Environmental Characteristics of HIV/AIDS Affected Households in a Nigerian Rural Community

Omolola T. Alade[1] [ID], Albert A. Abegunde[2], Joseph A. Adedigba[3],
Ibiyemi Fakande[4] and Michael A. Adedigba[1]

Abstract

A study of environmental attributes of HIV/AIDS affected households in Ijesa region, Nigeria (N = 297). Data from both primary and secondary sources were used to establish the relationship between socio-economic and environmental characteristics at different rural community zones; namely traditional core, post traditional and contemporary. There were more female HIV/AIDS patients, located in traditional core zones (78.1%) with high house density, living in shared apartments where residents shared sleeping and bath/toilet rooms. Thus, rape was significantly associated with the design and habitation density of households. In addition, widowhood, young age, informal education, menial jobs and unemployment of patients did not correlate with most environmental variables related to HIV/AIDS in contemporary zone compared with traditional zone. However, wealth status and quality education in relation to good housing environment and decent house density were significant in contemporary zone respectively. The study concluded that policies on HIV/AIDS prevalence at rural community level should focus more on high density areas having poor socio-economic and environmental characteristics.

Introduction

The environment refers to the economic, social and cultural contexts which surround individuals and influence them. Environmental characteristics impact individuals' lives in many ways including attitudes, cultural beliefs and practices and susceptibility to infections.[1] Thus, there have been increasing concerns about the impact of social and cultural structures on vulnerability to HIV/AIDS.[2] This socio-cultural practice perspective hinges on sexual and non-sexual practices that create vulnerability to HIV/AIDS.[2] These practices include polygamy, wife inheritance and sharing, female genital mutilation (circumcision), and skin perforation as well as having multiple sex partners and engaging in unprotected sex.[3] They may create conditions for sexual risk in specific contexts that are gendered.[4] In other instances, the socio-cultural practices are influenced by the socialization process at the community level.[5,6] This is because the place where HIV/AIDS patients live and the pattern of its prevalence have been environmentally explained in literature.[1]

Thus, HIV/AIDS epidemics are found in environments whose cause and effect emanate from the same area.

This makes discussions on HIV/AIDS to be related to housing environment. For instance, in war torn communities, residents may sleep together in camps and hideouts without gender separation and protection from abuse. This can also be found in households and communities where people from different families co-habit in houses that have no well-defined accommodation boundaries. Conducting a study on HIV/AIDS in the built environment also requires a spatial presentation of its prevalence. Therefore, the number of cases in relation to the population at risk, prevalence rates, the

[1]Department of Preventive and Community Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria
[2]Department of Urban and Regional Planning, Obafemi Awolowo University, Ile-Ife, Nigeria
[3]Tulane University School of Medicine, New Orleans, Louisiana, United States
[4]Living Hope Support Group, Ilesa Nigeria

Corresponding Author:
Omolola T. Alade, Department of Preventive and Community Dentistry, Obafemi Awolowo University, Ile-Ife, Nigeria.
Email: otalade@oauife.edu.ng

geographical scale and the set of criteria for determining these are basic to HIV/AIDS studies among residents within a geographic space.[7]

Geography of places is proving that HIV/AIDS is more prevalent in certain locations than others.[8] However, studies have separately linked the social, economic or environmental attributes of HIV/AIDS prevalence at regional levels without specific references to concerned communities.[7,9,10] These works were too general, macro in perspective and not local community specific.

A study that assesses the socio-economic and environmental characteristics of HIV/AIDS affected households in local communities of Nigeria is overdue as the world focusses on sustainable development goals that jointly address health, economy and the environment holistically. Relating this dream to the world pandemic disease (HIV/AIDS) at local community levels in a country where most of the developing nations' populations live is a pathway to achieve this. Thus, this study assessed the relationship between the socio-economic characteristics of HIV/AIDS patients and environmentally related HIV/AIDS attributes at the household level by geo-spatial location.

Data and Methods

A cross-sectional study where secondary and primary sources of data collection were explored. The study was conducted in Ijesa, Osun State, Nigeria. The communities in Ijesa region were grouped into three zones based on their period of formation; Traditional Core, Post-Traditional and Contemporary. The traditional core communities were defined as settlements that were first formed and there were nine of them – Bolorunduro, Ogudu-Igbaye, Oke-Ese, Ikoyi,

Ereje-Square, Isokun-Otapete, Itakogun, Araromi-Irojo and Imo (Figure 1). They had high rural population densities.

