SANITATION INFRASTRUCTURE AND MANAGEMENT ADEQUACY AS STRATEGIES TO HEALTHY TERTIARY EDUCATION INSTITUTIONS IN IMO STATE FOR SUSTAINABLE BUILT ENVIRONMENT

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Abstract

The study verified the sanitation infrastructure and management adequacy as strategies for healthy Imo state tertiary education institutions in Imo State sustainable built environment. This is with a view to evolving healthy tertiary education institutions in Imo state for sustainable built environment through the provision of adequate sanitation infrastructure and management strategies. The data of the study was analyzed with mean and standard deviation. Research question and t- tested hypothesis guided the study. The area of the study is the two main state tertiary education institutions in Imo state. Survey research design was used for the study. Total population of 85 respondents made up of 20 managerial/supervisory staff and 65 operatives of works/maintenance and sanitation departments were used for the study. The entire population served as the sample of the study. Five experts from Abia state owned tertiary education institutions validated the instrument of the study. The reliability coefficient of .89 yield of emerged through Crombach Alpha. The result showed the required sanitation infrastructure and management adequacy that will serve as strategy to healthy tertiary education institutions in Imo state for sustainable built environments. The tested hypothesis at $p < 0.05$ level of significance indicated that there was no significant difference on the mean rating of the respondents. Therefore the Ho were up held. Recommendation base on the outcome of the study were made.

Introduction

Health is wealth has indisputably been accepted globally as a dictum because the propelling force behind success in all human endeavors/development in education, sports, engineering, arts, technology, manufacturing, agriculture, aviation, marine construction, mining, sciences, social sciences and many others depend on prevalent state of health. All optimal performances in fields of productivities result to competencies attributes such as knowledge, skills and attitudes had depended on the state of health of person(s). The successes of the developed countries of Europe, America or Asia socio economic and political developments had resulted to healthy population with prolonged life expectancies hence the saying that health is wealth. Unfortunately the developing countries of the world are characterized by such unhealthy indicators like diseases, ignorance, illiteracy, high death rate, shortened life span and poverty which had adversely hampered growth, development, productivities, out puts and per capital income (Farrant 1982). These inhibitors are aggravated by poor sanitary conditions and unhealthy environment that do not encourage growth.

According to Britannica Encyclopedia (2010) health is general physical, mental and emotional ability to function effectively and in harmony with one environment. It is dynamic condition that represents physical and emotional state of organisms. Health is therefore not the absence of diseases but rather conditions that guarantee stabilities and general well being. Major determinants to good health include: heredity which is innate traits acquired biologically from nature or birth, good health hinges on maintenance programmes, life style that depends on conditioning/formulated habits and good sanitary environment which as key factor that controls the earth inhabited by living and non living things (Umeh 2010). Good sanitation makes all the above factors outstanding since it exerts positive influences on them. For instance, good food, housing, clothing and medication in poor sanitary conditions will not achieve set goals. Sanitation means the prevention of human contact with waste for hygienic purposes. It is the means of promoting healthy living through the prevention of contacts with hazards associated with food, water, air and housing by the control of vectors (living organisms that transmits diseases) that are harmful in the built environment. It focuses on the management of waste produced from human activities (Ezeji and Onoh, 2008 and Umeh, 2010). Study by Barry in Okparaeke (2008) indicated that average of three persons in a house hold generate $0.09m^3$ of waste per week. Wastes are materials that may not have nearby needs but could serve as feed stocks or raw material elsewhere that is those materials resulting from normal operations which their production, disposal or discharge can be controlled (Odocha and Sridher in Ezeji

and Onoh 2008) Ezeji and Onoh (2008) observed that waste such as domestic and industrial include: solid waste-garbage/rubbish, liquid or effluent- from domestic or industrial, gaseous-sulphides, carbon-iv-oxide and carbon monoxide and hazardous waste- radioactive, chemical, and biological substances with flammables and explosives. Good sanitation which embodied orderliness and cleanliness of the built environment are useful index of excellent health. Therefore health of people living in poor sanitary environment is prone to spread of communicable diseases among groups or crowds. Poor sanitation promotes ill health diseases or disabilities manifesting to dysentery, typhoid fever, cholera schistomiasis, amoebiasis and diarrhea with very high epidemic destroying outcomes of mass death very common among communities in towns or rural areas and in schools which necessitate sanitation practices (National Teachers Institute 2000). Reports from experts reveal disturbing states of our schools and colleges which the picture looks catastrophic.

Okorie (1999) stated that the physical environment of our tertiary institutions is in grave conditions with unkept lawn, fields and roads, broken and damaged water and sewage pipes, heaps of waste materials like papers, cans and broken bottles. This is as well as spoilt vehicles, machines and equipment. Also it is not uncommon to find students converting open places to public conveniences. He added that this could be blamed on the failure of the school authorities to provide public conveniences like toilets and lavatories near strategic places like libraries, churches, lecture halls, refectories, and sports arena. At times, provisions are made for these amenities but they are hardly managed and maintained. Concluding that many school environments are untidy and polluted by offensive odours from broken down toilets, bath rooms and blocked or damaged sewage tanks and pipes which constitute serious hazard to the staff and students.

The situation at the tertiary institutions that could serve as centre of value and cultural transformations had degenerated into sorry sites where mice, rodents, insects and others dominate. Most often public toilets and lavatories provided are kept under locked and keyed there by leaving the campus environment polluted due to poor management system (Akinsola and Aiyagba 2006).

Study by Jinadu in Okparaeke (2013) showed that almost all the Nigerian tertiary institutions had ancillary facilities functioning below average. The available toilets and lavatories in the campuses lack good drainage system, inadequate water supply, poor lighting, broken water closets, septic tanks and soakage pits. Some of the toilets are temporally out of use. Other related sanitation problems shown by the study include heaps of refuse, dilapidated buildings and bushy surroundings.

Another study by Akinsola and Aiyagba (2006) reported that the tertiary education institutions in Nigeria face immediate pressure to maintain the campuses to prevent health hazard from poor sanitation system. The study reported toilets and lavatories inadequacy and very low cleaning frequency, bushy compounds and poor waste management systems. The study therefore recommended for the upgrading/maintenance of infrastructures/sanitation to ensure healthy campuses. Worried by the poor sanitary and welfare in schools and colleges Taylor (2008) wrote that students and the school workers spend more than seven hours a day while some others live in the school compounds for months. The periods at schools add up to more working time than they are at home. Yet until recently, few had considered the environment quality of the school surrounding or the quality of the health of the students and teachers. Adding that

learning is important to Parent Teachers Association (PTA). School authorities and concerned parents have focused on teachers and the curriculum for a long time without being aware that the health sanitary conditions of school influence learning or that the toxins in the air affect the brain academically.

In the light of the above lamentations on the poor sanitation situation in the tertiary education institutions in the country there is need to restore cleanness in the campuses through efficient waste disposal system. Bamiro, Nurudeen and Akuru (1986) stated that in order to prevent soil, surface and underground water pollution and control pathogens; there should be practical application of sanitary measures that can be achieved through sanitary facilities provision and management since, they cautioned that all waste domestic or industrial should not be handled by bare hands. Ezeji and Onoh (2008) decried that waste management programme in the country had simply involved moving waste from one site to another and not managing it, such as moving waste from urban area to a land fill or dump site that will result to future problems. Ezeji and Onoh concluded that modern trends in waste management will involve use of adequate infrastructures, administration, planning, financing and supervision to ensure effective controlling, production, storage, collection, transportation, processing and disposal or utilization that will result to sustainable built environment. Sustainable built environment in the context of this study, is an environment which had been transformed from green area to habitable settlement with such infrastructures like buildings, roads, utilities (electricity, water and gas), parks in villages, towns, institutions, industrial and commercial estates on a continuous bases.

The sanitation infrastructure adequacy that will serve as strategies to healthy tertiary education institutions in Imo State for sustainable built environment should include efficiency, continuity and very clean surroundings to be classified as tools/containers, machines/equipment, structures and sanitation chemicals (cleaning agents and disinfectants). These are therefore what the study is designed to verify.

Purpose of the study

The purpose of the study is to determine the sanitation infrastructure and management adequacy that will serve as strategy to healthy Tertiary Education Institutions in Imo State for sustainable built environment. Specifically, the study will verify the sanitation infrastructures and management strategies in tertiary education institutions in Imo state for sustainable built environment.

Research Question

What are the sanitation infrastructure and management strategies for healthy tertiary education institutions in Imo State for sustainable built environment?

Hypothesis

H_o: There is no significant difference in the mean rating of managerial/supervisory staff and operatives of works/sanitation on sanitation infrastructure and management adequacy as strategies for healthy tertiary education institutions in Imo state for sustainable built environment.

Design of the Study

Survey research design was used for this study. The survey design was used because the researcher collected information from the respondents as they were without interference.

Area of the Study

The area of the study is Imo State University Owerri and Imo State Polytechnic Umuagwo, the state owned tertiary institutions in Imo state.

Population of the Study

Total population of 85 respondents made up of 20 managerial/supervisory staff and 65 operatives of works/ sanitation staff were used for the study.

Sample and Sampling Techniques

Since the population of the study is of manageable size, the eighty five respondents were used for this study. Therefore, consensus sampling was used.

Instrument for Data Collection

The instrument for data collection was a structured questionnaire comprised of 46 items with five response options rating scale of: Highly Adequate Strategy (HAS) =5, Adequate Strategy (AS)   4, Moderately Adequate Strategy (MAS) = 3, Not Adequate Strategy (NAS) = 2 and Not Highly Adequate Strategy (NHAS) 1, were used for this study.

Validity of the Instrument

The instrument was face validated by two works/maintenance and three sanitation department experts from Abia state owned tertiary education institutions: Abia State University Uturu and Abia State Polytechnic Aba who validated the instrument to the study. Their suggestions were used to improve and modify the instrument before it was administered to the respondents.

Reliability of the Instrument

The reliability of the instrument was obtained by single administration of the instrument to five works/maintenance and ten sanitation department operatives/experts from Michael Okpara University of Agriculture, Umudike. Crombach Alpha was used to calculate the reliability coefficient .This yielded internal consistency value of 0.89.

Methods of Data Collection

The instrument was administered to 85 respondents at their places of work with the help of three research assistants. All 85 questionnaire administered representing 100% were collected back and used for the study.

Data Analysis

The data was analyzed using mean and standard deviation to answer the research question and to test the hypothesis with t-test =at p< 0.05 levels of significance and degree of freedom of 2 and 83. The decision rules were based on any item with less than 3.5 as Not Adequate Strategy while any item above 3.5 was regarded as Adequate Strategy. The 3.5 is the upper limit of average of $\frac{15}{5} = 3$.The tested hypothesis with the calculated value less than the table value showed null hypothesis Ho which indicated that there is no significant difference between the mean ratings of the respondents on sanitation infrastructure and management adequacy as strategy to healthy tertiary education institutions in Imo state for sustainable built environment being studied.

Results

What are the sanitation infrastructure and management adequacy as strategies for healthy tertiary education institutions in Imo State for sustainable built environment ?

S/N	Sanitation Infrastructure Management	X	SD	t-cal Value	t-table Value	Df	Result
						N=85	
	Sanitation Tools/Containers						
1	Make brooms available in structures for cleaning	3.6	1.2	0.35	1.72	83	AS
2	Supply mobs for surface cleaning	3.5	1.1	0.45	1.72	83	AS
3	Supply dustpan and brush for removal of dust and dirt	3.7	1.2	0.26	1.72	83	AS
4	Supply dusters to clean surfaces	3.7	1.2	0.26	1.72	83	AS
5	Provide buckets for washing	3.8	1.3	0.45	1.72	83	AS
6	Supply waste paper baskets for refuse collection in offices, class rooms and hostels	4.2	1.3	0.35	1.72	83	AS
7	Provide garbage bags to hostel rooms/offices for waste collection	3.8	1.20	0.33	1.72	83	AS
8	Make available hand gloves for waste handling	3.8	1.2	0.28	1.72	83	AS
9	Place metal containers at refuse dumps for waste collection/disposal	4.0	1.3	0.37	1.72	83	AS
10	Supply spades or shovels for evacuation of waste	3.6	1.2	0.38	1.72	83	AS
11	Supply fork tools for lifting of waste	3.7	1.1	0.29	1.72	83	AS
12	Supply rakes for the gathering of refuse and garbage	3.8	1.3	0.45	1.72	83	AS
13	Supply scrubbing brush to clean surface and stains	3.5	1.2	0.47	1.72	83	AS
14	Issue out sponges for cleaning surface with water	3.6	1.2	0.36	1.72	83	AS
15	Supply squeegee that works like wind screen to wipe water from surfaces	3.5	1.1	0.28	1.72	83	AS
	Sanitation Machines And Equipment						
16	Provide vacuum cleaner to clean and suck up dust and dirt	3.6	1.2	0.35	1.72	83	AS
17	Supply cutlasses for clearing the vicinity	3.8	1.3	0.31	1.72	83	AS
18	Provide mowing machines for cutting grasses	3.7	1.1	0.40	1.72	83	AS
19	Provide operational truck for collection and disposal of refuse	3.5	1.3	0.33	1.72	83	AS
20	Make available pumping machines for pumping out water from flooded area	3.6	1.2	0.36	1.72	83	AS
21	Supply spraying machines for spraying disinfectants and herbicides in large areas	3.7	1.2	0.36	1.72	83	AS
22	Make available fumigation machines for the fumigation of premises	3.6	1.3	0.29	1.72	83	AS
	Sanitation Structures						
23	Construct underground sanitary tanks such as inspection chambers, septic tanks and soakaway pits for the collection storage, and disposal of domestic and industrial waste	4.0	1.2	0.34	1.72	83	AS
24	Construct toilets and lavatories at the offices, libraries, hostels, refectories and parks to curb indiscriminate defecation and urinating	4.3	1.3	0.50	1.72	83	AS
25	Provide sanitary landfills for disposing refuse where it will not create nuisance or pollution	3.5	1.1	0.34	1.72	83	AS
26	Provide incinerators to convert waste from solid, liquid or gaseous through combustion to gases.	3.5	1.2	0.40	1.72	83	AS
27	Provide compositing sites for the decomposition of organic waste matters for agriculture.	3.6	1.2	0.38	1.72	83	AS
28	Install waste recycle machine to convert waste to wealth.	2.8	1.2	0.25	1.72	83	NAS

	Sanitation Chemicals (Cleaning Agents And Disinfectant)						
29	Supply hydrogen peroxide as anti septic and bleaching agent	3.7	1.2	0.36	1.72	83	AS
30	Provide lavender oil for insect repellent and toilet cleaner	3.8	1.3	0.34	1.72	83	AS
31	Make lemon oil available as insect inhibitor	3.6	1.2	0.43	1.72	83	AS
32	Mentholated spirits supplied to be used as disinfectant and bacteria killer	3.7	1.2	0.40	1.72	83	AS
33	Tea with tannins should be used for cleaning aluminum and inhibiting insects	3.5	1.0	0.36	1.72	83	AS
34	Soap supplied for general cleaning and as antiseptic	3.8	1.2	0.34	1.72	83	AS
35	Izal should be provided for use as disinfectant	3.6	1.1	0.32	1.72	83	AS
36	Dittol be supplied as disinfectant	3.5	1.2	0.36	1.72	83	AS
37	Powdered soap supplied for washing	3.7	1.2	0.31	1.72	83	AS
38	Penetrating oil for stopping corrosion and serve as insect inhibitor	3.8	1.1	0.34	1.72	83	AS
	Sanitation Management Strategies						
39	Carry out on regular bases education of staff/students on good sanitation practices for healthy living	3.8	1.2	0.45	1.72	83	AS
40	Deploy adequate sanitation employees with proper supervision to carry out their duties with the right sanitation facilities	3.6	1.3	0.50	1.72	83	AS
41	Carry out regular maintenance of sanitation infrastructure	4.0	1.2	0.39	1.72	83	AS
42	Set up sanitary inspectors to supervise sanitation work and situation of the environment	3.9	1.1	0.60	1.72	83	AS
43	Providing water regularly to all sanitation infrastructure for hygienic environment	3.7	1.2	0.39	1.72	83	AS
44	Programming all the staff/students to be involved in sanitation work for clean environment	3.8	1.3	0.48	1.72	83	AS
45	Ensure regular collection and disposal of waste from various location	3.7	1.1	0.53	1.72	83	AS
46	Make adequate budgetary provision/ funding of sanitation work in the schools	3.6	1.2	0.48	1.72	83	AS

Key – X – mean, SD – Standard Deviation t – calculated value, t – tab – t – table value, As- Adequate Strategy and NAS – Not Adequate Strategy

The result of the table showed mean range of 3.5 – 4.3 this mean range is above the minimum 3.50 agreed as adequate strategy to sanitation infrastructure needed for healthy state tertiary education institution. However, an item with mean of 2.8 showed that it is not an adequate sanitation strategy. The table equally indicated the standard deviation range of 1.0-1.3. This range showed uniformity in the responses of the respondents and that the mean is not far from each other. The outcome of the hypothesis tested at <0.05 level of significance at the degree of freedom of 83 indicated that all the calculated t-value is lower than the t-table value. This showed that there was no significant difference in the mean ratings of the respondents on sanitation infrastructure and management adequacy as strategy to healthy tertiary education institutions.

Discussion of findings

The finding of the study showed that all the sanitation tools and containers serve as sanitation infrastructure and management adequacy as strategies to healthy tertiary education institution. This is in line with Lush and Fleming

(2006) submission that strategy to speed cleaning will be efficient and possible with correct/adequate sanitation tools and containers. Another outcome of the study showed that machines and equipment will serve as sanitation infrastructure and management adequacy to healthy tertiary institutions. This corroborated to studies by Nwocha (2008) that successful waste management, collection and disposal will depend on proper funding, enough infrastructural facilities like trucks and other earth work equipment with adequate maintenance and a well supervised staff. The finding of study equally revealed that the sanitation structures that are well maintained will serve as sanitation infrastructure and management adequacy to healthy tertiary education institutions. This tallied with Ezeji and Onoh (2008) and Jinadu in Okparaeke (2013) submissions that the provision of structures will institutionalize the era of clean and sustainable environment in our localities. However an item with the mean of 2.8 showed that the said structure will not serve as sanitation infrastructure and management adequacy to healthy tertiary education institutions. This rejection could be based on the fact that waste recycling facilities could be very expensive for tertiary education institution to install, operate and maintain. The study more so indicated that sanitation chemicals will serve as sanitation infrastructure and management adequacy to healthy tertiary education institutions. This finding complied with Lush and Fleming (2006) and Eke-Nwosu (1978) presentations that waste will be less harmful and bacteria problem minimized when cleaning agents and disinfectant are used for sanitation purposes. Finally, the finding indicated that all the sanitation management strategies will serve as sanitation infrastructure and management adequacy to healthy tertiary education institutions. This agreed with the directive of Ezeji and Onoh (2008) that effective management system will upgrade the level of sanitation in the society.

Conclusion

Since tertiary education institutions are centers of human development where cultural values, knowledge and skills are transmitted; good sanitation practices should be impacted to the students/staff through practical demonstration of clean and sustainable built environment. The schools should therefore achieve the set goals of hygiene through sanitation education, good healthy living habits, functional sanitation department, provision of adequate sanitation infrastructural facilities, regular maintenance of sanitation infrastructure and above all well supervised sanitation activities. If educational institutions at various levels can adopt well equipped sanitation programmes their environment will be healthy, conducive for learning and centre of excellence with continuity transcending to healthy built environmental sustainability.

Recommendations

1. Tertiary institutions should strive to install waste recycle machines to convert waste wealth for sustainable built environment.

2. Neat educational environment should be ensured by making available adequate sanitation tools and containers for the regular clean up of the institutions.

3. Sanitation operations should be made efficient through mechanization of using trucks, pay loaders, mowing machines and other equipment.

4. Educational institutions should make available adequate/well maintained toilets/lavatories with regular water supplied at strategic locations like offices, class rooms, libraries, laboratories, sporting complex, parks, hostels and others for sustainable built environment.

5. Sanitation chemicals such as cleaning agents and disinfectants should be supplied and be put into use regularly to reduce bacteria/infections for healthy and sustainable built environment.

6. A well supervised adequate man power should be provided for sanitation work in the tertiary institutions to maintain good health and sustainable built environment.

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