance of health facilities, lack of hygiene education for the students, non-existent or insufficient water supply, poor sanitation and inadequate hand washing facilities, dirty and unsafe water supply; toilets or latrines that are not adapted to the needs of students as well as unhealthy and dirty classrooms/school compounds. These factors have led to consequences on student health.

Diseases related to poor sanitation and water availability causes many sicknesses like cholera, diarrhoea, malaria and typhoid. All these diseases greatly affect the health of students. Students cannot even learn properly because they are sick. Even learning in unhealthy environments leads to student not even understanding what they are being taught and in extreme cases it could lead to students' mortality. Snel (2004) and Water Aid Uganda (2013) noted that diarrhoea which is caused by poor sanitation kills 1.5 million children each year. Based on the negative effects of poor sanitation on the health of students, something has to be done.

However, it is not clear on the extent in which school management have contributed in curbing poor sanitation practices. A lot of literature available talks about environmental sanitation strategies but most of them have been done in the wider communities and not in

institutions of learning (Sanni, 2015). Therefore, the study seeks to find out the strategies which could be employed to improve sanitation in the University of Nigeria Nsukka in order to reduce its effects on students' health.

3. Purpose of the Study

The major purpose of this study is to find out how sanitation practices affect students health in University of Nigeria, Nsukka. Specifically this study seeks to:

- 1) Identify the causes of poor sanitation practices in University of Nigeria, Nsukka.
- 2) Identify the effects of poor sanitation practices on students' health in University of Nigeria, Nsukka.
- 3) Ascertain the ways in which the school management have contributed in providing facilities that will enhance sanitation practices in University of Nigeria, Nsukka.
- 4) Find out the strategies that could be employed to enhance sanitation practices among students in University of Nigeria, Nsukka.

4. Research Questions

The study will be guided by the following research questions;

- 1) What are the causes of poor sanitation practices in University of Nigeria, Nsukka?
- 2) What are the effects of poor sanitation practices on students' health in University of Nigeria, Nsukka?
- 3) In what ways have the school management contributed in providing facilities that will enhance sanitation practices in University of Nigeria, Nsukka?
- 4) What are the strategies that could be employed to improve sanitation in University of Nigeria, Nsukka?

5. Methodology

Case study design was adopted for the study. It was conducted in University of Nigeria, Nsukka. The population for the study was 197 students all from the faculty of Vocational Technical Education. Non stratified random sampling was used to select 100 respondents comprising of 20 students each from the 5 departments within the faculty. These departments were agricultural and bioresources education, Business education, Home economics and hospitality management, computer education and Industrial technical education. The specific purposes turned into 4 research questions were posed and answered. A 30 item questionnaire was developed from literature to obtain data for the study. The scale for the questionnaire was Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD).

The questionnaire was face validated by three experts from the faculty of vocational and technical education, University of Nigeria, Nsukka. Cronbach alpha was used to determine internal consistency of the questionnaire

which yielded 0.76 coefficients. The questionnaire was administered on 100 respondents and there was 77% return rate which equates to 77 respondents Mean statistics was used to answer the research questions. Arithmetic mean of 2.5 was used to interpret the analysed data. Items with a mean of 2.5 and above were accepted while items having their mean below 2.5 were rejected.

6. Results

Research Question 1: What are the causes of poor sanitation practices in University of Nigeria, Nsukka?

Table 1: Mean ratings of the responses of respondents on the causes of poor sanitation practices in University of Nigeria, Nsukka

S/N	Item statement	\bar{X}	SD	Remarks
1	Inadequate Hygiene education	3.21	0.92	Accepted
2	Neglect of Health facilities	3.06	0.94	Accepted
3	Insufficient water supply	3.00	0.97	Accepted
4	Inadequate toilet/latrine facilities	3.00	0.60	Accepted
5	Lack of dustbins for disposing wastes like biscuit wraps	3.01	0.90	Accepted
6	Throwing rubbish anywhere in the compound	3.32	0.80	Accepted
7	Inadequate Funds to provide sanitation equipment	2.79	0.96	Accepted
8	Poor waste storage methods adopted	3.18	0.87	Accepted

\bar{X} = Mean SD =Standard Deviation

From Table 1, all the items had means above 2.5 showing that the respondents accepted all the items stated as the causes of poor sanitation in University of Nigeria, Nsukka. This shows that the main causes of poor sanitation are inadequate hygiene education, neglect of health facilities, insufficient water supply, inadequate toilet/latrine facilities, lack of dustbins for disposing wastes, throwing rubbish anywhere in the compound, inadequate funds to provide sanitation equipment and poor waste storage methods adopted. The SD ranged from 0.60-0.97 which showed that the respondents are not too far from each other in their responses.

