

EVALUATING RESIDENTS DISEASE BURDENS AS PREDICATES OF ENVIRONMENTAL QUALITY IN CALABAR, CROSS RIVER STATE

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Abstract

Abstract

This study emanates from the concern to evaluate human environmental disease from the point of view of physical environmental status and human activity profiles in spartial distribution contest in the city of Calabar, Cross River State Nigeria this research category is an ambit of descriptive epidemiology for the general survey of individual cases of etiology of diseases and then correlating them to their environmental characteristics/qualities. Calabar situates in the subtropical environment with hot solar radiation and correspondingly adequate supply of rainfall. Papodaski et al (1995) have categorized the city as belonging to a per humid ecological zone. Adequate supply of rainfall and high solar receipt, provide a suitable breeding ground for a number disease vectors such as Mosquitoe, tsetse fly, felea, redfly (drosophila) and so on. Human land use occupation has equally contributed in shaping the environmental characteristics over the itinerant economic and geographic landscape. This mosaic of Human environmental images have a lot in store for explanation in environmental epidemiology. The study population is the entire adult residents in Calabar. The study is therefore challenged by the need to evaluate the true perspectives of the disease burden prevalent in the spatial environmental context. To effectively obtain field data information, the questionnaire instrument was administered to respondents to elicit information on their health history. Preceding this was delimitation of the entire city domain on the criteria of "Residents environmental Status" such as "flooded areas", permanently waterlogged" slum/ghetto areas etc. Twelve of such categories were designated. Accordingly, a number diseases such as malaria, dysetry, schistosominsis etc were selected for identification through interview. The data obtained from the field was presented as "Environmental disease matrix of Calabar". The data was analyzed based on the technique of one-way analysis of variance. In line with decision rule, the r_{cal} ratio is greater than the $F_{critical}$ value at Alpha level of 0.05. it was therefore evident that H_0 was rejected, which the " H_1 " was accepted indicating that there is significant variation in the disease burden prevalence rate over the city of Calabar.

Keyword: Single Diseases Burdens, Enviornment Quaility , epidemiological, ecology

Introduction

Disease burden is the physical, social and economic impact of disease infestation on persons and/or individuals. Epidemiological literatures have provided prodigious facts on the relationship between environment and disease prevalence. Three Scholars, Hardoy, Mitlin and Salerthwaile (1992) have worked extensively on the etiology of certain diseases in their digest, "Environmental problems in third world cities" in which they brought out succinct evidences on the co-connection between environment and well-being. They postulated that environmental quality has a direct relationship with individuals psychosocial health.

Different environments procreate different categories of morbidities but it has equally been recognized that no environment is completely devoid of disease.

In the study area Calabar, there are several ecological niches which are correspondingly variegated in their disease prevalence rates. Urban slum areas present a formidable repository for proliferation of different strains of diseases due to the nature of the physical and social milieu of the people.

There are a range of different strains of diseases which have not been sufficiently explored by earlier studies.

Those residing in flood prone zone have their unique category of health incidence distinct from those in noise infested domains.

The high class residential areas equally require discrete investigation particularly with reference to indoor air pollution and incidents of synthetic life styles. Anthropogenic activities of sundry categories have adequate impact in the proliferation of different disease categories. Pollution from industries urban waste generation and management, domestic environmental activities, urban transportation, commercial activities of several categories all have grave implications for disease burden proliferation. This study is therefore focused on identification and evaluation of disease categories in their place contexts.

Statement of the research problem.

Disease burden is a major concern in every society the world over because of its grave economic social and physical implications. Morbidity or disease prevalence in the population presents fervent challenges to its members as it demands expenditure in time, money and emotional dispensation. As it is popularly said, 'Health is Wealth'. Formidable health loss has corresponding wealth devastation.

In the study area, Calabar Nigeria there is seeming dearth of information on the general health status of the population. Biostatistical information is few and far between as reflected in the frequent cases of hospital admission or herbal home visitation by residents both literate and illiterate. The more worrisome side of the scenario derives from the condition of urban, poor some of which occupy marginal/environments in the overcrowded clusters to be late mentioned in the text to this study. These category lack sufficient medical information about their health status and anatomical well being. Very few have the routine of attending hospitals for checkups.

Coupled with this, ecological peculiarities of different environmental niches need evaluation in order to adequately appreciate the prevailing epidemiological conditions inherent there. Overall there is the dire need of the full appreciation of the existing health status of the people for proper decision making towards environmental capacity building.

Objectives of the study

The study is backed by the following specific objectives.

