

RESEARCH ARTICLE

Pattern of Water Consumption among Students in Cross River University, Calabar Campus, Nigeria

Salvation U. Eteng^{1*}, Ndifreke Moses Etim¹, Ifiok Christopher Eyo¹, Celestine Chinedu Eze²

¹Department of Urban and Regional Planning, University of Uyo, Akwa Ibom State, Nigeria

²Department of Urban and Regional Planning, Cross River University of Technology, Cross River State, Nigeria

Corresponding author: Salvation U. Eteng, salvationeteng@gmail.com

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Abstract

The study analysed the pattern of water consumption among students in Cross River University, Calabar Campus, Nigeria. Specifically, the study examines the extent and ways water is consumed. Data for the study were obtained using interviews, observations and questionnaire in eliciting data. A total of 300 copies of questionnaire were distributed in the residential hostels. In order to have a general impression of the situation under investigation, 150 copies of questionnaire were distributed in male hostels and same were distributed in female hostels. Data were analysed using descriptive statistics such as frequencies, simple percentages and means. A 5-point likert scale was used in understanding the level in which certain variables contribute in water consumption in the study area. The study noted that water consumption was significantly influenced by gender and age. For instance, the study highlighted that female consumed larger water quantity than males. Equally, students within the ages of 18 years and 25 years constitute larger percentage of water consumers. It was also noted that water consumption among students in the hostels was influenced by particular periods of the day. For instance, the quantity of water consumed in the morning was observed to be higher than in other periods of the day. Furthermore, bathing account for the largest quantity of water consumption while drinking constitute the least. Based on the above observations, it was suggested that the quality of water that is supplied for consumption be improved so as to allow students to drink. Finally, should be supplied at required quantity and regularly.

Keywords: Hostels; school environment; quantity/quality of water; water demand; water supply

Introduction

Water is fundamentally necessary to all living things. For instance, plants need water for growth while animals/humans need water to fasten digestion. Specifically for humans, water is needed for washing of dishes/clothes, preparation of meals, cleaning of houses, washing of cars and several other domestic duties (Ukata, Ohon, Ndik, Eze and Ibor, 2011). Therefore, water is an essential commodity to man. Water is also needed in industries (manufacturing and production) and companies etc. Even more, water is considered as one of the five major needs of man. Other necessities include air, food, light, heat and water (Utsev and Aho, 2012). Ascertaining the importance of water, Ukata et al., (2011) posited that there would come a time in the world where countries would be at war with each other not because of oil or territorial boundaries but only due to the absence of sufficient water. This is because water is not made available in sufficient quantity and in sufficient proportion in several regions of the world.

Despite the necessity of water to life and man's dependence on water for survival, water supply has continued to remain a problem mostly in developing countries of the world (Odjegba, Idowu, Ikenweuwe, Martins and Sadeeq, 2015). The problems associated with inadequate water supply in developing countries are not unconnected to poor regulatory framework, weak funding for the provision of quality water and production of water at sufficient quantity/quality. In several developing countries, policies have been made that are expected to ensure water supply without realistic evidences. For instance, the United Nations (UN) claimed that access to improved and potable water will be achieved in 2015 across developing countries. For this to be achieved, adequate water supply was captured as in the Millennium Development Goals (MDGs) (Eteng, 2021). Realistically, 2015 has come and gone yet, inaccessibility to improved and potable water has remained a recurring decimal.

Nigeria (2004) has the various policies made both locally and internationally regarding water supply. The policy which was deduced from the aftermath of several international conferences established that water is an economic commodity that needs to be supplied in required quantity and quality. Ojo (2011) has showed that most attempts channeled towards water provision in Nigeria are limited in scope to the urban residents yet, there are shortfalls in supply of water even in the urban area. Haylamicheal and Moges (2012) noted that out of 94 percent of diarrheal diseases in the world, 10 percent of the disease is linked to drinking of unsafe water, unhygienic practices and poor sanitation which are all connected to inadequate water supply.