Research Question 2: What are the effects of poor sanitation practices on students' health in University of Nigeria, Nsukka?

Table 2: Mean ratings of the Respondents on the effects of poor sanitation practices on students health in University of Nigeria, Nsukka

S/N	Item statement	\bar{X}	SD	Remarks
1	Poor sanitation can cause diarrhoea for students	3.53	0.74	Accepted
2	Poor sanitation can cause typhoid for students	3.35	0.87	Accepted
3	Poor sanitation can cause cholera for students	3.32	0.83	Accepted
4	Poor sanitation can lead to stunted growth in students	2.39	1.09	Rejected
5	Poor sanitation can lead to malnutrition	2.23	1.02	Rejected
6	Poor sanitation can lead to malaria	3.43	0.80	Accepted
7	In extreme cases, poor sanitation can lead to student mortality	2.84	0.80	Accepted

\bar{X} = Mean SD= Standard Deviation

From Table 2, it shows that the respondents accepted items 1, 2, 3, 6 and 7 while they rejected items 4 and 5. This shows that the effects of poor sanitation on students' health include diarrhoea for students, typhoid, cholera, malaria and student mortality in extreme cases. The respondents however rejected stunted growth and malnutrition as effects of poor sanitation. The SD ranged from 0.74-1.09 which showed that the respondents are not too far from each other in their responses

Research Question 3: In what ways have the school management contributed in providing facilities that will enhance sanitation practices in University of Nigeria, Nsukka?

Table 3: Mean ratings of the respondents on the ways the school management has contributed in providing facilities that will enhance sanitation practices in University of Nigeria, Nsukka?

S/N	Item statement	\bar{X}	SD	Remarks
1	Provision of hygiene education	2.45	1.07	Rejected
2	Employing cleaners to keep the environment clean	3.42	0.68	Accepted
3	Provision of dustbins/ rubbish bins all over the school	2.35	0.92	Rejected
4	Proper maintenance of health facilities	2.20	0.94	Rejected
5	Adequate supply of clean water	2.17	0.96	Rejected
6	Encouraging individuals to engage in environmental sanitation research	2.90	1.02	Accepted

\bar{X} = Mean SD= Standard Deviation

From Table 3, the respondents accepted items 2 and 3 while they rejected items 1, 3, 4 and 5. This shows that the respondents agree that the school management employs cleaners to keep the environment clean and the school encourages individuals to engage in environmental research. The respondents however rejected provision of hygiene education, adequate supply of clean water, proper maintenance of health facilities and provision of rubbish bins as ways in which the school management has provided facilities to ensure proper sanitation within the school. The SD ranged from 0.68-1.07 which showed that the respondents are not too far from each other in their responses

Research Question 4: What are the strategies that could be employed to improve sanitation in University of Nigeria, Nsukka?

Table 4: Mean Responses of the Respondents on Strategies that could be employed to Improve Sanitation in University of Nigeria, Nsukka

S/N	Item statement	\bar{X}	SD	Remarks
1	Need for environmental sanitation research	2.90	0.62	Accepted
2	The need for students to undertake hygiene education	3.55	0.64	Accepted
3	More health workers should be trained to include sanitation practises counselling into their consultations with patients	3.48	0.78	Accepted
4	More toilets should be put in place in strategic locations to complement the existing ones to reduce incessant urination and faecal deposit	3.39	0.77	Accepted
5	Impromptu inspection around the campus from time to time	3.47	0.77	Accepted
6	Management should source for more funds from local and international levels which would be used for providing sanitation facilities	3.42	0.79	Accepted
7	Waste disposal vehicles should be procured so that waste can safely be removed.	3.37	0.79	Accepted
8	Partnership should be established with private agencies to help convert waste to wealth through waste reduction, reuse and recycling.	3.32	0.74	Accepted
9	Regular seminars should be organized on the need for sanitation.	3.47	0.66	Accepted

\bar{X} = Mean SD= Standard Deviation

From table 4, all the items were accepted showing that the respondents agree that all the items mentioned are

strategies that can be adopted to improve sanitation practices in the University of Nigeria, Nsukka.