1. Delineation of the city into distinct clusters or areas on the basis of their ecological peculiarities or human activities profile.
2. Identification of endemic diseases in their environmental contexts.
3. Comparison of prevalence incidents in their spatial residential categories.

Research hypothesis

The hypothesis is stated in the null form as follows:

HO: There is no significant difference in the disease prevalence rate over the entire city domain of Nigeria.

Literature Review

General overview

There is a significant relationship between environmental quality and human health status. Several works have been carried out in different cities of the world to establish the veracity of the claim that only a healthy environment can promote good health.

Hardoy et al (1992) have reported that many physical characteristics of the housing and living environment can influence the incidence of and severity of psychosocial disorders through stressors such as noise, overcrowding, in appropriate design, poor sanitation, garbage collection and inadequate maintenance. Three aspects of the physical environment have been recognized as determinant in the people's psychosocial health. These included the dwellers level of satisfaction with the house and its neighborhoods, its location within the urban area, the dwelling overall physical structure and the neighborhood.

In another related report, it was categorically stated that the nature of the built-up environment can influence children health. Further on, that poor physical environment can inhibit or permanently damage the child's mental health (Meyers 1991).

Focusing on socio economic factors, Okonwo and Ibor (2017) have reported that increases of malarial infestation, apart from being primarily associated with environmental factors such as high temperature, rainfall and humidity, can be equally linked to social, cultural, political and economic factors. They held further that poor people are at an increased risk of being infested with malaria and becoming infested more frequently with the disease (FMOH 2004). And also, that child mortality rates are known to be higher in poor homes than the rich. The reason adduced for this situation was that the poor live in houses that offer less protection against Mosquito and less able to afford preventive measures.

Following several studies carried out, air pollution has been implicated as one of the highest urban environmental health problem. Rhaman (2016) reported on the precursors of air pollution in urban areas which he traced primarily to the incidence of high concentration of population in the city locale.

He said this is more applicable to developing countries where environmental regulations are relatively lacking or non-existent. He provided an official account of this episode by reporting that in the year 2004, urban outdoor air pollution is ranked as the 14th global risk factor in mortality. Further, he reported that even in developed countries, populated areas attain unhealthy levels of pollution.

In a further report, it was held that polluted air can cause respiratory irritation or breathing difficulties even for healthy persons.

A similar report by Danditiya (2019) held that exposure to air pollutants is in related to both acute and chronic effects on health. The report further stated that, "Numerous studies worldwide have confirmed that both short term and long term exposure to air pollutants are associated with increased mortality and a number of health effects. Under the aegis of the WHO (2013) the international Agency for research in Cancer was quoted as classifying air pollution as carcinogenous. Grossly, it has been established that environmental air pollutant are the major causes of health burdens and mortality in most cities of the world including Nigeria.

Disease burdens in selected urban activities areas.

Caused by the heterogeneity of its population and cultures, the urban area is hearth of human activity galore or mosaic of economic and geographic space which are characteristically variegated in their ecological niches. Here, attention will be turned to selected activity or ecological niches where certain diseases are prevalent as burdens to the occupants.

1. Urban slum disease spectra/profile.

Slums areas are domains in the urban areas that area characterized by unplanned, unsightly and unhealthy physical and social environment (Okoye 1987). It is an area where urban liveability is at its bearest minimum: A section of the urban areas occupied by the urban poor is with high urban liveability challenges (Ofomata 1974).

Riley et al (2007) in their report in BMS human rights, stated categorically that urban slums, like refugee communities comprise a social cluster that engenders a distinct set of health problems.

This ‘abandoned population,’ as they christened, have become a reservoir of a wide spectrum of health conditions that must be attended to.

The burden and determinants of illnesses in these communities give rise to complications that are chronic and unpreventable.

Ko, Al Reis et al (1999) have in their epidemiological survey of a slum dwelling in Salvador, Brazil, provided an outline of disease burden common to slum dwellers. Some of these include, acute renal failure, leptospirosis transmitted by a spirochete excreted in the Urine, Jaundice and Pulmonary Haemorrhage meningococcal disease etc. Active hospital-based surveillance found that the major risk factor of acquiring heptospirosis manifestation was to be a resident of a favela slum.

A further report has it that over 95% of the stated ailment came from the various favelas slum. In Brazil, the concept of slum is known as favela and the slum concept goes by different names in different places such as, Favela, Kiji, Jochpadpate, Gecekonu, Ghetto, Shanties and so on. Going by the above reports the slum environment presents formidable health challenge to its members and the public as a whole.