The post-traditional communities were defined as settlements established after the traditional core communities. There were five communities in this zone – Iroye, Ogburu-Iloro, Olomilagbala, Ijebujesa and Omi-Asoro (Figure 1). Nearly all the communities in this zone were of medium population density.

The last zone was named as the contemporary zone because many of them came into existence later than those in the traditional core and post traditional zones. These were of low population density, were scattered and not located along main transportation routes. These included Kajola, Fadahunsi, Isale-General, Imola and Ireti-Ayo.

The secondary data used for this study was a register of the cases of the people living with HIV/AIDS maintained by a Non-Governmental Organization (NGO) in Ijesa region, Southwestern Nigeria. The information extracted from the register included age, gender, marital status, education, year the centre was visited, occupation, wealth status and residential address. The latter information from the register was used to identify and position HIV/AIDS cases within space (through GIS tool) in the base map of Ijesa region, sourced from the Department of Urban and Regional Planning, Ministry of Lands and Housing, Ilesa West Local Government Area, Osun State, Nigeria. Figure 1 reveals the spatial pattern of HIV/AIDS prevalence in the study area.

The primary data were collected via interviews at the household level. Using purposive sampling technique, all houses where information on environmental attributes were supplied became the sample size (N = 297). Adults with the longest stay in each household were the primary respondents.
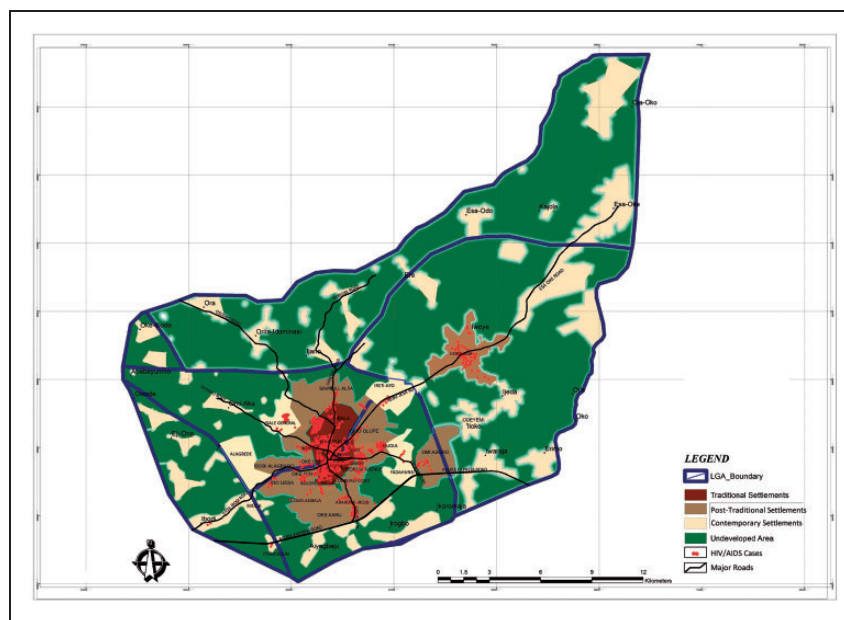

Figure 1. Map of Ijesa Region, Nigeria Showing Settlement Groups and Pattern of HIV/AIDS Prevalence in the Rural Communities.

These adults were interviewed to determine the environmental variables assessed in this study.

These environmental variables were nature of housing design by habitation, nature of sleeping room, housing density, usage, nature and condition of place of bath/toilet and household report of rape. Housing design by habitation referred to number of households that lived under the same roof as influenced by the building design. The nature of sleeping room was defined as the average number of people sleeping in habitable rooms and how and with whom these were shared while housing density was the total number of people residing in a house. The housing density was categorized as low, average, high and very high according to the Nigerian housing standard which states that density is low when resident(s) within a house is/are between 1–3 persons. It is considered average when residents are within 4–7 persons and high when there are ≥8 people in the house. Housing density is categorized as very high when the number of residents is more than a double of the minimum level of high density, i.e. 8x2 (16); a house with ≥16 residents is categorized as very high.[11,12] Usage considered the average number of people using a bath/toilet room in a house, its location and nature of design; and the household report of rape focused on the number of rape occurrences in each household in the past year as reported by the primary respondent. The adult who had stayed the longest in the household was asked to give the household report of rape which was then was categorized over time. It was described as low when rape was reported to occur less than once in three months (a quarter). It was considered as average when rape was reported to occur about once per quarter and high when rape was reported to occur nearly every month in a house.[13] Physical observations were also made, where necessary to confirm the information obtained on the environmental characteristics of each house.