The SD ranged from 0.62-0.79 which showed that the respondents are not too far from each other in their responses

Discussion of Findings

The findings from Table 1 indicate that the causes of poor sanitation are inadequate hygiene education, neglect of health facilities, insufficient water supply, inadequate toilet/latrine facilities, lack of dustbins for disposing wastes, throwing rubbish anywhere in the compound, inadequate funds to provide sanitation equipment and poor waste storage methods adopted. The findings are supported by Danida (2007) when he said that schools often suffer from non-existent or insufficient water supply, sanitation and hand washing facilities, dirty and unsafe water supply; toilets or latrines that are not adapted to the needs of students particularly girls; nonexistence of hygiene education, unhealthy and dirty classrooms/school compounds among others. Also, the findings are also supported by Ogawa (2005) when he revealed that lack of sanitation, unsafe disposal or storage of waste in/around houses and streets, and in undesignated containers may provide habitats for vectors of diseases that cause various infectious diseases including typhoid fever and diarrhoeas

The findings from Table 2 shows that the effects of poor sanitation on students’ health include students being affected by diarrhoea , students being affected by typhoid, students falling sick due to cholera infection, students being sick due to malaria and student mortality in extreme cases. The findings is supported by WHO (2007) when it estimated that 88% of diarrhoeal disease is caused by unsafe water supply and inadequate sanitation and hygiene. Also, Snel (2004) and Water Aid Uganda (2013) backed up the findings when their study discovered that diarrhoea which is caused by poor sanitation kills 1.5 million children each year

The findings from Table 3 indicate that the school management employs cleaners to keep the environment clean and the school encourages individuals to engage in environmental research. This is supported by Thor (2005) when he noted that a major way of solving environmental sanitation issues is the encouragement of research into environmental sanitation.

Finally, the findings from Table 4 indicate that the ways in which sanitation practices can be improved include; need for environmental sanitation research, the need for students to undertake hygiene education, more health workers should be trained to include sanitation practises counselling into their consultations with patients, more toilets should be put in place in strategic locations to complement the existing ones to reduce incessant urination and faecal deposit, impromptu inspection around the campus from time to time, management should source for more funds from local

and international levels which would be used for providing sanitation facilities, waste disposal vehicles should be procured so that waste can safely be removed, Partnership should be established with private agencies to help convert waste to wealth through waste reduction, reuse and recycling and regular seminars should be organized on the need for sanitation. The findings are supported by WHO and UNICEF (2012) when they stated that sanitation involves having access to facilities for the safe disposal of human waste (faeces and urine), as well as having the ability to maintain hygienic conditions, through services such as garbage collection, industrial/hazardous waste management, and wastewater treatment and disposal.

Conclusion

Sanitation can be seen as the policy and practice of protecting health through hygienic measures. Sanitation is necessary in all places which includes schools. School sanitation refers to hygienic practices that occur in schools. However, sanitation in institutions have been observed to be poor. This is due to a number of factors such as inadequate hygiene education, neglect of health facilities, insufficient water supply, inadequate toilet/latrines facilities, lack of dustbins for disposing wastes, throwing rubbish anywhere in the compound, inadequate funds to provide sanitation equipment and poor waste storage methods adopted. Poor sanitation has led to negative effects on students' health.

Poor sanitation leads to students' ill health which can lead to failure of students in their academic work. Effects of poor sanitation on student health is manifested in students being sick due to diseases like malaria, cholera, diarrhoea, and even death in extreme cases. Due to these negative effects, school management have devised means of ensuring proper sanitation. These ways include employing cleaners to keep the environment clean and encouraging people to undertake research in environmental sanitation. However, these aren't enough to ensure proper sanitation

Ensuring sanitation in schools involves a lot of ways which should preferably be used together instead of adopting these methods in isolation. The methods include; the need for students to undertake hygiene education, more health workers should be trained to include sanitation practises counselling into their consultations with patients, more toilets should be put in place in strategic locations to complement the existing ones so as to reduce incessant urination and faecal deposit, impromptu inspection around the campus from time to time. Management should source for more funds from local and international levels which would be used for providing sanitation facilities, partnership should be established with private agencies to help convert waste to wealth through waste reduction, reuse and recycling and regular seminars should be organized on the need for sanitation.

