

SOCIOECONOMIC DYNAMICS AND ENVIRONMENTAL HEALTH OUTCOMES IN INFORMAL SETTLEMENTS OF PORT HARCOURT, NIGERIA

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ABSTRACT

Although many studies have shown strong evidence of a direct relationship between the human environment and health, they have been too generic in nature, concentrating on community patterns and largely ignore the link between environmental health outcomes and specific socioeconomic indices manifesting at the household level. This study, therefore, seeks to understand the interface between household socioeconomic indices and the urban environment in six informal coastal settlements of Port Harcourt Nigeria. It further examined how these interactions affect environmental health. It questions the extant belief that living in a deprived neighbourhood is bad for one's health, hence the focus on the households level. Issues examined include housing and environmental conditions like sources of water, sanitation methods, drainage conditions and quality of toilet and kitchen facilities as well as socio-economic characteristics such as age, gender, income and household size. Health seeking behaviour and recent self-reported illnesses associated with poor environmental conditions were also considered. Data collection was by mixed methods integrating simple random sampling on household heads as well as focus group discussion with community leaders in Andoni, Bundu, Captain Amangala, Emenike, Marine Base and Rex Lawson communities respectively. Data analysis was by simple descriptive statistics as well as chi square test of relationships.

Major results show that even though environmental and housing conditions across the selected communities were in deplorable conditions, socio-economic status, especially educational level of the household head, had a significant influence on health seeking behaviour. Furthermore, sanitation related diseases (diarrhoea, typhoid and cholera) were the most prevalent, directly attributable to the poor environmental conditions. The study concludes by advocating for community driven urban renewal efforts aimed at improving access to urban basic services including education and health infrastructure. It further advocates for an interface of the formal-informal governance structures in order to find a mutually beneficial solution to the hitherto almost neglected people of the informal squatter waterfront settlements of Port Harcourt waterside communities.

Keywords Environmental health, informal settlements, prevalent diseases, Port Harcourt, socio-economic

1. INTRODUCTION

Urban agglomeration in Africa is typified by the urbanization of poverty. The African Union (2003) has described this process as resulting in a situation where majority of urban dwellers grapple with widespread unemployment, food insecurities and life under squalid conditions. The 2010 State of African Cities Report estimates that 62% of urban dwellers reside in slums, hence Pieterse (2011), concludes that based on current trends, urban poverty, ill-health and slum urbanism will continue to feature significantly in African city life for at least the next four decades.

Informal settlements (slums and squatter settlements) are the most tangible evidence of pervasive urban poverty, and in Nigerian cities; they range from clusters of shacks in environmentally fragile land areas to entire local government areas. As described by Scalar and Northridge (2003), while their physical forms vary by place and over time, slums are uniformly characterized by inadequate provision of basic infrastructure and public services necessary to sustain health, such as water, sanitation, and drainage. Port Harcourt is the largest and most significant urban centre in the Nigeria's Niger Delta with a population that has grown from 135,000 in 1960 to 1.47 million in 2010 and projected to reach 2.6 million in 2025 (UN-Habitat, 2012). Recognized for its beauty and cleanliness (Archibong, 2004), the erstwhile beautiful Garden City has now been taken over by as many as 49 recognized informal settlements (Akujuru, 2008) accounting for 65% of the city's population (Odoemene, 2011). Most of these settlements are located along the many water bodies that traverse the city (Obinna et al, 2010).

Studies on socio-economic differentials and health status in developing countries are many and include the work of Rutstein, 1984; Bicego and Boerma, 1993; Gwatkin et al, 2000 and Woelk and Chikuse, 2000. More recently, studies such as those of Feng & Myles (2004) and Arleen et al (2007) posit that residence in a socio economically deprived neighbourhood have been linked to poorer health outcomes, while others such as Stafford et al. (2003) as well as Wen et al (2003) and Ballesteros (2010) opined that the relationship between neighbourhood status and health cannot be taken to mean that living in a deprived neighbourhood is bad for one's health. According to the Institute of Medicine (2009), health disparities are produced by both environmental factors (i.e. physical, chemical and biological agents to which individuals are exposed) and social forces (i.e. individual and community level characteristics such as socio-economic status, education, psychosocial stress, coping resources and support systems).

Individual and household socio economic status are specifically linked to health outcomes as higher income is associated with more frequent and more intensive use of health services (Castro-Leal et al, 1999), while the human assets of knowledge, literacy, and education also influence household decisions with regard to the proximate determinants of health (World Bank, 2001). In low income communities such as those in Port Harcourt, household statuses are important indicators. This is because socioeconomic dynamics oftentimes determine the vulnerabilities of particular households to environmental health conditions. Although the health of a population is determined by a large number of factors, placing emphasis on individual and household level determinants, such as age, education, marital status, behaviours, health competencies, and SES, is important (Bonita et al. 2006; Ruiz et al , 2011).

Studies on socio-economic status and health in urban settlements in Nigeria include those of Adedoyin and Watt (1989) who investigated urban health conditions in Ilorin slums, Egunjobi and Olatubara (2002) who studied environmental health conditions in traditional communities in Ibadan, Agbola, Nwokoro and Kassim (2007) who analysed housing conditions and health status of urban slums in Ibadan. These studies have all shown strong evidence of a direct relationship between the human environment and health. They however are generic in nature, concentrating on community patterns and largely ignore the link between environmental health outcomes and specific socioeconomic indices manifesting at the household level.