Other forms of Environmental diseases investigated in the epidemiological literature.

A variety of earlier works carried out revealed a strong relationship between environment and Etiology of most diseases. Among these earlier works, there is an earlier theory which supports the advocacy of Environment-disease causation postulates. From its original enunciation christened “Theory XYZ” put forward by Von Pelten Koffer (1895), it tends to explain the basis of disease based on the people and environment (Olaniran and Ikpeme 1995).

Along this line, two authors (Arong and Ekpe 2014) in their investigations on “Environmental Factors and the distribution of Urinary schistosomiasis in Cross River State, Nigeria” presented useful findings on the links between certain environmental parameters and the prevalence of the disease. If the parameters explored, their findings revealed a positive correlation between temperature and aridity while there was a negative correlation between rainfall and vegetation index. This generally indicates that the prevalence of environmental diseases is variegated not homogenous in space and time.

For all the facts adduced above, some useful insights have emerged as bases of useful epidemiological explanations.

1. That Urban areas are the highest repository of a variety of diseases due to the heterogeneity of their population and intricate categories of their human activity profiles. (The Global burden of Disease Study 2019).
2. That Globalization has resulted in an increase in the incidence of non communicable diseases in Nigeria (Maiyaki et al 2014).

Methodology

Study design:

This study is a category of descriptive epidemiology survey aimed at data collection towards analysis of the spatial or geo-geographical distribution of diseases within the city of Calabar, Nigeria. (Olaniran & Akpan 1995).

Study Area:

The study area is Calabar, Nigeria. Calabar is an ancient city in Nigeria, West African located at the shores of the Atlantic ocean on the Gulf Guinea. It’s coastal location confers on it a typical equable Marine environment, ameliorated by the incidence of sea breeze, by day and landbreeze by night caused by change in pressure patterns. It is characterized by microclimatic mosaics caused by the varieties of human activities carried out on the city landscape.

The residents are mostly engaged in Civil Service occupation while an insignificant fraction undertake other itinerant engagements. The city by way of its population is a second hierarchy urban settlement compared to such primate cities like Lagos, Ibadan, Port-Harcourt, Abuja and so on. There is less presence of industrial estates as present in such primate cities earlier mentioned above.

This has significant positive implication for environmental quality assessment. Yet the method of poor waste collection and disposal by the municipal government may not guarantee that.

Population of the study

The study population comprises adult male and female residents permanently domiciled in the city of Calabar, Nigeria.

Sampling Procedures:

Multi stage sampling was carried based on

- i. Purposive cluster sampling
- ii. Systematic serpentine sampling of households and
- iii. Stratified gender sampling.

The total number of respondents engaged in the interview proceeds across the area were One Hundred Male and Female residents from the age of Twenty Five years and above.

Data Collection Procedure

Data was collected using the questionnaire which was developed along the lines of the research objectives. Defacto (face-to-face) approach was adopted where interview was carried out on the respondent using the questionnaire as a guide.

Method of data analysis

Data was analysed based on the one way Analysis of variance statistical techniques following the decision rule, the null hypothesis was rejected while the alternative hypothesis was favoured signifying that there is significant variation in the prevalence of disease over the geographical space of the city of Calabar, Nigeria.

Data presentation and analysis

Presentation: Oral epidemiological survey was conducted in different environment settings.

The method involved direct interview of residents of the areas with different environment qualities using the process of information from the subjects based on their medical and /or health histories.

Following the method of descriptive epidemiological survey procedures on the basis of selected disease incident. The results are presented on table I for affirmation of persons to periodicity of diseases mentioned. The number persons interviewed in each setting did not exceed 10. Those who respond in positive in each case were entered accordingly.

The resultant information presented in the table is christened environmentally based disease matrix for Calabar.

This was accordingly analysed using the technique of analysis of variance (ANOVA) to determine the homogeneity or diversity in the incidence rate.