Dakyaga, Kyessi and Msami (2018) showed that in Tanzania, water sources are unsafe and pose threats to health and wellbeing of water consumers. Haylamicheal and Moges (2010) observed that in Ethiopia, there is growing concern of water borne disease due to provision of unsafe and unhealthy water to residents. Mohammed (2014) showed that in Nigeria, the quality of water mostly in rural areas are unsafe. He showed particularly that about 29.7 percent of residents in Kano obtain water from untreated boreholes, 21 percent fetch water from untreated wells, while streams account for 8.7 percent of water. His study observed that only 20.3 percent have access to pipe borne water. Students in tertiary institutions in Nigeria are not exempted from the foregoing as access to water has remained problematic. According to the World Health Organization (WHO), each human being require at least 125 litres of water on daily basis. This suggest that students need to have access to water supply systems sufficiently. In the Nigerian educational institutions specifically in the hostels, scholars have returned different results regarding water demand/supply situation. It should be noted that consumption pattern of water is largely linked to the quantity and quality of water that is available for consumption (Eteng and Ajom, 2021; Eteng, 2021) therefore, the pattern in which students in tertiary institutions consume water can largely be attributed to the quantity/quality of water that is made available. In available studies, the pattern of consumption of water among hostel students in tertiary institutions in Nigeria have not been given adequate attention. Available studies. In Calabar, studies have shown a variation in the consumption of water among students in tertiary institutions. Eteng and Zion (2022) observed that water is demand among students is a prevalent feature. They noted that water is demand for several purposes. They approached water demand without aggregating the patterns in which water is consumed by students implying a gap in literature. Other studies, (Ugwoha and Nwike 2018; Sattar, Afridi, Afridi and Khan 2019; Eteng, Mfon and Okoi, 2022) focused on accessing water quality, water demand and water problems in tertiary institutions without giving adequate concern to the pattern of water consumption in the institutions. This suffice that

there is limited knowledge regarding the pattern of water consumption in tertiary institutions specifically in the residential halls of students. Based on this premise, the paper seeks to address the foregoing so as to contribute to knowledge and equally fill the gap that is identified. Specifically, the paper appraised consumption pattern of water among students in Universities in Nigeria using Cross River University as the case study.

Literature Review

Water consumption is largely concerned with the amount of water that is reserved for use. It has to do with the water quantity that can be accessed by a particular group of people within a specific time. Holistically, consumption of water varies based on activities, lifestyles, socioeconomic attributes, countries and locations. Based on the variation on water consumption by countries, Otaki, Otaki, Sugihara, Mathurasa, Pengchai and Aramaki, (2008) noted that in Thailand, water consumption per person per day for sanitation stands at 27 litres, dish washing requires 4 litres of water while cloth washing requires 45 litres. Eja, Otu, Atu, and Edet (2011) observed that 200 litres of water is required for consumption per person on daily basis in United States of America and the required quantity of water for consumption per person is 50 litres in India. The World Health Organization suggest that individuals should consume at least 50 litres of water per person per day aggregating it to 5 litres for drinking, 20 litres for daily hygiene/sanitation, 15 litres for bathing and 10 litres for food preparation. Furthermore, the international consumption figures released by the 4th World Water Forum (2006) explained that an individual within urban areas require a minimum of 250 litres per day. When the required quantity of water is not consumed, there is every likelihood that diseases and epidemic outbreak will occur. Eteng and Ajom (2021) in their study examined the extent to which household sizes/population influence water consumption. They observed that there is water supply deficit in Calabar, Cross River State. They noted that the residents of Calabar do not have access to the required water quantity. They further noted that the inability of relevant agencies and government to provide adequate water force residents to turn to unsafe and unhealthy sources of water which have possibilities of unraveling health challenges of various magnitude.

Water consumption is equally influenced by other variables as seen in recent studies. For instance, available studies have pointed to the fact that socio-economic and demographic factors influence water consumption. Specifically, Eteng (2021) observed that factors such as gender, age, income and household size influence water consumption. Mohammed (2014) equally revealed that women consume water in larger quantity than men. Abaje, Ati and Ishaya (2009) noted a significant relationship between income of consumers and the quantity of water consumed. Similar submissions were

made by Akeju, Oladehinde and Abubakar (2018) in Ondo State and Kannayo, Ezeuilo and Maurice (2013) Eastern Nigeria. Ubugha, Okpiliya, Njoku, Itu, Ojoko and Erhabor, (2017) showed that population is a factor that equally influences water consumption

Students within hostels in tertiary institutions also demand water for various reasons. Daud and Abdullah (2020) carried out examinations of water consumption in Universities residential halls in Malaysia. They sought to understand the amount of water usage per person and the differences in water consumption among genders. In order for the authors to measure water consumption among students, they relied on information from water meter reading (in litres) which was done by observing every block of student's hostels randomly within five weeks. They further subjected the data to analysis using both descriptive and statistical hypothesis tests. They observed that the average daily water consumption of students exceed the average water demand of 250 litres per student that was provided. On the basis of gender, they noted that female students consume more water than male students. From their observations, they inferred that universities should take some initiatives to enhance student awareness on the importance of saving their daily water usage.