The study therefore seeks to understand how household socioeconomic indices interface with the environment and the consequences of these for health outcomes in six low income settlements of Port Harcourt Nigeria. In the light of all the above, this paper therefore seeks to answer the following questions; what are the socio economic characteristics of the residents of the study area, what are the environmental health conditions in these areas, Is there a land governance framework in the study area and what is the relationships between selected squatter settlements and identified health indicators of the residents in the study area. The study leans on the hypothesis that even though the communities share similar environmental conditions, household level socioeconomic status have a great influence on environmental health outcomes. It outlines the methodology which combines both qualitative and quantitative methods of enquiry including direct observations, empirical survey. It thereafter analyses the data with the use of chi square tests of relationships and concludes by making recommendations for the major issues highlighted.

2. THE CONTEXT OF THE STUDY

Port Harcourt, the capital of Rivers state is the predominant coastal city in Nigeria's south south region. This study is based on the squatter settlements located mainly by the waterside areas in old Port Harcourt. The old Port Harcourt city centre remains the same attractive commercial, trading and administrative centre of the expanding metropolis. According to Theis et al (2009), it is a high level peninsular jutting out into the mangrove swamps along the Bonny River and fringed with low-lying areas by the waterside which have been reclaimed both formally and informally over the years. The communities that live along the coastal areas of Port Harcourt are interchangeably called "waterfront" or "waterside", but while waterfront is a global name for areas of natural beauty, commercial potential and desirability with high value real estate with great investment potential, waterside on the other hand is a term which captures the occupants' marginal character and peripheral location literally and socio-economically. For example, Bundu waterside, Okrika waterside, Marine base etc.

Most of the waterside areas have developed informally and currently occupied by established communities living, in many cases, at very high densities (Theis et al, 2009). A major contributing factor to the growth of these communities is their closeness to the city centre and formal commercial riverside developments and the employment and social service opportunities available there. This unacceptable high densities, their haphazard manner of development and lack of adequate sanitation make them prone to environmental and health hazards. On the basis of water and sanitation alone, and most likely according to the other criteria, the Port Harcourt Waterfront settlement inhabitants are clearly defined as slum dwellers by the UN definition. In terms of topography, these areas are subject to flooding and will increasingly be so with rising sea levels associated with climate change predictions. These communities can then be summarised as having the following characteristics which justify their choice for this study. They surround the city centre peninsular and are located along low-lying reclaimed land, with buildings sitting at water level or less than 4 metres above it. Their major sources of income are fishing and informal income generating opportunities. There exists a high degree of social cohesion, with many communities which allows for close and long-standing kinship ties and heritage. There was community participation in the areas of land reclamation by sand-filling, creating access, sinking boreholes, providing electricity and other basic services. The settlements are characterised by a lack of basic and social infrastructure as well as absence of vehicular access in many parts of the waterside areas. This is a big challenge in the provision of basic urban services such as access to emergency service vehicles and for solid waste removal and disposal.

According to Aprioku (2005), the question of land ownership is controversial as the Rivers state government claims ownership of the Waterfront areas as haven been set aside for the development of the metropolis under the Land Use Decree of 1978. However, the residents have a contrary opinion, with many of their families have resided in these communities over several generations. With the government attempting to implement the Greater Port Harcourt City Master plan which allocated higher end commercial and tourism land use to the area, persistent conflicts between the residents of these waterside communities and the government over this issue has resulted in attempted evictions and violent confrontations.

The research therefore attempts to unravel the effects of tenure status on the environmental conditions and health status of residents in squatter settlements in Port Harcourt as well as determine the influence of land policy and land titling on health and socio-economic activities in solving the underlying problems of urban centers. This is expected to increase knowledge in the fields of city redevelopment and urban planning.

3. RESEARCH METHODOLOGY

The study is essentially an empirical study that required the collection of data on socio-economic characteristics, environmental conditions and the effect of these on the health seeking behaviour and status of the residents of the study area.

Six (6) coastal communities were randomly selected from the 49 identified squatter settlements in the Port Harcourt Metropolis. They are Andoni, Bundu, Captain Amangala, Emenike, Marine Base and Rex Lawson. The sample frame and size were determined based on the average household size of 6.0 in Port Harcourt. A total of 833 questionnaires were administered: Andoni (117), Bundu (235), Captain Amangala (94), Emenike (35), Marine Base (176) and Rex Lawson(176).

The research exercise was ethically carried out as prior approval of the research instrument was sought from the Research and Ethics Committee of the Lagos University Teaching Hospital. Furthermore, respondents participated of their own volition and signed an Informed consent form before the interviews.