The data obtained were analysed using frequency tables and proportions.

Ethical Considerations

Approval to use the NGO's data was obtained and the patients' records were de-identified. Interpreters in the local language were employed to interpret information contained in the consent form and the questionnaire to respondents at the household level (where necessary). Ethical approval for the study was obtained from the Institute of Public Health Research Ethics Committee, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

Results

Table 1 and Figure 1 also show that most of the affected residents hailed from four rural communities and were all located in traditional core zone Bolorunduro (15.2%), Itakogun (15.8%), Isokun-Otapete (13.1%) and Ogudu-Igbaye (11.4%). Next to these were Araromi-Irojo (6.7%)

Table 1. HIV/AIDS Prevalence and Selected Cases by Communities in Ijesa Region, Nigeria.

Communities' groups	Name of Community	Number of Cases (n = 297)	Percentage (%)
Traditional core	Imo	15	5.1
	Oke-Ese	7	2.4
	Araromi-Irojo	20	6.7
	Ikoyi	15	5.1
	Ereja square	10	3.4
	Isokun-otapete	39	13.1
	Itakogun	47	15.8
	Ogudu-Igbaye	34	11.4
	Bolorunduro	45	15.2
	Sub total	232	78.1
Post traditional zone	Omi Asoro	4	1.3
	Olomilagbala	1	0.3
	Ijebujesa	20	6.7
	Iroye	8	2.7
	Ogburu-Iloro	12	4.0
	Sub total	45	15.2
Contemporary	Imola	1	0.0
	Isale general	9	3.0
	Ireti Ayo	3	1.0
	Fadahunsi	4	1.3
	Kajola	3	1.0
	Total	20	6.7
Grand total		297	100.0

and Ijebujesa (6.7%) rural communities in traditional and post traditional zones respectively. As reflected in Figure 1, the clustering pattern of HIV/AIDS in the study area was along the major transportation route that dissected the region.

A total of 297 patients from the NGO records were matched with their households. Overall, 78.1% of the patients resided in high density areas, 72.7% of them were aged 20–39 years, 74.1% were married, 62.3% were females, 35% were involved in business/trading, 52.9% had secondary education and 48.8% of them belonged to the middle class (Table 2).

The common house types inhabited by the affected residents in the environment were Brazilian type (this is called 'face-me-face-you' in Nigeria) (33.3%), compound house (27.7%) and flat (27.8%) (Table 3). Table 3 also shows that most households reported personal sleeping rooms. However, of the seven households where it was reported that sleeping rooms were shared with visitors and non-relatives, six (85.7%) of them were in the Traditional Core zone. Similarly, most of the open and shared bathrooms (80.3%) were reported in the Traditional Core zone. Concerning household report of rape, 20.0%, 22.2% and 9.1% of the households in the Contemporary, Post-Traditional and Traditional Core zones reported a high level of rape respectively.

Table 2. Socio-Economic Attributes of Patients Affected by HIV/AIDS in Ijesa Region.

