

## RESEARCH PAPER

# Urban health dynamics and population variables: a case study of environmental sanitation of Maiduguri metropolis in Nigeria

Abubakar Shaibu Dauda \*, Mahmoud Ahmad Abdulkadir, Jacinta A. Opara  
University of Maiduguri, P.M.B 1069, Maiduguri, Borno, Nigeria



## Highlights

- Provision of environmental sanitation is of great importance to the health status of the people.
- Demographic factors and environmental sanitation education correlate with the health status of the residents in Maiduguri Metropolis in Nigeria.
- Nigerians need urgent sanitation education on environmental sanitation.
- Gender, economic status, level of education and environmental sanitation education does not significantly correlate with health status of residents.

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## Graphical Abstract



## Abstract

Provision of environmental sanitation is of great importance to the health status of the people. However, the success may severely depend on the effective access to information and education which are communicated to the public. The purpose of this study is to examine the degree of correlation of demographic factors and environmental sanitation education on individual's health status of residents in Maiduguri Metropolis, Borno State, Nigeria. To this aim, Survey design is used for the study. The population for this study was selected of all the residents in Maiduguri Metropolis, and 384 respondents were sampled. Descriptive statistics of mean, standard deviation, standard error, frequency count and percentages is used to organize and describe demographic information while inferential statistics of multiple regressions was used to test the hypothesis at significance level of 0.05. Results shows that demographic factors and environmental sanitation education correlate with the health status of the residents, in Maiduguri Metropolis in Nigeria.



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\* Corresponding author: [abubakar.s.d1990@gmail.com](mailto:abubakar.s.d1990@gmail.com) (A.S. Dauda)

## 1. Introduction

The provision of environmental sanitation is of great importance to people's health status and sustainable development (Thornton et al., 2016; Eaves et al., 2017). However, the success may severely depend on the effective exposure to information and education which are communicated to the public on environmental sanitation education. The best way to provide information for environmental matters and the promotion of environmentally responsible behaviors is by means of increasing access to environmental education. This impression is in line with the recommended programs of action for achieving sustainable development in Agenda 21 of the green development environment and sustainability in the third world (Pedersen, 2019).

The earth itself is one of the determinants of individuals' wellbeing status, family, and networks on the loose. Individuals' wellbeing is influenced by the nature of the spot they live and work, the air they inhale, the water they drink, and the food they devour. These are delegated segment factors. Segment factors are financial attributes of a populace communicated measurably as age, sexual orientation, instructive capability, pay level, conjugal status, occupation, religion, birth rate, demise rate, and size of the family (Adams et al., 2016). The recognized segment factors have positive and negative consequences for man's condition of wellbeing. However, the purpose of this study is to examine the degree of correlation of demographic characteristics and environmental sanitation education with individual's health status (Eaves et al., 2017).

It is nature that inclines individuals to different specialists, bringing on any illness or medical issues. The condition's nature is decaying exceptionally quick, particularly in populace blast industrialization and urbanization, deforestation, autos, atomic innovation, and green upheaval. Also, environmental sanitation is a system that promotes the proper disposal of human and animal waste, improves the quality of the environment, and reduces the amount of disease. But this may be affected by either economic status or level of education of the individual, family, and community at large (Lee et al., 2020). An improved natural sanitation office cleanly isolates excreta from human contact and is utilized by just individuals from one family. Toilets flushing to see were frameworks or septic tanks, ventilated improved pit (VIP) lavatories, pit restrooms with a section, and fertilizing the soil toilets; this might be influenced by monetary status training individual, family, and network on the loose.

Natural Sanitation implies more than exceptional road clearing and the freeing from filthy seepage frameworks (Ekong, 2015). It incorporates individual tidiness and wellbeing duties, just as the component of the considerable number of elements in man's physical condition, which practice or may prompt unsafe impact on man's physical, mental or social prosperity. For instance, air, water, and land contamination have intense wellbeing outcomes; however, this must be accomplished when the segment variable is ideal (Adams et al., 2016). Nevertheless, existing literature indicates a relationship between educational attainment, income/wealth, age, gender, household size, access to electricity, housing condition, and geographical factors such as regions and living in rural/urban areas with environmental sanitation and hence affects the health status of individuals, family and the community as a whole (Basu et al., 2017). The actions include reorientation education towards sustainable development and increased public awareness. For instance, how can change the Nigerian child or adult believes about 'dorti no dey kill black man' (Filth does not kill a black man).

Level of education is one of the issues that affect environmental sanitation education, which correlates with the health status of the household (Mayall, 1993). Therefore there is a relationship between environmental sanitation education and the educational accomplishment of household heads. Similarly, household income has a significant relationship with the sanitation facility (Ikemi, 2017). The least fortunate families had no entrance to VIP restrooms and present-day sanitation offices (flush to septic tanks or sewer frameworks). The less fortunate family units utilized pit lavatories without a chunk; pit restrooms with a section, and immaterial extent of the less fortunate families utilize different offices (Broadhead et al., 1983).