Primary data was obtained through questionnaire distribution, direct interviews, focus group discussions and personal observations. Questionnaire was administered on household heads selected through the use of simple random sampling. Variables considered include socio economic variables such as age and educational qualification, environmental conditions such as water and sanitation as well as health seeking behaviour such as accessibility to health facilities and disease profile. Secondary data include medical records of inhabitants sourced from various hospitals to determine the most prevalent diseases. The diseases considered include respiratory, water related, sanitation and malaria. Focus Group Discussions (FGD) were also organized in order to corroborate information from the survey exercise. FGD was mainly to get information on the inter-community interactions, land governance issues and how they were responding to identified sanitation ailments which were identified from the survey results. These issues were ignored by most respondents hence they were made the major issues for discussion at the FGDs.

Relevant maps were generated to locate important flashpoints with the help of GPS. Data analysis was through descriptive as well as chi square tests of relationships to determine associations among socio economic conditions, environmental and housing conditions and the health status of inhabitants in the selected squatter settlements, and to identify major relationships between socio-economic status and health outcomes at the household level.

4. FINDINGS AND DISCUSSIONS

Presentation of research findings covered the major issues examined as well as across the six communities selected for study. These include the household dynamics regarding socio economic conditions, environmental and housing conditions and the health profile of the inhabitants. Furthermore, the results of the chi square tests were used to determine the relationships among these variables

4.1 Socio Economic Conditions of Residents in selected Communities

The six selected communities fall within the areas designated as “waterfront” or “waterside”, otherwise known as squatter or informal settlements. The socio economic variables that were investigated were age, gender, educational qualification, average monthly income, employment status, and housing tenure ship status of household head.

The study revealed a predominantly male population across the communities as shown in Table 1. While 56.3% of the respondents were males, 43.7% were females, with Bundu having the highest proportion of both males and females while Emenike had the least. However, most of the females were said to have gone to their various businesses mostly fishing and trading. Research findings show that most of the population in these communities are made up of mostly people in their highest productive and procreative ages. 43.0% are between 31 and 45 years mostly based in Bundu, while 27.3% of the inhabitants are within the 16 – 30 age range. Collectively these groups make up over 70% of the respondents. The age range of 46 – 60 represents 23% of the entire population, while the elderly aged 61 years and above is made up of only 3.3% of the total number of respondents.

Table 1 further indicates the relative high literacy level in the study area as majority of the respondents' have at least secondary school education (60.4%). These are mainly resident in Bundu, Rex Lawson and Marine base communities. Respondents that have attained tertiary education are made up of 20.1% of the total number, which is almost evenly spread across all the communities. Only 9.9% of the respondents attained primary level, while those that did not have any formal education are represented by 9%.

Table 1: Socio-economic Conditions of Residents compared across Communities, Port Harcourt, 2013

Characteristics		Study Location							
		Emenike	Bundu	Marine Base	Captain Amangala	Rex Lawanson	Andoni		
		%	%	%	%	%	%	%	
Gender	Male	2.8	14.8	12.9	5.4	11.5	8.9	56.3	
	Female	1.8	11.2	9.3	6.5	9.7	5.1	43.7	
Age in Years	16-30	0.7	7.2	7.8	2.5	6.1	2.9	27.3	
	31-45	2.7	11.8	8.0	5.7	8.6	6.3	43.0	
	46-60	1.2	6.6	5.5	3.1	5.9	4.1	26.3	
	61 +	0.0	0.9	0.3	0.5	0.5	1.1	3.3	
	None	0.1	2.5	1.6	1.1	2.7	1.6	9.6	
Level of Education	Primary	0.0	2.7	2.7	0.8	1.1	2.7	9.9	
	Secondary	3.3	16.7	12.8	6.0	13.1	8.5	60.4	
	Tertiary	1.1	4.4	4.7	3.9	4.3	1.9	20.1	
	Public/Civil Servant	0.8	4.0	3.2	2.4	4.1	0.7	15.0	
Occupation of Head of Household	Private Employed	1.2	4.1	2.2	1.6	2.1	1.3	12.5	
	Business	2.2	14.0	11.1	6.2	8.6	8.2	50.3	
	Informal Economy	0.3	1.1	1.5	0.5	1.8	1.3	6.5	
	Unemployed/Retired	0.0	2.1	1.6	0.9	2.8	0.8	8.2	
	Other	0.0	1.3	1.7	0.1	1.8	2.5	7.5	
	N18,000 and below	2.0	8.0	6.7	3.7	5.4	3.7	29.5	
	N18,001- N25,000	1.3	5.9	3.9	3.0	4.7	5.0	23.8	
Average monthly Income monthly in income	N25,001- N40,000	0.8	3.2	3.0	2.2	4.0	1.2	14.4	
	N40,001- N60,000	0.7	4.4	3.5	2.7	5.4	1.0	17.6	
	N60,001 & above	0.2	2.3	2.2	1.0	0.5	1.7	7.9	
	No idea	0.2	2.0	1.8	0.3	0.7	1.8	6.9	
	No of Rooms for Exclusive Household Use	1	2.0	14.5	12.2	4.2	9.9	6.6	49.3
		2	1.5	8.5	6.3	3.2	8.7	6.6	34.8
3-4		0.6	3.1	2.4	4.2	1.5	2.4	14.1	
5 &above		0.4	1.0	0.1	0.1	0.1	0.0	1.8	

Most of the respondents (65%) are self-employed, operating mostly in the informal economic sector as artisans or traders. Only 15% are employed by the government civil service which is not surprising based on the minimum educational requirement for this type of employment. 6.5% represents those involved in the informal activities while 8% are retired which also corresponds with the low % of elderly population.

In analysing the monthly income of respondents, the basic minimum wage of N18,000 (about \$120) in Nigeria was adopted as the threshold level for absolute poverty. Residents that earn less than the monthly minimum wage make up 29.5% of the respondents and are considered as in the absolute poor category. This is significant as almost a third of respondents fall within this socio-economic cadre. On the other hand, 23.8% and 32.0% earn between N18,000 – 25,000 (\$120-180) and N25,001 – 60,000 (\$180-400) respectively. Only 7.9% of the total number of respondents earn over N60,000 (\$400) monthly. These different earning capacities are spread almost evenly across the communities investigated and corroborate both their level of educational attainment and employment status. The study will later attempt to understand how household incomes affect health outcomes. From the fore-going, it can be concluded that these six communities have very similar and striking measures of low socio economic status. However, average household income was varied as 29% fell under the absolute poor category and 8% could be considered as earning average income of over N50,000.

Average household size in the study area was between four and six and information on the number of rooms occupied by each respondents' household, yet another measure of socio economic status was obtained. Across the six communities, about 50% of residents' households share one room, 34.8%, share two rooms while only 15.9% can afford to live in more than two rooms. This corroborates the submission of Theis et al (2009) that an average household size in the slums to be about 5.3 persons per household. With limited evidence, an assumption of an average room occupancy rate of about one room per household, was also allowed. The extent of individual household over-crowding is an important factor which exacerbates public health issues, especially in a scenario which manifested in all the communities where when developments were built to a high density with narrow access ways and little air-spaces between houses.

4.2 Environmental and Housing Conditions of Residents in selected Communities

The environmental factors that were investigated include types of building, drainage facilities, sources of water, waste disposal methods, toilet facilities and kitchen facilities. These are all indicated in table 2 and discussed forthwith.

The major type of building occupied by the respondents is the rooming apartment popularly known in local parlance as “face –me- I -face -you”, referring to many rooms facing each other along a usually very long and dingy corridor. Results show that 47.6% of the respondents live in rooming houses, 25.4% in one room apartments and 24.3% in flats. It had been reported earlier that about 50% of the respondents share single rooms with other members of their households. The implication is that the communities are prone to environmental vulnerabilities associated with overcrowding as several households reside in rooming houses, the predominant building type in the study area. This precarious condition is further enhanced as there are no recreational or incidental open spaces in the communities. Direct observation shows that majority of the respondents use their surrounding open spaces for commercial activities such as snail processing.

The field survey, focus group discussion also corroborate the literature on Port Harcourt environmental fragility such as that of Aprioku (2005) which highlighted poor drainage across the city and the flood-prone nature of the waterside communities.. These waterside communities are especially vulnerable because of their location on the mud flats in addition to facing multiple threats from local, riverine and storm surge flooding which are all likely to increase over time due to current threats from global environmental change. Poor drainage was evident across the study area with 45.5% of respondents having no drainage facilities at all. Although 39.2% have drainage facilities, they were not free flowing as many were full of debris and household wastes.. Only 15.3% of the respondents' environment have good and free flowing drainages. The implication of this is the possible breeding of mosquitoes and other rodents, causative agents for malaria and sanitation illnesses.

As noted by Aprioku in 2005, around 80% of solid waste is dumped into rivers, and /or used as a base for further land reclamation. This was evident in the study area and across the study area, 53.5% considered this a sustainable means of disposing household refuse. The efficiency of this communal dumping is very much in doubt as most of the communities were observed to be experiencing environmental deterioration as different types of refuse were seen scattered all over the place. Refuse burning or burying was practiced by about 26.1% of the respondents, while 17.2% patronise scavengers or cart pushers.

Access to safe sources of water was poor in the communities, typical of many Nigerian cities. Generally water for drinking was from the purchase of sachet water, drawn from questionable sources, while water for bathing and cooking was from the surface wells or boreholes, which were usually donated by community leaders and faith based organizations. However, most of the 49.4% of all respondents who sourced water from boreholes did so by purchasing by the bucketful from the commercial ventures, While 39.0% patronised itinerant water vendors or tankers. Only 8.7% of the respondents have access to public piped borne which was reported to be dry most times.

Toilet facility is one important measure of neighbourhood environmental condition. In the communities investigated it is not surprising that majority of the respondents defecate by the waterside. This is because most of the houses are makeshift stilt houses built on land reclaimed by dumping of refuse and so not very suitable for water closets. Many entrepreneurs in Bundu and Captain Amangala ran commercial toilet facilities that drained directly into the creeks. However, Emenike had a reasonable number of water closet toilets and this may be due to her location at a higher gradient. Pit latrine is another prominent method of toilet facility used by the respondents.

Table 2: Environmental /Housing Conditions of Residents compared across Communities, Port Harcourt, 2013

Characteristics		Emenike	Bundu	Marine Base	Captain Amangala	Rex Lawanson	Andoni	Total
		%	%	%	%	%	%	%
Type of Building	Traditional Compound	0.1	0.9	0.4	0.1	0.4	0.3	2.3
	Rooming House	2.7	13.2	10.4	4.2	9.1	8.0	47.6
	Single R/m	0.4	5.8	5.3	3.5	7.2	3.2	25.4
	Apartment							

Condition of Drainage	Flat	1.1	6.6	5.0	3.9	4.5	3.2	24.3
	Duplex	0.0	0.0	0.1	0.1	0.1	0.0	0.4
	Free	2.6	3.3	2.3	3.3	0.7	3.0	15.3
	Blocked	0.7	4.1	4.8	.9	7.4	3.5	21.3
	Open & Blocked	0.6	2.9	2.7	2.9	6.1	2.7	17.9
	No Drainage	0.6	14.6	10.0	5.2	8.5	6.5	45.4
Garbage Disposal	PSP/Municipal Collection	0.8	0.5	0.0	1.6	0.0	0.3	3.2
	Private Scavenger/Cart Pusher	3.5	2.2	2.4	5.1	2.4	1.6	17.2
	Communal Dump	2.2	17.7	14.8	5.1	7.0	6.7	53.5
	Burning/Burying	1.6	7.3	5.1	2.2	4.8	5.1	26.1
Source of Water	Public Pipe borne water	0.0	1.4	1.7	1.8	1.8	1.8	8.7
	Borehole	3.5	10.9	8.2	7.1	11.3	8.2	49.4
	Surface Well	0.3	1.1	0.1	0.0	0.0	0.0	1.6
	Water Vendor/Tanker	0.7	11.5	10.1	3.5	8.2	5.0	39.0
	Stream/Pond	0.0	0.3	0.3	0.0	0.0	0.3	0.9
Type of Toilet Facilities	Water Closet	50.0	29.7	29.9	39.3	-	-	-
	Pit Latrine	20.6	9.9	12.1	10.1	-	-	-
	Bucket Latrine	-	3.5		1.1	-	-	-
	By the waterside	26.5	43.6	42.0	47.2	-	-	-
Respondent Kitchen	Indoors (Designated Kitchen)	1.2	7.5	7.1	4.6	6.1	5.0	31.5
	(Within living quarters)	0.1	2.1	1.8	1.3	2.7	1.6	9.6
	(Along corridor)	1.9	11.1	7.7	3.8	7.7	4.4	36.7
	Outdoors (Designated Kitchen)	1.3	1.9	2.1	1.5	3.6	2.8	13.2
	(Open Air)	0.3	3.0	1.0	0.9	1.9	1.9	9.0

Expectedly, the kitchen facilities in communities dominated by rooming apartments will be poor and shared. Research findings revealed that 36.7% of the residents interviewed did their cooking indoors, along the corridors of the rooming houses. Accordingly, each resident has its cooking area, beside the door of his own room along the corridor. This portends a lot of fire risks as well as air pollution, hence the study will attempt to understand if there is a relationship between number of rooms per household and prevalence of respiratory illnesses. While 31.5% have indoor designated kitchens, 13.2% have outdoors designated kitchen spaces. This also agrees with the finding of the proportion of residents living in one room apartments. However, 9.0% of the population still cook outdoor in the open air while only 9.6% have kitchens properly located within their flats. It was also discovered that most of the respondents used kerosene stoves for cooking,

while others used charcoal and firewood. Only a marginal few used gas and electricity as sources of energy for cooking. Furthermore, many of the residents powered their electrical appliances from the national grid, though the power supply was not dissimilar to that experienced in the rest of the Metropolis.

From the indices analysed above, it is safe to conclude that the environmental and housing conditions across the selected communities are in very poor condition which is also a reflection of their low socio economic status.

4.3 Health Seeking Behaviour and Disease Profile of the Residents

The aim of the study is to ascertain if the identified socio economic and environmental conditions have any effect on the health of the inhabitants. It is therefore instructive to find out how the residents care for their health and wellbeing and the most prevalent diseases that are associated with these poor conditions.

In terms of patronage of medical facilities, almost half of the respondents visit the patent medical stores or chemists which represents 46.9% of the population as seen in Table 3. The study revealed that among the respondents, 30.4% and 22.6% visit the hospitals and indulge in self-medication respectively. This could be linked to the poor accessibility to primary health care across the communities. Only 14.0% have the primary health care centres located within a walking distance. While 15.2% of the residents have these health facilities located within 1 -2 km, about 22.5% need to travel for over 2km before they can reach the nearest formal health facility. The implication is that in emergency cases, respondents are likely to go to the nearest chemist store for medical care

Table 3: Health Seeking Behaviour and Disease Profile of Residents across Communities, Port Harcourt, 2013

Characteristics		Emenike	Bundu	Marine Base	Capta in Aman gala	Rex Laws on	Ando ni	Total
		%	%	%	%	%	%	%
Medical Service Use	Hospital	2.8	7.4	6.6	4.4	6.1	3.1	30.4
	Patent Medical Store	1.5	12.6	10.5	4.2	10.8	7.3	46.9
	Self-Medication	0.3	6.7	2.9	3.1	4.4	5.3	22.6
	Herbalist/Spiritual houses	0.0	0.0	0.0	0.0	0.1	0.0	0.1
	Walking Distance	0.8	3.0	2.2	4.0	2.0	2.0	14.0
Access To Basic Primary Health Centr	1/2 to 1km	1.2	4.8	4.5	2.8	1.0	0.0	15.2
	2-4km	0.2	1.0	0.7	1.7	5.7	1.8	11.0
	More than 4km	0.3	2.3	0.7	1.2	5.0	2.0	11.5
	Above N10,000	0.0	0.7	0.0	0.0	0.0	0.0	0.7
Health Insurance Beneficiary	Yes	0.1	3.0	0.8	0.8	0.7	0.7	6.0
	No	3.8	21.2	17.0	10.1	17.8	13.1	83.0
Respiratory Disease	Cough & Catarrh	5.5	27.6	16.4	12.9	21.9	15.7	100.0
	Asthma	9.7	29.0	22.6	19.4	6.5	12.9	100.0
Sanitary	Diarrhoea	15.4	34.6	7.7	3.8	11.5	26.9	100.0

Diseases	Typhoid	7.8	30.5	19.8	9.0	19.8	13.2	100.0
	Cholera		45.5	45.5	9.1	-	-	100.0
Others	Malaria	5.1	30.3	18.1	12.6	19.0	15.0	100.0
	Fever and Headache	5.6	27.3	18.2%	12.4	21.3	15.2	100.0
	Heat Rashes and Skin Prob.	11.9	28.6	16.7	9.5	9.5	23.8	100.0
	Burn	13.3	26.7	26.7	13.3	20.0	-	100.0
	Worm	5.9	21.6	24.5	8.8	29.4	9.8	100.0
	Ulcer	6.9	20.7	17.2	12.1	25.9	17.2	100.0

The focus group discussions revealed that some people take advantage of this vulnerability. The case of Marine Base where periodic sessions with itinerant alternative medical practitioners charging consultation fees, diagnosing a myriad of illnesses and selling medicine occurred at the Town Hall is an example. Health insurance is quite novel in Nigeria, hence awareness and importance of this is yet to be understood by most people, so expectedly only 6% are either aware or have registered with the National Health Insurance System (NHIS). These are likely to be the civil servants among the populace.

The disease profile of the residents in the selected communities indicates that most of the diseases investigated are very prominent in Bundu, Marine Base and Rex Lawson (table 3). These are the disease counts for each community as reported by their households in the past one year. Respiratory diseases (cough, catarrh, asthma) collectively show results in Bundu(56.6%), Marine Base (37.0%) and Captain Amangala (32.1%) respectively. Malaria was equally prevalent in Bundu (30.3%), Rex Lawson (19.0%), and Marine Base (18.1%).Fever and headache were most prevalent in Bundu (27.3%), Rex Lawson(21.3%) and Marine Base (18.2%). However, the most prevalent diseases reported in the past one year in all the selected communities are the sanitation related diseases (diarrhoea, typhoid and cholera). Cholera was reported most in Bundu (45.5%) and Marine Base(45.5%). Other sanitation diseases (diarrhoea and typhoid) were also prominent in Bundu(65.1%), Andoni (40.1%) and Rex Lawson (29.5%). Similarly, skin diseases which include skin rashes, eczema and worms were mostly reported in Bundu (55.3%), Marine Base (43.4%) and Rex Lawson (29.5%). This is expected in communities where majority live in rooming houses, with an average household size of 6 living in one crowded room in buildings that do not have enough spaces in between them impeding air circulation. On the other hand, the diseases of the stomach investigated are worms and ulcer. Worms in Rex Lawson (29.4%), Marine Base (24.5%) and Bundu (21.6%) as well as ulcer in Rex Lawson (25.9%), Bundu (20.7%) and Andoni(17.2%) were reported respectively. In conclusion, Bundu had the most reported cases of almost all the diseases, especially, cholera and other sanitary related diseases, followed closely by Rex Lawson and Marine base communities.

It can also be concluded that the most prevalent diseases in all the communities are sanitary related diseases followed by malaria, respiratory diseases and then skin diseases. The reason for the high prevalence of the sanitation diseases is directly attributable to the poor environmental conditions and lack of access to safe sources of water and toilet facilities

4.4 Relationship between household Socio economic characteristics and Environmental Conditions with the Health of the Residents

To further investigate the relationships between socio economic and environmental conditions of the residents with their health status, chi square tests were utilised to ascertain some associations.

First, a group of socio economic variables were tested against the health seeking behaviour of the residents, secondly, some environmental and housing variables were tested against the sanitation related diseases and, lastly some socio economic variables against prevalent diseases. The detailed results are shown in table 4, and discussed below.

The first group of relationships have thrown up some very significant associations at 5% level of significance. The Chi-square test of relationship between the type of medical facility used by respondents and level of education across the communities revealed that the residents' choices of either hospital, patent medical stores, self-medication or medical service is statistically significant at Bundu ($x^2 = 20.809$, P. value = 0.002), Captain Amangala ($x^2 = 22.293$, P. value = 0.001) and Rex Lawson ($x^2 = 26.605$, P. value = 0.002). The next was the test for expenses on medical bills and monthly income of residents across all the communities which revealed the following results in Bundu ($x^2 = 37.975$, P. value = 0.009), Captain Amangala ($x^2 = 35.178$, P. value = 0.019), Rex Lawson ($x^2 = 40.687$, P. value = 0.004) and Andoni ($x^2 = 40.931$, P. value = 0.004). The implication of this is that the amount of income expended on medical bills can be related to the monthly income of residents in these communities. On the other hand the test on the same expenditure on medical bills with level of education showed significant relationships in Rex Lawson ($x^2 = 22.499$, P. value = 0.032), Andoni ($x^2 = 21.772$, P. value = 0.040) and Emenike ($x^2 = 9.602$, P. value = 0.048) communities.

The chi square test of relationship conducted for expenditure on only drugs and monthly income of residents across the communities at 5% level of significance indicated some highly significant relationships in Marine Base ($x^2 = 51.626$, P. value = 0.000), Rex Lawson ($x^2 = 32.712$, P. value = 0.005) and Andon ($x^2 = 42.273$, P. value = 0.003). Similarly, the same test for expenditure on drugs and level of education of respondents showed significant relationships in only Bundu ($x^2 = 33.946$, P. value = 0.001) and Captain Amangala ($x^2 = 26.021$, P. value = 0.011). The last socio economic characteristics tested was level of education with expenditure on mosquito sprays and this was statistical significant only in Captain Amangala ($x^2 = 11.454$, P. value = 0.003).

It can be concluded that household socio economic conditions in most of the communities play an important role in the residents' health seeking behaviour.

Furthermore, Chi-square tests were also utilised to determine if significant relationships existed between environmental and housing conditions and selected diseases investigated, all tests at 5% level of significance. These include cholera with toilet facilities, cholera with drainage facilities, cholera with kitchen conditions and typhoid with sources of water which revealed fairly significant relationships in Bundu ($x^2 = 4.000$, P. value = 0.046), Marine Base ($x^2 = 4.000$, P. value = 0.046), Bundu ($x^2 = 4.000$, P. value = 0.046), and Bundu ($x^2 = 36.229$, P. value = 0.002) respectively. It can thus be deduced that sources of water has a strong relationship with typhoid although significant in only Bundu waterside, and instructively other environmental factors that were tested with cholera also showed some relationships in Bundu. There is no doubt that Bundu waterside needs an urgent intervention in areas of environmental health.

The test of relationship between typhoid fever and kitchen conditions was statistically significant only in Rex Lawson ($x^2 = 12.990$, P. value = 0.043), while that of diarrhoea and toilet condition ($x^2 = 7.000$, P. value = 0.030) as well as diarrhoea and drainage condition ($x^2 = 6.000$, P. value = 0.050) revealed strong relationships in only Andoni waterside.

The next group of chi-square tests carried out to further ascertain relationships all at 5% level of significance between some diseases and certain socio economic variables include household size and respiratory diseases, malaria with drainage conditions and malaria and gender.

The results shown in table 4 are as follows; for household size and respiratory diseases, there were statistically significant relationships in Bundu ($x^2 = 32.702$, P. value = 0.036), Rex Lawson ($x^2 = 43.457$, P. value = 0.001) and Andoni ($x^2 = 54.208$, P. value = 0.000) while that of malaria and drainage conditions also revealed significant relationships in Rex Lawson ($x^2 = 13.881$, P. value = 0.031), Emenike ($x^2 = 13.134$, P. value = 0.041) and Andoni ($x^2 = 20.710$, P. value = 0.002) waterside. However, the test of relationship between malaria and gender was significant only in Rex Lawson ($x^2 = 10.503$, P. value = 0.005).

Table 4: Chi-square Test of Relationships among Socio economic, Environmental Conditions and Health Status of Residents, Port Harcourt, 2013

		Marine Base			Bundu			Captain Amangala			Rex Lawsonson			Andoni			Emenike		
		χ^2	df	P.Valu e	χ^2	df	P.Valu e	χ^2	df	P.Valu e	χ^2	df	P.Valu e	χ^2	df	P.Valu e	χ^2	df	P.Valu e
Socio-economic and Health Factors	MSU * AMInc.	17.053	10	0.073	9.628	10	0.474	15.763	10	0.107	10.019	10	0.439	11.060	10	0.353	9.635	8	0.292
	MSU * LE	7.869	6	0.248	20.809	6	0.002	22.293	6	0.001	25.605	9	0.002	5.469	6	0.485	3.248	4	0.517
	AMEHB * AMInc.	25.563	20	0.181	37.975	20	0.009	35.178	20	0.019	40.687	20	0.004	40.931	20	0.004	14.292	1	0.282
	AMEHB * LE	12.683	12	0.393	16.033	12	0.190	16.547	12	0.167	22.499	12	0.032	21.772	12	0.040	9.602	4	0.048
	AMEHD* AMInc	51.626	15	0.000	31.247	15	0.052	21.113	15	0.174	32.712	15	0.005	42.273	15	0.003	16.393	9	0.059
	AMEHD* LE	9.543	9	0.389	33.946	9	0.001	26.021	9	0.011	6.949	9	.642	20.056	9	0.066	1.800	6	0.937
	AMEMS*AMInc	7.436	5	0.190	8.384	5	0.754	4.259	4	0.372	12.273	5	0.658	2.876	8	0.942	1.200	2	0.549
	AMEMS * LE	1.149	3	0.765	1.737	6	0.942	11.454	2	0.003	5.143	9	0.822	6.840	6	.336	1.600	2	0.449
Environmental /Housing Conditions and Sanitary Diseases	HCC*SW	5.000	2	0.082	4.000	3	0.261	a	a	a	e	e	e	a	a	a	e	e	e
	HCC*TF	5.000	2	0.082	4.000	1	0.046	a	a	a	e	e	e	a	a	a	e	e	e
	HCC*GD	4.000	1	0.046	a	a	a	a	a	a	e	e	e	a	a	a	e	e	e
	HCC*CK	a	a	a	4.000	1	0.046	a	a	a	e	e	e	a	a	a	e	e	e
	HCT*SW	10.192	9	0.335	36.229	15	0.002	1.527	4	0.822	1.218	2	0.544	5.883(a)	6	.436	2.438	2	0.296
	HCT*TF	11.047	6	0.087	11.448	12	0.491	1.911	4	0.752	5.464	6	0.486	9.386	9	0.402	9.286	4	0.054
	HCT*GD	13.441	6	0.037	18.990	9	0.025	1.143	2	0.565	3.333	4	0.504	3.938	2	0.140	6.313	6	0.389
	HCT*CK	19.802	12	0.07	19.802	1	0.071	5.450	8	0.709	12.990	6	0.043	12.984	1	0.370	4.813	4	0.307

	HCD*SW	9.000	4	0.06 1	9.000	4	0.061	a	a	a	0.750	1	0.386	0.467	2	1	0.495	a	a	a
	HCD*TF	1.479	3	0.68 7	1.479	3	0.687	a	a	a	a	a	a	7.000	2		0.030	1.333	1	0.248
	HCD*GD	1.286	2	0.52 6	1.286	2	0.526	a	a	a	a	a	a	6.000	2		0.050	2.000	2	0.368
	HCD*CK	4.371	3	0.22 4	4.371	3	0.224	-	-	-	-	-	-	0.630	1		0.427	1.333	1	0.248
HOH & RD	HCCC*HS	25.983	22	0.25 2	32.702	2	0.036	30.467	2	0.108	43.547	1	0.001	54.280	2		0.000	6.579	1	0.884
	HCA*HS	13.500	12	0.33 4	13.500	1	0.334	6.000	4	0.199	a	a	a	5.250	6		0.512	3.000	2	0.223
Malaria & Socio- enviro nment	HCM*CD	9.127	6	0.16 7	9.127	6	0.167	6.053	6	0.417	13.881	6	0.031	13.134	6		0.041	20.71	6	0.002
	HCM*GENDER	4.629	3	0.20 1	4.629	3	0.201	0.406	2	0.816	10.503	2	0.005	1.623	2		0.444	0.163	2	0.922
	HCM*AGE	13.485	9	0.14 2	13.485	9	0.142	12.363	6	0.054	6.729	6	0.347	3.702	6		0.717	2.771	4	0.597

Summary of findings from the Focus Group Discussions in the various communities show a lot of similarities in land tenure and community governance systems. The most instructive was how organised the communities were and how the informal governance structure was key for any interventions possible. Most of the community leaders were very educated and understood the political issues in Port Harcourt as it affects their development.

Generally, the land tenure system as well as developmental efforts across the communities is communal. Expectedly, the significant occupations of the communities are based on the peculiarities of the communities, For example, majority of the residents in the waterside communities are fishermen so they dominate.

Furthermore, participants said they had no health insurance in place and there is a near absence of government hospital in place across the communities. There is usually low reportage of diseases in questionnaire instruments but this was fairly achieved during the discussions as the health information helped corroborate the most prevalent diseases reported in the survey.

5. CONCLUSIONS AND RECOMMENDATIONS

The main thrust of this work has been to investigate the possible interface between the Socio-economic attributes, human environmental factors and household health outcomes in six low income informal squatter settlements in Portharcourt Nigeria.

It is discovered in this study that the socio-economic attributes of the households and their affecting environmental factors tend to be consequences of the specific health issues observed in the six locations studied in Port Harcourt, Nigeria. The common diseases in the communities which are basically sanitation environmentally driven are cholera, diarrhoea, malaria, respiratory and skin diseases arising possibly from poor environmental conditions and lack of safe water and other sanitation sources in the study area.

It is important to note that the communities share common environmental and socio-economic background and unexpectedly environmental health status, in which case the problem is not space specific but rather generic. The relationships are very much displayed in the various chi-square tests results in the text.

The study calls for a potent and community driven urban renewal efforts, first to improve on the existing air spaces around buildings and by and large to provide access and locations to facilities that could make life better for the hitherto almost neglected people of the informal squatter waterfront settlements in Port Harcourt in Nigeria. This exercise if carried out will also facilitate the issuance of land tenure documents for the inhabitants. This work also provides a good working threshold for the government and non- government agencies who may wish to intercede or collaborate with the people in the study area for a meaningful development agenda.

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