Socio-economic attributes	Community population density			
	Low N (%)	Average N (%)	High N (%)	Total (%)
Age	0 (0)	1 (2)	5 (2)	6 (2)
20–29	6 (30)	17 (38)	64 (28)	87 (29)
30–39	9 (45)	17 (38)	103 (44)	129 (44)
40–49	2 (10)	8 (18)	41 (18)	51 (17)
>=50	3 (15)	2 (4)	19 (8)	24 (8)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Marital status				
Single	7 (35)	12 (27)	35 (15)	54 (18)
Married	12 (60)	28 (62)	180 (78)	220 (74)
Divorced	1 (5)	2 (4)	8 (3)	11 (4)
Widow	0 (0)	3 (7)	9 (4)	12 (4)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Sex				
Male	7 (35)	19 (42)	86 (37)	112 (38)
Female	13 (65)	26 (58)	146 (63)	185 (62)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Occupation				
Unemployed/Housewife	0 (0)	1 (2)	10 (4)	11 (4)
Artisans	3 (15)	12 (27)	64 (27)	79 (27)
Business/Trading	12 (60)	14 (31)	78 (34)	104 (35)
Private worker	1 (5)	1 (2)	8 (3)	10 (3)
Civil service	1 (5)	6 (13)	13 (6)	20 (7)
Students	1 (5)	3 (7)	13 (6)	17 (6)
Driving/Okada riding	0 (0)	7 (16)	27 (12)	34 (11)
No response	2 (10)	1 (2)	19 (8)	22 (7)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Education				
No formal education	0 (0)	2 (4)	15 (6)	17 (6)
Primary	1 (5)	13 (29)	70 (30)	84 (28)
Secondary	15 (75)	22 (49)	120 (52)	157 (53)
Tertiary	4 (20)	8 (18)	27 (12)	39 (13)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Wealth status				
Poor	7 (35)	24 (53)	83 (36)	114 (38)
Middle	7 (35)	14 (31)	124 (53)	145 (49)
Rich	6 (30)	7 (16)	25 (11)	38 (13)
Total	20 (100)	45 (100)	232 (100)	297 (100)

Discussion

This study found that the clustering pattern of HIV/AIDS in the study area was along the major transportation route that dissected the region. This supports findings that HIV/AIDS diffuses in in an organised sequence along major routes, affecting residents in major settlements to rural areas, dispersing along the road-network to the peripheries.[14] The types of housing designs reported by the respondents in this study are noted for low level of indoor privacy arising from high internal mixture with people from outside the immediate family. These conditions could expose residents who are co-occupants with social deviants to rape, sexual harassment and molestation, especially those who

are children and women in high density area. This could be why most residents in this study did sleep in places where they shared rooms with relations (80.9%) and non-relations and visitors (85.7%) in high density areas of the concerned communities. However, residents with HIV/AIDS in duplex buildings (6.8%) where privacy is expected to be very high were very few. Thus, affected residents that acknowledged to the average (13.7%) and high (11.7%) levels of rape in this study hailed mostly from high density areas of the communities in Ijesa region. Hence, low and medium density areas in this study were not characterized with using bath room built with thatched materials and shared (0.0%), unlike houses where HIV/AIDS patients lived in the high density area where bath places were

Table 3. Environmental Attributes of Households Affected by HIV/AIDS in Ijesa Region, Nigeria.

Environmental attributes	Rural settlement group (Zone)			
	Contemporary N (%)	Post traditional N (%)	Traditional core N (%)	Total (%)
Nature of housing design and habitation				
Duplex	2 (10)	1 (2)	17 (7)	20 (7)
Flat	3 (15)	17 (38)	62 (27)	82 (28)
Shared flat	1 (5)	1 (2)	14 (6)	16 (5)
Compound house	11 (55)	14 (31)	55 (24)	80 (27)
Face-me-face-you	3 (15)	12 (27)	84 (36)	99 (33)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Nature of sleeping room				
Personal	14 (70)	31 (69)	157 (68)	202 (68)
Joint with partners	2 (10)	8 (18)	31 (13)	41 (14)
Shared with relations	4 (20)	5 (11)	38 (16)	47 (16)
Non-relations and visitors	0 (0)	1 (2)	6 (3)	7 (2)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Condition of place of bath				
Private and personal	7 (35)	20 (44)	90 (39)	117 (39)
Private and shared	7 (35)	18 (40)	77 (33)	102 (34)
Open and shared	5 (25)	7 (16)	49 (21)	61 (21)
Built with thatched materials and shared	0 (0)	0 (0)	6 (3)	6 (2)
Open but private	1 (5)	0 (0)	10 (4)	11 (4)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Housing density				
Low	14 (70)	32 (71)	159 (68)	205 (69)
Average	3 (15)	7 (16)	35 (15)	45 (15)
High	3 (15)	5 (11)	34 (15)	42 (14)
Very high	0 (0)	1 (2)	4 (2)	5 (2)
Total	20 (100)	45 (100)	232 (100)	297 (100)
Household report of rape				
Not at all	11 (55)	13 (29)	63 (27)	87 (29)
Low	3 (15)	16 (35)	96 (41)	115 (39)
Average	1 (5)	3 (7)	36 (16)	40 (14)
High	4 (20)	10 (22)	21 (9)	35 (12)
No response	1 (5)	3 (7)	16 (7)	20 (6)
Total	20 (100)	45 (100)	232 (100)	297 (100)

shared, either they were located within the house or in open places. Expectedly, they acknowledged that the densities of their houses were either high (81.0%) or very high (80.0%) while no resident (0.0%) submitted to the latter opinion in low density area because they never shared rooms with non-relations and visitors (0.0%).