Nigerians need urgent sanitation education on environmental sanitation. Subsequently, natural sanitation information stays an authentic instrument for making open mindfulness on subjects concerning the significance of ecological sanitation on the individuals (Ikemi, 2017). It can assist change with peopling's discernments, perspectives, propensities, tendencies, and practices, consequently limiting the instances of ailments like

transferable, gastrointestinal, and skin maladies). The objective of the National Policy on nature is to accomplish feasible improvement in Nigeria and specifically, to make sure about for all Nigerians a decent nature of the condition for their wellbeing and prosperity, among others. The privilege of a solid domain is likened to the established right to life. Since an unsanitary and filthy condition can unfavorably impact singular well-being and bring about death along these lines, it brings about death. In this way, man's principal right to live in a perfect, sheltered, and sound condition without any dangers to life. As opposed to this, the run of the mill physical condition in Nigeria, regarding the degree of sanitation and ecological indiscipline in networks is very troubling. Sanitation support practice is still horribly lacking (Ekong, 2015).

## 2. Materials and Methods

Descriptive statistics of mean, standard deviation, standard error, frequency count, and percentages will be employed to organize and describe demographic information, while inferential statistics of multiple regressions were used to test the hypothesis at a significance level of 0.05 (Montabon et al., 2018).

### 2.1. Research questions

To what extent do gender, economic status, education level, and environmental sanitation education correlate with health status? (Valenti et al., 2017).

### 2.2. The objective of the study

The study's objective is to determine if demographic variables such as gender, economic status, level of education, and environmental sanitation education correlate with residents' health status in Maiduguri Metropolis, Borno State.

### 2.3. Hypothesis

Gender, economic status, education level, and environmental sanitation education do not significantly correlate with residents' health status in Maiduguri Metropolis, Borno State.

### 2.4. Methodology

The survey research method was applied to the present study. The survey design is used because it allows the relative incidence, distribution, and interaction of sociological and psychological variables (Burns and Groove, 2001). The survey provides accuracy in describing what exists, and the frequency with which it occurs assigns new meaning to the phenomenon and adds information into categories.

### 2.5. Population and sample

This study's population was all the residents in Maiduguri Metropolis (Keith et al., 2004). Amongst a community of over one (1) million, finally, 384 samples were selected. A multi-stage sampling procedure was used for the study. Maiduguri metropolis comprises of 2 (two) Local Government Area, which will be selected purposively and two wards will be selected using a random sampling system; and systematic random sampling will be used to choose houses to be sampled, and every fifth house in the ward will be selected, that is, 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup> and so on. And dip hand random sampling system will be used to select the respondent in each house.

### 2.6. Validity and reliability of the instrument

The instrument was validated for the instrument's face and content validity, the researcher supervisor, and other experts in the field of Physical and Health Education (Stülb et al., 2019). The reliability of the instrument was tested in Bauchi. Split half reliability method will be employed to test the instrument data collected subjected to a statistical test using spearman brown prophecy formula to determine the reliability index and 0.74.

### 3. Results and Discussion

Table 1 shows the percentage of people by gender. Table 2 shows that more (30%) of the respondents are in their thirties, (28%) are in their forties, and (19%) are in less than thirties. Those who are in their fifties and above also have a relatively high number (23%).

**Table 1.** Gender of Respondents.

S/N	Gender	Frequency	Percentage (%)
1	Female	122	54
2	Male	102	46
	Total	224	100

Note: indicates that a larger number of the respondents (46%) are male, while only 54% are females.

**Table 2.** Age of Respondents.

S/N	Age	Frequency	Percentage (%)
1	30 years or less	43	19
2	31-39	67	30
3	40-49	62	28
4	50 and above	52	23
	Total	224	100

Source: Generated by Researcher using SPSS 20.0 from questionnaire response.

Table 3 shows the level of education of the respondents. A larger number (48%) of the respondents fall within the first-degree group, followed by the 32% who have master's degree; the diploma group has 19% whereas only 1% of them possesses a doctorate. Table 4 presents the distribution of the respondents according to their level of income. The table indicates that the majority of the respondents (33%) had income level with the ranges of N101,000-150,000, followed respectively by income levels N151,000-N200,000 (22%), N50,000 or less (15%), N51,000-N100,000 (17%), N201,000-250,000 (9%) and the bottom two are the highest paid at levels of N251,000-N300,000 (3%) and N301 and above (1%).

**Table 3.** Level of Education.

S/N	Level of Education	Frequency	Percentage (%)
1	Doctorate Degree	2	1
2	Master's Degree	71	32
3	Bachelor's Degree	107	48
4	Diploma	44	19
	Total	224	100

Source: Generated by Researcher using SPSS 20.0 from questionnaire response

**Table 4.** Level of Income of Respondents.

S/N	Level of Income	Frequency	Percentage (%)
1	N50,000 or less	33	15
2	N51,000-100,000	37	17
3	N101,000-150,000	75	33
4	N151,000-200,000	49	22
5	N201,000-250,000	20	9
6	N251,000-300,000	7	3
7	N 301,000 and above	3	1
	Total	224	100

Source: Generated by Researcher using SPSS 20.0 from questionnaire response.

3.1. Test of hypothesis

Table 5 shows that gender and environmental sanitation education do not significantly correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria. The computed outcome has  $\beta$  weight of -.347, S.E=2.180 and  $p = .874$ , since  $p>0.05$ . This shows that gender and environmental sanitation education did not correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Table 5. Gender and environmental sanitation education correlation with the health status of residents in Maiduguri Metropolis, Borno State.

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Remarks
	B	S.E				
Gender	-.347	2.180	-.047	-.059	.874	NS

Table 6 shows that environmental health education is significantly related to the health status of residents in the metropolitan area of Maiduguri, Borno State, Nigeria. The calculated result has weight  $\beta$  1.138, S.E = 1.143 and  $p = 0.002$ , because  $p = 0.002 > 0.05$ . This shows that age is positively related to the health status of residents in Maiduguri Metropolis, Borno State, Nigeria. That is, with increasing age, personal and environmental health and hygiene are affected.

Table 6. Age and environmental sanitation education do not correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Remarks
	B	S.E				
Age	1.138	1.143	0.397	7.996	0.002	Age

In Table 7 observed that Employment Status and environmental sanitation education significantly correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria. The computed outcome has B weight of -.397, E=7.996 and  $p = .002$ , since  $p = .002 < 0.05$ . Since t is 7.996, which shows that Employment Status correlated positively.

Table 8 presents that Employment Status and environmental sanitation education significantly correlate with residents' health status in Maiduguri Metropolis, Borno State. The computed outcome has B weight of -.111, E=5.404 and  $p = .007$ , since  $p = .007 < 0.05$ . This shows that Employment Status was significantly correlated with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Table 7. Employment status and environmental sanitation education do not correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Remarks
	B	S.E				
Employment Status	1.138	1.143	.397	7.996	.002	S

Table 9 shows that the Level of Income and environmental sanitation education significantly correlate with residents' health status in Maiduguri Metropolis, Borno State. The computed outcome has B weight of -.671, S.E=5.005 and  $p = .004$ , since  $p = .007 < 0.05$ . This shows that the Level of Income significantly correlates with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

**Table 8.** Level of Education and environmental sanitation education do not correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Remarks
	B	S.E				
Level of Education	-.871	2.155	-.111	5.404	.007	S

**Table 9.** Level of Income and environmental sanitation education does not correlate with residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Remarks
	B	S.E				
Level of Income	-.671	1.005	-.111	5.404	.004	S

**Table 10.** Summary of Multiple Regression Result shows the composite effect of independent variables on residents' health status in Maiduguri Metropolis, Borno State, Nigeria.

Source of variance	df	S	NS	F-ratio	Sig.	Remark
	2	531.473	371.110	22.528	0.0001	S
	271	3105.530	1.307			
	273					

Note: S represents Significant; NS represents Not Significant

Multiple R = 0.791,

Multiple R<sup>2</sup>= 0.794,

R<sup>2</sup> ADJUSTED=0.79,

F – VALUE= 22.528

The result of the relapse investigation of oxygen utilization among Security men recorded a coefficient of assurance as a balanced R<sup>2</sup> estimation of 0.79. This implies that the variables included in the model explain 79% variation in the correlation of residents' health status by the independent variables, including age, gender, employment status, level of education, and income (Rao et al., 2010). The staying 21% can be ascribed to blunder in particular and the avoidance of different variables from the model. For example, four factors, age, work status, level of training, and level of salary, were factually critical. In contrast, the staying one, for example, the free sexual orientation factor, was measurable unit the important. This showed the quantity of autonomous part in sexual orientation doesn't connect with wellbeing status of inhabitants. The relapse was investigated at a centrality level of 0.05. Convincingly, this implies all the five (5) factors taken together represented 79% of the fluctuation in connection with occupants' wellbeing status.

The F-Statistic is 22.528; this is exceptionally high and factually critical at 0.05 levels. This is higher than its hypothetical qualities. The F-measurement affirms that connection with occupants' well-being status is measurably identified with the free factors old enough, sexual orientation, business status, level of training, and pay level.

### 3. Conclusions

Demographic factors and environmental sanitation education correlate with the health status of the residents in Maiduguri Metropolis council. Demographic factors such as age, employment status, and income level correlate significantly with the residents' health status in Maiduguri Metropolis. However, gender does not correlate with the health status of the residents in Maiduguri Metropolis Borno State. Increasing age of people,



difficult working conditions and low level of income of families are important and effective factors in determining the level and quality of personal and environmental health.

### Recommendations

Health and environmental conditions in the environment are not good at all, and the government should help provide health facilities and conditions in poor and low-income neighborhoods. In order for low-income people to improve their health practices and enjoy healthy living facilities, the government must interpret health awareness messages broadly to the target audience and explain how to use these facilities. Therefore, the re-entry of environmental health inspectors to these cities and communities to organize and inform about personal and environmental health for different groups, regardless of the situation and gender discrimination can be a good idea to get rid of this unhealthy situation among families. And be members of the community.

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