Table 1: Environmental disease matrix of Calabar

S/N	Residents Environmental Status	Malaria	Dysentery	Typhoid	Cholera	Tuberculosis	STS	Schistosomiasis	River blindness	Meningitis	Total
1.	Frequently flooded area	8	8	8	8	2	3	6	4	-	47
2.	Permanently warelog	9	9	8	7	1	2	7	6	-	49
3.	Gully/Ravin terrains	6	7	7	5	2	3	4	3	-	37
4.	Sums/Ghetos	9	9	7	6	6	9	4	6	5	61
5.	Overcrowded build	8	8	7	6	7	7	3	8	4	58

	environments										
6.	Poorly designed areas	6	7	6	5	2	3		2	4	35
7.	Waste dump sites	9	10	12	11	8	4	5	7	2	68
8.	Noise prone zones	4	4	2	4	-	6	-	4	3	27
9.	Urban tarinarced area	4	5	4	2	2	2		6	5	30
10.	Uplanged residential areas	7	8	9	4	6	7	2	5	6	54
11.	Poorly ventilated buildings	7	6	8	10	2	3	4	6	10	56
12.	Inadequate sewage	8	6	7	10	4	5	5	7	2	54
	Total	85	87	85	78	42	54	40	64	41	576

This was analysed using the one-way analysis of variance (ANOVA) as stated below

Data analysis

Hypothesis statement: the hypothesis is stated in the null form as follows

Ho: there is no significant variation in environmental diseases prevalence in Calabar , Cross River State, Nigeria

One-Way ANOVA of Environmental Disease Matrix Air Calabar

Variable source	Df	DS	MS	F-ratio
Treatment	8	796	99.50	
Error	99	1898.84	19.18	5.1877
Total	107	2694.84		

*Significant at 0.05

Reject Ho if $F_{cal} - ratio > F_{\alpha}$ otherwise do not reject

Since $F_{cal} - ratio = 5.1877 > F_{(3,99)} = 3.95$ at 0.05 level of significant, we reject Ho and hence concluded that there is variation in environmental disease prevalence in Calabar , Cross River State, Nigeria

Results/findings:

Following the decision rule which confirms the acceptability of the hypothesis that there is significant variation in the spatial distribution of diseases in the economic and geographic landscape of Calabar, Cross River it is evident that there is a close relationship between disease burden prevalence and environmental quality. This finding substantiates reports from earlier works carried in relation to the nature of the environment and disease prevalence. Hardoy et at’s (1992) works on “Environment and wellbeing” threw sufficient light on the nature of housing quality and psychosocial disorder of residents. They clearly reported that the housing quality in terms of its sanitation, location and neighborhood can significantly influence the physical and psychological wellbeing of occupants. A wide array of disease burden was mentioned in connection with housing characteristics and the physical/psychological wellbeing of individuals such as depression, hypertension, emotional instability and so on.

Accordingly, indoor air pollution is equally implicated as major ailment in some urban housing environments. Some diseases are endemic in some areas while in others there are virtually absent. This confirms Arong's and Ekpo's (2014) inquiry and report on "Environmental Factors and the distributions of urinary Schistosomiasis in Cross River State", where they explored a number of environmental parameters in connection with the prevalence of the diseases. Their findings revealed that there was a negative correlation between rainfall and vegetation and the prevalence of the schistosomiasis disease while there was a positive correlation between high temperature, aridity and altitude, and the distribution of the disease. Also Ibor and Okoronkwo's (2017) study of "socio economic and demographic factors influencing malaria incidence in Cross River State" clearly revealed that the prevalence and frequency of malarial incidence was higher among the Urban poor with poor housing quality in and of overcrowding. This report is conformal with a similar study which reported that "Housing design, poor state of maintenance, and climatic condition of building environment can expose residents to excessive cold (Krieger and Higgins 2002). These authors attributed cold indoor conditions with poorer health and increased risk of cardiovascular disease. Along similar lines were the report from Agbo et al (2012) who established that some health disorders such as typhoid, and paratyphoid fever diarrheas, dysenteries can be contacted through poor toilet facilities.

From our findings as represented in table I (data presentation) waste dump areas have the highest burden of disease load with a total prevalence scale of 68, followed by Slum/Ghetto areas with a disease load of 61 and then ranking next is overcrowded areas with a disease load of 58.

On the precinct of disease load analysis, frequently flooded areas have high incidence load of malaria, typhoid, and dysentery. This ranked second after waste dump sites with appreciably high burdens for the four mentioned morbidity incidents and water logged terrain with appreciably high incidents for the four categories of diseases.

Ready explanations for these scenarios may be drawn from the fact that these environments have similar characteristics such as adequate moisture for breeding of agents (vectors) of the disease and equally a favourable temperature required for the survival of the pathogens.

On the basis of disease by disease assessment, Dysentery tops the list with a load value of 87, and followed by malarias and cholera with 85 each. Going by the epidemiological explanations, these ranked as the most prevalent tropical diseases as gleaned from existing epidemiological literatures.

Tuberculosis is also commonly prevalent in the four environments mentioned, while meningitis is highest in poorly ventilated buildings.

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