If these methods are used in synergy instead of in isolation, the menace of poor sanitation and its negative effects on students' health can be stopped or at least reduced to a manageable level.

Recommendations

Based on the findings, the following recommendations were made;

- 1) The school management has to ensure that the various ways of improving sanitation within the institution are used in synergy instead of in isolation due to fact these methods are all important.
- 2) The government at all levels should provide the necessary funds needed by the school management to ensure the procurement of various facilities/equipment needed for students to live in a hygienic environment
- 3) The school management have to ensure that those in charge of cleaning the school environment are adequately monitored so as to ensure they discharge their duties properly.

References

- [1]. Coppens, O. (2005). *Preliminary Literature Study to a School Sanitation and Hygiene Education (SSHE) Strategy*. Retrieved from <http://www.protos.be/temas-es/PROTOSSHEstrategy.pdf>, accessed 13 November 2016.
- [2]. Danida (2007). *Workshop on water supply, sanitation and health at schools and local communities in West Africa*. Retrieved from http://www.danishwaterforum.dk/knowledge_network/Ghana%20Workshop%2007/Workshop%20report.doc. Accessed on 10, September, 2016.
- [3]. Evans, B., Vandervoorden, C. & Peal, A. (2009). *Public Funding for Sanitation - The many faces of sanitation subsidies*. Geneva, Switzerland: Water Supply and Sanitation Collaborative Council.
- [4]. Iheke (2010). *Impact of workers' remittances on efficiency and welfare of rural smallholder arable crop households in south eastern Nigeria*. A PhD dissertation, Michael Okpara University of Agriculture, Umudike, Nigeria.
- [5]. Ogawa, H. (2005). *Sustainable solid waste management in developing countries*. Proceedings of the second High-level Meeting on Health and Environment in ASEAN and East Asian Countries, Bangkok, 12-13th December, 2005
- [6]. Sanni, M.M. (2015). An examination of environmental sanitation and its health hazards in the polytechnic, Ibadan. *Academic Journal of Interdisciplinary studies*, 4(1), 47-56.
- [7]. Sharma, S. (2014, October 1). *15 diseases India can stamp out by improving sanitation*. Hindu Times. Retrieved October 10, 2016 from m.hindustantimes.com/india/15-diseases-india-can-stamp-out-by-improving-sanitation-AXFE29Xo135btpqrd20a90.html.
- [8]. Snel, M. (2004). *The worth of school sanitation and hygiene education (SSHE) Case studies*. Retrieved from www.irc.nl/content/download/11311/166737/file/SSHE_cases_draft.pdf. Retrieved on 12 September, 2016.
- [9]. Sustainable sanitation solutions (2008). *Towards more sustainable sanitation solutions*. SuSanA Vision Document. Author. Retrieved from www.susana.org/en/resources/library/details/267
- [10]. Thor, A.S (2005) *Breaking the sanitation barriers; WHO Guidelines for excreta use as a baseline for environmental health*. Ecosan Conference, Durban, South Africa from 23-26 May, 2005.
- [11]. Tilley, E., Ulrich, L., Lüthi, C., Reymond, Ph. & Zurbrugg, C. (2014). *Compendium of Sanitation Systems and Technologies*. (2nd ed.). Dübendorf, Switzerland: Swiss Federal Institute of Aquatic Science and Technology (Eawag). Retrieved from www.eawag.ch/en/departement/sandec/publikationen/compendium/
- [12]. Water Aid Uganda (2013). *Status of Water, Sanitation and Hygiene in Primary Schools*. Retrieved from www.wateraid.org/uganda, accessed 12 September 2016.
- [13]. World Health Organization (2007). *The World Health Report 2007. A safer future*. Retrieved from: <http://who.int/whr/2007/en/index.htm>. Accessed on 25 August, 2016.
- [14]. World Health Organization & UNICEF (2012). *Progress on drinking water and sanitation: Update*. United States: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation.