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Article

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Environmental Sanitation Practices in Osogbo, Nigeria: An Assessment of Residents' Sprucing-Up of Their Living Environment

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Abstract: This paper examined residents' environmental sanitation practices across different residential zones of Osogbo, Nigeria. The stratified residential zones are the traditional zone, the transition zone and the sub-urban zone. A total of 194 residents were selected for survey using systematically sampling technique. The study revealed that residents' socio-economic characteristics varied significantly with different residential zones. Findings revealed that there is low level of access to environmental sanitation facilities across the residential zones. Similarly, the proportion of residents with environmental sanitation facilities in their homes was low. The study established poor environmental sanitation practices among the residents in terms of utilization of available amenities across the residential zones. It recommended the provision of environmental sanitation facilities in homes by residents and communal provision of facilities by government and Community Based Organizations (CBOs), environmental education and also the enforcement of environmental regulations in the city and others with similar setting.

Keywords: environment, environmental sanitation, practices, residents' Osogbo, Africa

JEL codes: D19, K32

1. Introduction

All over the world, poor environmental quality is increasingly recognized as a major threat to social and economic development and even to human survival. (Acheampong, 2010; UNICEF, 2007; UNICEF, 2006 WHO, 2005). The impacts of environmental deterioration are severe on developing

countries thus hindering and undermining their development (Bello, 2007; Mmon, 2003). The living environment is well polluted owing to social misdemeanor of indiscriminate littering, improper domestic wastewater discharge, and poor sewage disposal. These behaviours promote unsanitary living conditions which result in the breeding of communicable diseases (Adimekwe, 2013; WHO and UNICEF 2008; IRC, 2006).

Poor environmental sanitation practices exhibited in the disposal of solid waste, wastewater and excreta, cleaning of drainage including personal, household and community hygiene significantly contribute to infant and child mortality (Mmon and Mmon, 2011; UNICEF, 2007; Amadi and Iwuala, 2005; WHO, 2005; UNICEF, 1999; EHP, 1999). This is contrary to the notion of environmental sanitation which aims at developing and maintaining a clean, safe and pleasant physical environment in all human settlements (IRC, 2006; FRN, 2005). Environmental sanitation comprises the disposal and treatment of human excreta, solid waste and wastewater, control of disease vectors, and provision of washing facilities for personal and domestic hygiene which work together to form a hygienic environment (Schertenleib et al, 2005).

Improved environmental condition affects positively a wide range of development indicators. Thus, environmental sanitation is a channel to improved quality of life of the individuals and a contributor to their social, economic and physical development (Olowoporoku, 2013). Numerous studies have shown that the incidence of many diseases is reduced when people have access to, and make regular use of adequate sanitary installations (Aremu, 2012; Mohammed 2011; Mmon and Mmon 2011; Nwankwo, 2011; Luthi, 2012; Acheampong, 2010; FMHE 2009; Harvey, 2008; WHO and UNICEF, 2008; Amadi and Iwuala, 2005; FRN, 2005; WHO, 2005; Mensah, 2002). It has been documented that about 24% of global diseases with high mortality ratio is caused by environmental exposures which can be averted (WHO, 2006). Nevertheless, most of these deaths are preventable through adequate environmental sanitation practices.

Environmental sanitation practices refer to residents' involvement in provision, utilization, and maintenance of environmental sanitation facilities and services and adherence to environmental legislation (Daramola, 2015). In Nigeria, adequate environmental sanitation practices have not been ensured. They are characterized by lack of basic amenities and poor sanitation habits (Ademiluyi and Odugbesan 2008; Afon, 2006). General access to environmental sanitation facilities and services by citizens remains very poor (Akpabio, 2012). Nigerian cities are characterized by rapid population growth which is not accompanied by a corresponding increase

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in the delivery of environmental sanitation facilities and services capable of enhancing environmental sanitation practices. The resultant effects of these are unsanitary and unhealthy environmental conditions that are prevalent in Nigerian urban centres (Daramola, 2012).

From the foregoing, it is evident that provision of adequate environmental sanitation facilities and services could at best be referred to as means to an end. The attitude and behavioural practices of the stakeholders determine the end (Bello, 2007). In order to achieve proper environmental sanitation practices, good sanitation behaviour and availability of facilities and services must work in unison (Mmom and Mmom, 2011; IRC, 2006; World Bank, 2002). As it is in other environmental management activities, environmental sanitation practices are influenced by various factors (Willuweit 2009; Owens, Dickerson and Macintos, 2000; Owoeye and Adedeji, 2003; Vicente and Reis, 2008). These include social, economic and demographic attributes, such as age, income, gender, education, household structure; situational conditions. Others include level of information, religious participation, enabling law and place of residence.

Issues related to environmental sanitation practices have been explored by many researchers. For instance, there are studies on environmental sanitation as an exercise (Adejumo, 2013; Afon and Faniran 2013; Aluko and Agbola 2007; Nwachukwu 2008), health effects of environmental sanitation (Mmon and Mmon, 2011; Harvey, 2008), community participation in environmental sanitation (Ekong, 2013; Daramola, 2012; Luithi 2012; UNEP, 2005), environmental sanitation management (Acheampong, 2010) and environmental sanitation education (Anijah et al, 2013; Aremu, 2012). These studies have focused on issues pertaining to provision and deficiencies of facilities and services as well as legislation. Studies on environmental sanitation habits are quantitatively unimpressive, especially in Africa.

Adequate environmental sanitation practices are more than just an inconvenience. It allows users knowledge and experience to the design and management of facilities and services and to increase the likelihood that the services will be used sustainably. The aim of this paper is to examine residents' environmental sanitation practices in Osogbo. In achieving this, it assessed the socioeconomic characteristics of residents of Osogbo; the availability of environmental sanitation facilities and services and also residents' environmental sanitation practices across the residential zones in the study area.

2. The Study Area

The study area is Osogbo, the capital of Osun State, located in south-western part of Nigeria. Osogbo in 2006 had a population of 287,156 (Federal Government of Nigeria, 2007). This city is mainly covered by two Local Government Areas (LGAs) – Osogbo and Olorunda and the two contains 26 political wards delineated for electoral purposes. As common to most typical traditional African cities, three homogeneous residential zones are identified in Osogbo. These are the core, the transition and the sub-urban. The level of development in the residential zones varies with the different historical period's common in African countries: pre-colonial, colonial and post-colonial.

Each of these zones is observed to be internally homogeneous in terms of physical characteristics, socio-economic status and availability of environmental amenities. The core, transition and sub-urban are respectively associated with high, medium and low residential areas respectively. Pre-colonial development in any African city with long historical origin is attributed to the traditional town centre or core of the city which is predominantly occupied by indigenes. Residential buildings in this zone are closely built together and connected to one another with foot paths in a serpentine manner. The houses are mainly of traditional courtyard system and Brazilian type (popularly called face-me-I-face-you in Nigeria). The zone is usually devoid of adequate environmental amenities.

The transition residential zone features house types such as flats and face-me-I-face-you which are mostly characterized with road accessibility and better provision of environmental amenities. The presence of heterogeneity of residents is introduced in this zone as well as improved socio-economic characteristics. The sub-urban residential zone is characterized with well layout plans. The ethnic composition is also heterogeneous and the residents mostly engage in white collar job. The building types comprised mainly flats and duplexes with small private open spaces. Also, the zone is of better provision environmental amenities compared with the other two zones.

3. Methodology

The 26 political wards in the city of Osogbo were stratified into residential zones. This stratification comprised seven wards in the traditional zone, ten wards in the transitional zone and nine wards in the sub-urban zone. Due to homogeneity of residential zone, one ward was selected in each of the residential zones. In the three selected wards, every 10th residential building was sampled sequel

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to enumeration of buildings based on street numbering system and the counting of building where buildings were not numbered, especially in the traditional residential areas. In each selected building, the focus was on any adult from age 18 years and above. The benchmark of 18 years is premised on the age as a point of legal transition into adulthood. The benchmark has been used in previous Nigerian studies such as Daramola (2015). Thus, a total of 194 residents were selected from the 194 selected buildings on which questionnaires were administered. Thus, the sample comprised 67 respondents in the traditional zone, 65 respondents in transition zone and 62 respondents in the sub-urban zone.

Data collected through the questionnaire survey were socioeconomic attributes of the residents and those pertaining to environmental sanitation practices and availability of environmental sanitation facilities. Analysis of the data was done using cross tabulation and Analysis of Variance (ANOVA).

4. Research Findings

This section discusses the profile of the respondents, the available environmental sanitation facilities based on residential characteristics, and environmental sanitation practices in the study area.

Profile of the Respondents

The profile of the respondents discussed is age, gender, educational attainment, marital status, income status and household size, all these in relation to their residential zones (places of residence). Findings revealed representation of the two categories of gender across the residential zones. In all, 35.6% were male while 64.4% were female. Impliedly, the females who were traditionally saddled with the responsibility of handling environmental sanitation and with greater sensitivity towards environmental issues were fully involved in the study. Age is expected to play a significant role as maturity could affect level of environmental awareness. Schultz et al, (2005) and Mayer and Frantz (2004) opined that the higher one's age, the more the person is concerned about the environment. This implies that older residents are expected to be more environmentally conscious than the younger counterparts. The age of the respondents was grouped into four: teenagers (those with less than 20 years); young adults (21 to 39 years); elderly adults (40 to 59

years) and old people 60 years and above). Across the residential zones, majority of the residents (90.2%) were adults (21 to 59 years), 7.7% were teenagers and 2.1% were old people (60 years and above). Further findings on age revealed that the average age of respondents for traditional, transition and sub-urban residential zones were 34years, 37years and 34years respectively. The overall mean age was 35years. This indicates that respondents were of age that could make them environmentally-concerned and thereby appreciate the essence of adequate environmental sanitation practices.

Educational level plays a significant role in environmental awareness. Studies such as Olofsson and Öhman (2006), Theodori and Luloff (2002) and Fransson and Gärling (1999) opined that educated people are more concerned about the environment and place more emphasis on preserving the environment. Findings on residents' educational qualifications across the residential zones of Osogbo revealed that 40.3%, 44.8% and 14.9% of the residents in the traditional zone had primary, secondary and tertiary education respectively. In the transition zone, it changed to 17.0% for primary education holders and 41.5% in each case for holders of secondary and tertiary education. There was improved level of education in the sub-urban. In this zone, 6.5% of the residents had primary education, 30.6% had secondary education while 62.9% had tertiary education. Further findings revealed that the average number of years spent in school computed for the core, transition and sub-urban stood at 11years, 12years and 13years respectively. This indicates that number of years spent in school increases as distance increases from the core to the sub-urban area of the city. This is further established by ANOVA results ($F=4.99$; $p < 0.00$) which indicated that educational attainment varied significantly with residential zones. This variation is important as it would assist in revealing and explaining environmental sanitation activities embarked upon by residents across the three different residential zones of Osogbo.

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Table 1. Residents' Socio-economic Characteristics

Attribute	Core	Transition	Sub-urban	Total
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Gender				
Male	22 (32.8%)	27 (41.4%)	20 (32.2%)	69 (35.6%)
Female	45 (67.2%)	38 (58.6%)	42 (67.8%)	125 (64.4%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Age				
<20	6 (9.0%)	6 (9.2%)	3 (4.8%)	15 (7.7%)
21-39	39 (58.2%)	32 (49.2%)	39 (62.9%)	110 (56.7%)
40-59	20 (29.9%)	25 (38.5%)	20 (32.3%)	65 (33.5%)
≥60	2 (2.9%)	2 (3.1%)	0 (0.0%)	4 (2.1%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Educational Status				
Primary	27 (40.3%)	11 (17.0%)	4 (6.5%)	42 (21.6%)
Secondary	30 (44.8%)	27 (41.5%)	19 (30.6%)	76 (39.2%)
Tertiary	10 (14.9%)	27 (41.5%)	39 (62.9%)	76 (39.2%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Marital Status				
Single	22 (32.8%)	13 (20.0%)	17 (27.4%)	52 (26.8%)
Married	45 (67.2%)	52 (80.0%)	45 (72.6%)	142 (73.2%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Income Status				
≤₦20,000	36 (53.7%)	36 (55.4%)	11 (17.7%)	83 (42.8%)
₦21,000- ₦60,000	30 (44.8%)	20 (30.8%)	31 (50.0%)	81 (41.8%)
≥₦61,000	1 (1.5%)	9 (13.8%)	20 (32.3%)	30 (15.4%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Household Size				
1 – 5	35 (52.2%)	43 (66.2%)	47 (75.8%)	125 (64.4%)
6 – 10	30 (44.8%)	22 (33.8%)	15 (24.2%)	67 (34.6%)
Above 10	2 (3.0%)	0 (0.0%)	0 (0.0%)	2 (1.0%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)

Source: Authors' own elaboration.

Findings from the study also revealed that majority of the respondents (73.2%) were married. The case was sinister across the residential zones. Closely related to residents' marital and education status is their income level. For easy analysis, the initial quantitative data on residents' average monthly income were grouped into three: low, medium and high. Incomes below ₦20,000 were categorized as low income. This is based on the prevailing Civil Service Salary Scale in the country.

The minimum wage at the federal level in Nigeria is ₦18,000 while it ranges from ₦15,000 to ₦20,000 in the states of the federation. The medium monthly incomes were categorized as from ₦20,000 to ₦60,000 while residents earning above ₦60,000 were categorized as high income earners. Based on this categorization, variation in income classes existed across the three residential zones. Further findings revealed that the average monthly income computed for the core, transition and sub-urban stood at ₦24,890.00, ₦36,215.00 and ₦47,745.00 respectively while the overall mean monthly income was ₦28,746. These results revealed that income distribution varied significantly with residential areas and it increased with increase in distance from the traditional zone to the peripheral zone. The results are similar to those of some earlier studies carried out in other traditional African cities such as Ogbomoso (Afon, 2005) and Ibadan (Daramola, 2015; Afron and Faniran, 2013) where conclusions were made that residents' income increased as distance increased from the core to the periphery of the cities. Indeed, studies have shown that those who have high income are willing to support programs that enhance the quality of the environment than those in with low income group (WHO 2011).

Another identifiable factor in environmental sanitation practices is household size. A household was defined as a person or group of people with shared cooking and living arrangements. Thus, household size was measured by the number of people living together with common eating arrangement. Based on this, the household size of the residents was categorized into three. The household sizes of one to five members were categorized as small, those with six to ten members as medium while those with more than ten members was categorized as large. Findings revealed that majority of the families in Osogbo (64.4%) had less than six household members. However, the average household size computed for the traditional, transitional and sub-urban zone was six persons, five persons and four persons respectively. This results show that household sizes vary significantly with residential areas and it increases as distances increases from the core. The ANOVA results ($F=5.34$; $p < 0.00$) indicates that household size varied significantly with residential zone. One important fact to note is that multi-habitation is a character of residential buildings in the traditional zone as such there might be shared environmental sanitation facilities in their houses thus exerting pressure on available environmental sanitation facilities. This likelihood long ago expressed by Onibokun (1985) still holds in the traditional areas of African cities.

Respondent's Access to Environmental Sanitation Facilities

Information on residents' access to environmental sanitation facilities across the residential zones is presented in Table 2. It is also imperative to consider the environmental sanitation facilities available to residents. This is necessary because availability of facilities may influence resident's environmental sanitation practices. Starting with availability of water in residents' homes, findings revealed that 87.6% of the residents had water in their homes while 12.4% did not have water in their homes. This overall percentage in the study area is, however, less than the proportion of residents with water supply in the transition zone (90.3%) and sub-urban zone (90.8%) but greater than that of the traditional zone (76.1%). Findings on water sources revealed that 38.8%, 24.6% and 21.0% of residents in the core, transition and sub-urban residential areas respectively has access to tap water. However, availability of tap water decreases as distance increases from the core to the sub-urban. The low level of access to tap water outside the core area could be attributed to their latter development. As opined by Daramola (2012), demographic and spatial growths of Nigerian cities are not with commensurate increase in provision of environmental amenities. Thus, core areas are benefitting more than others in supply of pipe-borne water. As a result of this, other predominant sources in the study area are hand-dug well (43.3%) and bore hole (25.3%). This revealed that almost half of the residents with access to water from well (43.3%) might not have access to adequate water availability.

Table 2. Residents' Access to Environmental Sanitation Facilities

Facilities	Core	Transition	Sub-urban	Total
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Availability of Water				
Yes	51 (76.1%)	59 (90.8%)	60 (96.8%)	170 (87.6%)
No	16 (23.9%)	6 (9.2%)	2 (3.2%)	24 (12.4%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Source of Water Supply				
Tap water	26 (38.8%)	16 (24.6%)	13 (21.0%)	55 (28.3%)
Well water	24 (35.8%)	31 (47.7%)	29 (46.8%)	84 (43.3%)
Borehole	16 (23.9%)	14 (21.5%)	19 (30.6%)	49 (25.3%)
Water Vendor	1 (1.5%)	4 (6.2%)	1 (1.6%)	6 (3.1%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Availability of Toilets				
Yes	44 (65.7%)	46 (70.8%)	57 (91.9%)	147 (75.8%)
No	23 (34.3%)	19 (29.2%)	5 (8.1%)	47 (24.2%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Type of Toilet Used				
Flush Toilet	17 (38.6%)	33 (71.7%)	50 (87.7%)	100 (68.0%)
VIP Toilet	11 (25.0%)	8 (17.4%)	5 (8.8%)	24 (16.3%)
Pit Latrine	16 (36.4%)	5 (10.9%)	2 (3.5%)	23 (15.7%)
Total	*44 (100.0%)	*46 (100.0%)	*57 (100.0%)	*147 (100.0%)
Availability of Drains				
Yes	54 (80.6%)	53 (81.5%)	56 (90.3%)	163 (84.0%)
No	13 (19.4%)	12 (18.5%)	6 (9.7%)	31 (16.0%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Type of Drains				
Piped Drain	2 (3.7%)	5 (9.4%)	5 (8.9%)	12 (7.4%)
Covered Drain	9 (16.7%)	9 (17.0%)	13 (23.2%)	31 (19.0%)
Open Drain	43 (79.6%)	39 (73.6%)	38 (67.9%)	120 (73.6%)
Total	*54 (100.0%)	*53 (100.0%)	*56 (100.0%)	*163 (100.0%)

*These were less than number of questionnaires administered because some residents did not have such facilities in their homes

Source: Authors' own elaboration.

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Investigation into availability of toilets revealed that 75.8% of respondents in Osogbo have toilets in their homes. The proportion of respondent with flush toilet decreases as distance decreases from the peripheral zone to the traditional zone while the proportion of pit and VIP latrine decreases as distance increases from the core to the periphery. Findings on availability of drains in respondents' homes revealed that 84.0% of the respondents had drains in their houses, although the rate of availability of drains varied with residential area. Also, 73.6% of the drains in the study area were open drains with little variation pertaining to this across residential zones in the study area.

Residents' Environmental Sanitation Practices

Sequels to the findings on residents' access to environmental sanitation facilities, findings were also made on residents' environmental sanitation practices in the study area (see Table 3). Findings revealed that 90.2% of the residents had waste storage facilities in their homes. In other words, majority of the residents had designated containers for dumping solid wastes in their homes. Further investigation revealed that respondents in the core, transition and sub-urban who used containers with lid were 32.8%, 36.8% and 24.6% respectively while the proportion of respondents using container without lid to store waste in the core, transition and sub urban stood at 27.9%, 21.1% and 33.3% respectively. Other prominent waste storage facilities in respondents' homes were polythene bags and baskets. These were used by 28.5% and 12.6% of the respondents in the study area.

Table 3. Residents' Environmental Sanitation Practices

Practices	Core	Transition	Sub-urban	Total
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Availability of Waste Storage Facilities				
Yes	61 (91.0%)	57 (87.7%)	57 (91.9%)	175 (90.2%)
No	6 (9.0%)	8 (12.3%)	5 (3.2%)	19 (9.8%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Type of Waste Storage Facility				
Container with lid	20 (32.8%)	21 (36.8%)	14 (24.6%)	55 (31.4%)
Container without lid	17 (27.9%)	12 (21.1%)	19 (33.3%)	48 (27.5%)
Polythene bag	18 (29.5%)	16 (28.1%)	16 (28.1%)	50 (28.5%)
Basket	6 (9.8%)	8 (14.0%)	8 (14.0%)	22 (12.6%)
Total	*61 (100.0%)	*57 (100.0%)	*57 (100.0%)	*175 (100.0%)
Residents Waste Disposal Methods				
House to house collection	32 (35.6%)	17 (21.0%)	29 (37.2%)	78 (31.3%)
Burning	15 (16.7%)	20 (24.7%)	22 (28.2%)	57 (22.9%)
Dumping on dump sites	35 (38.8%)	29 (35.8%)	14 (17.9%)	78 (31.3%)
Others	8 (8.9%)	15 (18.5%)	13 (16.7%)	36 (14.5%)
Total	**90 (100.0%)	**81 (100.0%)	**78 (100.0%)	**249 (100.0%)
Average Litres of Water Used Daily				
1 – 100	49 (73.1%)	43 (66.2%)	29 (46.8%)	121 (62.4%)
101 – 200	14 (20.9%)	16 (24.6%)	17 (27.4%)	47 (24.2%)
Above 200	4 (6.0%)	6 (9.2%)	16 (25.8%)	26 (13.4%)
Total	67 (100.0%)	65 (100.0%)	62 (100.0%)	194 (100.0%)
Cleaning of Drains				
Daily	1 (1.9%)	7 (13.2%)	14 (25.0%)	22 (13.5%)
Weekly	10 (18.5%)	14 (26.4%)	21 (37.5%)	45 (27.6%)
Monthly	21 (38.9%)	23 (43.4%)	16 (28.6%)	60 (36.8%)
Every 6 months	22 (40.7%)	9 (17.0%)	5 (8.9%)	36 (22.1%)
Total	*54 (100.0%)	*53 (100.0%)	*56 (100.0%)	*163 (100.0%)

*These were less than number of questionnaires administered because some residents did not have such facilities in their homes

**This exceeded the number of questionnaires administered because residents identified more than one source

Source: Authors' own elaboration.

Information on waste disposal methods as put by the residents is also presented in Table 3. The common waste disposal methods in the study area were house to house collection, burning, dumping on dumpsite and others (dump in a pit and dump in the open). Findings revealed that 35.6%, 21.0% and 37.2% of the respondents in the core, transition and sub-urban engage in house

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to house collection of waste. This implies that the residents engage the services of waste disposal agencies. From the investigation, the proportion of residents who burn waste in the core area was 16.7%, this was 24.7% in the transition area and 28.2% in the peripheral area. This revealed that rate of burning of waste increases as distance increases from the core to the sub-urban. Also, the study revealed that rate of dumping of waste in communal waste disposal sites decreases as distance increases from the core. The pattern of the rate of dumping of waste on dumpsite is further explained as 38.8%, 35.8% and 17.9% of residents in the core, transition and sub-urban residential areas respectively. The high rate of dumping of waste on dumpsites in the traditional and transitional areas can be attributed to the presence of derelict and undeveloped lands which are converted to communal waste dumpsites, within the residential areas of the core and transition areas of Nigerian traditional cities. However, waste dumpsites in the sub-urban areas are usually designated by the government and are usually distant from residential areas. The proportion of residents who engage in other waste disposal methods (dump in pit and dump in open) in the traditional zone was 8.9%, while it was 18.5% in the transition and 16.7% in the sub-urban. Dumping of wastes in pits on open space in the long run constitute temporary/permanent filth nuisances in the residential areas.

As regards findings on daily household water consumption, the initial quantitative data were categorized into three: 1-100 litres, 101-200 litres and 200 litres and above. The Institute Water for Africa (2016) and UN opined that a human being needs 50 litres of water per day in order to prepare meals, have enough for personal hygiene in order to avoid diseases and retain efficiency. Findings revealed that 62.4% of the residents of Osogbo use between 1-100 litres in their household daily, 24.2% use between 101-200 litres of water daily in their homes. The remaining 13.4% of the residents used above 200 litres of water daily in their homes. Findings on the average daily water used in respondents' homes across the residential zones of Osogbo revealed 96 litres in the core, 104.4 litres in the transition and 163.5 litres in the sub-urban area. The overall mean household daily water consumption was 120.4 litres. This is further established by the ANOVA results ($F=12.52$; $p < 0.00$) which indicated that water usage in respondents' homes varies significantly with residential area. This increase in household water usage outside the traditional areas could be attributed to reduced population pressure on sources of water in those areas. The average per capita consumption of water was determined using the average household sizes in each residential zone. It was revealed that the average per capita water consumption in the core area was

16.0 litres, this was 20.8 litres in the transition area and 40.8 litres in the transition area. This revealed that the residents of Osogbo did not consume the benchmark of 50 litres needed to prepare meals, have enough for personal hygiene in order to avoid diseases and retain efficiency as stated by the Institute Water for Africa (2016) and UN.

Closely associated with household water usage are the findings on cleaning of drains across the residential zones of Osogbo. In the traditional area, 1.9%, 18.5%, 38.9% and 40.7% of the residents clean their drains daily, weekly, monthly and every six months respectively; in the transition zone, it changed to 13.2% clean their drains daily, 26.4% weekly, 43.4% monthly and 17.0% bi-yearly. There was improvement in the periodical cleaning of drains in the sub-urban zone. In this zone 25.0% of the residents clean their drains daily, 37.5% clean their drains weekly, 28.6% clean their drains monthly while 8.9% does cleaning of their drains bi-yearly. Further findings revealed that daily and weekly cleaning of drains increases as distance increases from the core area to the sub-urban zone while monthly and bi-yearly cleaning of drains decreases as distance decreases from the periphery to the core. This finding was further established by the ANOVA results ($F=31.40$; $p < 0.00$) which indicated that period of cleaning of drains varies significantly with residential area.

5. Conclusion and Recommendation

This study assessed residents' environmental sanitation practices in Osogbo in relation to their socio-economic characteristics and across the different residential zones of the city.

The findings from the study revealed that relationship exists between residents' environmental sanitation practices and their place of residence. Also, the environmental sanitation practices are reflections of their socio-economic characteristics such as educational attainment, household size, and income but not with age and marital status in the study area. These findings are consistent with the results of some earlier studies (Daramola, 2015; Adejumo, 2013; Daramola, 2012; Hunter et al. 2004; Dunlap et al, 2000; Stern, 2000) which have indicated that there is a significant statistical association between characteristics such as education, income, household size and place of residence and residents' environmental practices. Thus, they could serve as predictors of environmental sanitation practices in the study area.

Specifically, it can be concluded that:

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- place of residence, gender, educational attainment, household size and income can be used to explain variance in residents' environmental sanitation practices in Osogbo;
- there is low level of access to adequate environmental amenities such as pipe-borne water supply, toilets, drains and solid waste disposal services across the residential zones. This level however varied with residential zones in the city. This also indicates also low level of provision of environmental sanitation facilities in residents' homes;
- there is also poor environmental sanitation practices among residents in terms of utilization of the available environmental sanitation facilities. An instance is the disposal of solid waste in a manner that is not environmentally friendly;

Based on these findings, the following are recommended in improving residents' environmental sanitation practices in Osogbo.

- the residents should provide household environmental sanitation facilities while the government and Community Based Organizations (CBOs) should provide community environmental sanitation facilities and services;
- the government should enforce existing environmental sanitation regulations in order to sanction house owners without basic environmental sanitation facilities;
- Pro-environmental sanitation practices depend on effective environmental literacy. Thus, campaign to raise public awareness about environmental sanitation is essential in achieving success in environmental issues. This mind-set reorientation can be achieved through recruitment of trained young men and women who would engage residents one on one especially in the core on the need to be environmentally concerned.
- CBOs, NGOs and government should engage in environmental regulation.

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***Środowiskowe zachowania sanitarne w Osogbo, Nigeria:
ocena wystroju wykonanego przez mieszkańców w ich otoczeniu***

Streszczenie

W niniejszym artykule zbadano środowiskowe zachowania sanitarne mieszkańców różnych stref w Osogbo w Nigerii. Wydzielone strefy mieszkalne to strefy tradycyjna, przejściowa i podmiejska. Wykorzystując systematyczną technikę doboru próby, dokonano wyboru 194 respondentów do badań. Wyniki badań ukazały, że społeczno-gospodarcze warunki mieszkańców różniły się znacznie w zależności od strefy, a ponadto, że we wszystkich strefach występował słaby dostęp do infrastruktury i urządzeń sanitarnych. Podobnie, niski był odsetek mieszkańców posiadających urządzenia sanitarne w swoich domach. Zgodnie z wynikami badań, mieszkańcy w słabym stopniu wykorzystują dostępne urządzenia w ramach środowiskowych zachowań sanitarnych. W artykule przedstawiono rekomendacje dotyczące wyposażenia przez mieszkańców ich gospodarstw domowych w urządzenia sanitarne, a także zapewnienia takich urządzeń komunalnych przez rząd oraz organizacje społecznościowe (ang.: Community Based Organizations, CBOs). Niezbędna jest ponadto edukacja środowiskowa oraz egzekwowanie regulacji środowiskowych.

Słowa kluczowe: środowisko, higiena środowiskowa, zachowania, mieszkańcy Osogbo, Afryka