In a similar study in Pakistan, Sattar, Afridi, Afridi and Khan (2019) investigated the per capita demand and water consumption pattern using Arduino acquisition system and flow meter sensor. They installed the water flow sensors in the outlet pipe from water storage tank to hostels while the Arduino flow meter was used in recording the water flow for every moment. Their study showed a variation in the per capita consumption. They also noted a strong relationship between the number of student available per day and the total water consumed in liters per day. Furthermore, their study showed that there is no relationship between per capita water consumption and maximum/minimum temperature humidity wind speed. This suggest that the consumption of water among students in hostel is not significantly influenced by environmental factors. Their study also observed that water consumption among students is influenced by periods within the day. Consumption of water hit its peak in the morning hours according to the findings of the authors.

Ugwoha and Nwike (2018) analysed the quality of borehole water used in the three hostels of Choba campus of the University of Port Harcourt. Their physical parameters for carrying out the analysis were true colour, odour, turbidity, total suspended solids (TSS), temperature and total dissolved solids (TDS). Chemical parameters that they used in the assessment were pH, electrical conductivity, salinity, alkalinity, total hardness, chloride, nitrate, phosphate, biochemical oxygen demand (BOD), chemical oxygen demand (COD), dissolved oxygen (DO), Iron, lead and arsenic and biological parameters. The results from their analysis showed that all physical parameters were within standards established by WHO while chemical parameters

were mostly within the WHO permissible limit unless for pH (3.97 – 4.49) for all boreholes in the hostels. Biological parameters showed that water consumed in hostels was below detection. This indicate that there was no obvious biological contamination of the water. They further showed that there was no significant difference in water quality between the three hostels' boreholes. Based on their observations, they concluded that the boreholes be treated so as to ensure the reduction of acidity before consumption. From the studies above, it is clear that water consumption in hostels and residential halls is a derivative of several factors including number of students in hostels, quantity/quality of water that is available, peak periods, activities that are carried out by the students as well as gender, income and occupancy rate in the residential halls. Notably, there is likely to be increased water consumption in hostels where students are allowed to prepare meals than in residential halls where students are deprived. Studies that are available have not consistently appraised the patterns of water consumption with particular reference to the study area. Based on this observation, the present study seeks to fill the gap in knowledge.

Methodology

The study was carried out in University of Cross River. The University is specifically located in Calabar metropolis which is the capital city of Cross River State. The University is a state-owned higher institution which came to existence in August, 2002. It was formerly known as the Polytechnics Calabar. The University has student strength of over 10,000 in Calabar Campus (Omang, 2018). Several academic courses are offered in the University at the undergraduate and postgraduate levels. The University provide hostels for it students and as such, the residents of the hostels demand water for various reasons. In spite the fact that water is consumed in varying quantities and various purposes in the hostels, available studies have not discussed it. It is on this premise that the present study was conceived.

In order to obtain data for the study, data were obtained using a combination of different methods. For instance, copies of questionnaire, interviews and observations were used in collecting data. Data were specifically obtained on the quantity of water per head that is consumed. Averages were taken in order to establish the mean quantity of water that is consumed on daily basis by students in the institution. The institution provide accommodation for both male and female students in 4 different residential halls. In order to ensure collection of data so as to have a general impression of the situation under investigation, 300 students were purposively sampled out for questionnaire administration. This consist of 150 students from male hostels and 150 students that are residents of female hostels. Data were further obtained to determine the major activities that demand water. The aggregation of water used was helpful in determining the pattern of consumption of water among

students in the institution. Data were equally obtained on the water supply situation in the study area. Such data include periods of water availability, quality of water supplied and the quantity of water that the students can access within specific periods. Furthermore, descriptive statistics were employed in carrying out analysis using frequencies and simple percentages. In order to access the variation in the consumption pattern of water based on the variables, the following model was used; $(5n_5+4n_4+3n_3+2n_2+1n_1) / 5N$ (Eteng et al., 2022). A five point likert scale was adopted in the study. Specifically, 5 represent strongly agree, 4 represent agree, 3 undecided and 2 was disagree and 1 represent strongly disagree.

Discussions and Findings

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Table 1: Variation in Water Consumption

Variable	Categories	Frequency	Percentage
Gender	Male	111	37
	Female	189	63
	Total	300	100
Age	Below 18years	89	30
	18-25years	135	45
	26 and above	76	25
	Total	300	100

Source: Field Survey, 2021

The information in Table 1 explained that females consume larger quantity of water than males. This is due to the fact that female students are engaged in more activities that demand water than males. This particular observation was earlier noted in the findings of Mohammed, (2014); Daud and Abdullah (2020) and Eteng (2021). The authors showed that females consume larger water quantity being that they are mostly involved in cleaning of houses, preparation of meals among others. Daud and Abdullah (2020) equally had

similar results in their study among students in Malaysian Universities. In the institutions, it was revealed that females dedicate more time to sanitation and other activities that demand water in larger quantities. Equally, the dominant age bracket of water consumers was shown to be those between the ages of 18 years and 25 years. This is due to the fact that people within this age brackets comprise the largest population of students in the institution.

Table 2: Peak Period for Water Consumption

Period	Frequency	Percentage
Morning	201	67
Afternoon	-	-
Evening	99	33
Total	300	100

Source: Field Survey, 2021

The peak period for water consumption among students in hostels was observed to be in the morning. This is due to the fact that personal hygiene, house cleaning and other chores demand water and such activities are mostly carried out in the early hours of the da. By extension, the activities process make students to demand and consume larger water quantity during the period.

The pattern of water consumption based on the specific uses in which water is consumed was ascertained using Seven (7) variables. As presented in 3, water is mostly consumed in residential halls of students in tertiary institutions for the purpose of bathing. An index score of 4.5 indicate that that bathing is the largest consumer of water in hostels. The table also noted that laundry activities account for water consumption only second to bathing. This is due to the fact that while bathing is an everyday activity that may be carried out as many times as possible by hostel residents, laundry may not necessary be an everyday activity. It is on this basis that bathing indicated greater influence on water consumption. In the table, it was also noted drinking with a score of 2.5 had the least contribution to water consumption.

Table 3: Water Consumption Pattern

S/N	Variables	Strongly agree	agree	Undecided	Disagree	Strongly disagree	Mean
1	Drinking	255	212	42	134	115	2.5
2	Bathing	960	344	27	26	0	4.5
3	Room Sanitation	505	364	156	36	38	3.7
4	Cooking/meal preparation	340	288	63	262	8	3.2
5	Personal hygiene	610	224	243	46	18	3.8
6	Laundry	945	336	15	30	7	4.4
7	Washing of dishes	440	388	186	44	31	3.6

Source: Field Survey, 2021

In other words, the amount/quantity of water that is consumed on the basis of drinking account for the least. This is not unconnected to the fact that most students avoid drinking water that is supplied in the hostels believing that

it is not properly treated for consumption. As such, they buy sachet/bottle water for drinking.

Conclusion and Recommendations

The study assessed the pattern of water consumption among students of Cross River University, Calabar Campus. However, water being an essential commodity is always demanded for various purposes and the pattern of consumption is a determinant of the uses in which water is put. Therefore, it was observed in the study that demand for water among students is increasing rapidly and the increase is due to the activities that water is put. For instance, females were observed to constitute larger percentage of water consumers than males while the quantity of water consumption hit its peak in the morning hours than in other periods of the day. The study also observed that bathing/showering account for the largest percentage of water that is consumed in the hostels which is closely followed by laundry. Furthermore, the quantity of water that is set aside for drinking account for the least water quantity. The observation implied that the water that is supplied is not fit enough for drinking and as such, there is need to improve on the quality of the water. This suggest that water treatment should be given adequate attention. Having in mind that water is a necessity of utmost importance, there is need to ensure that school authorities and relevant agencies concerned with water provision remain committed to ensuring water availability and at the required quantity and quality.

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