Most residents living with HIV/AIDS in rural communities in traditional core zone, Ijebujesa in post traditional zone and Ireti-Ayo in contemporary zone were either young adults or teenagers. The situation can be worse where such young adults are not well educated and lack good trades that can fetch adequate earnings. This perhaps explains why most people affected by HIV/AIDS in this study, especially among those in contemporary and post traditional zones were young adults within the age bracket of 20–39 years old with low level of education and mostly engaged in artisan, private work, driving, informal business or students.

Prior to this study, Magadi and Jha et al. had concluded that density and socio-economic attributes of an environment are cardinal to drawing conclusions on HIV/AIDS prevalence in developing communities of the world.[15,16] This notion cannot be generalized in this study. This is because no resident living in contemporary zone (of low density) in Ijesa region contacted the disease among those who were widows, below age 20 years, unemployed and housewives, without formal education or commercial vehicle drivers/motorcycle riders. On the contrary, most affected residents who lived in traditional zone of the region were highly represented among people living with HIV/AIDS in the study area, irrespective of their socio-economic characteristics. While the prevalence level in the latter zone confirmed that HIV/AIDS is common among unemployed, widows who are single adults, with low level of education and showed interest in commercial driving, those living with HIV/AIDS in contemporary rural communities with low density might not be

threatened by the disease due to poor socio-economic status. This also explained why education of people living with HIV/AIDS was inversely significant ($p < 0.05$) with nature of sleeping room and (-0.481) and house density (-0.358) among residents in contemporary zone of this study. What this implies is that respondents with high level of education would scarcely shared apartment or be crowded in house density. HIV/AIDS prevalence was highest in Isale-General but characterized with high level of education and private apartment where residents would likely not share sleeping rooms. Dissimilarly, shared apartment peaked in Itakogun and Bolorunduro (traditional core zone) where respondents with no formal education training were highly represented.

This is understandable because some places with shared apartment with high level of HIV/AIDS prevalence in rural Africa are characterised with polygamy, multiple children, communal living and high house density[17] while most monogamists with average family sizes are literate and live in places with low density. Expectedly, a good number of affected residents who lived in traditional core zone also acknowledged that their house densities were either high (81.0%) or very high (80.0%) while no resident (0.0%) had this challenge in the contemporary zone because they never shared rooms with non-relations and visitors. In addition, the latter were also not using bathrooms/places built with thatched materials or shared with others.

Associating findings with the environmental attributes of the study area, common house types/design inhabited by the affected residents were Brazilian type locally tagged "face-me-face-you", compound houses and flats that were shared in some places among those possibly living in traditional core zone. In addition, most people who slept in places where they shared rooms with relations (80.9%) and non-relations and visitors (85.7%) in this study were from rural communities in the traditional core zone. However, residents with HIV/AIDS in duplex buildings (6.8%) where privacy is expected to be very high were very few. In another dimension, Madise et al., (2012) also noted that HIV/AIDS was more prevalent among slum dwellers than others.[18] These show that the types of house designs in high density area like the traditional core zone are characterised with low level privacy and high household mixture with people from outside the immediate family. This have high tendency of exposing residents who are co-occupants with social deviants to rape, sexual harassment.[19] This could be why incidence of household report of rape was acknowledged to be high among some residents who lived in traditional core zone of this study where shared houses were common due to low income.

Study Limitation

The study depended on limited documented socio-economic data available at the secondary source for this study. The work would have been richer if more information on and current status of the socio-economic lifestyle of respondents were available. However, this study was conducted under stringent ethical conditions that restricted researchers from intentionally having direct contact with any of the HIV/AIDS patients in the sampled households.

Conclusion

The study evidently showed that war against HIV/AIDS spread must be highly intensified but not limited to the high density dwellers; medium and low density rural communities (especially those located within the axis of high density dominated rural region) with good housing environment must not be excluded, rather should be well informed and involved. The types of housing designs that encourage communal living with multiple families must be discouraged. Findings in this study is expected to be relevant to medical practitioners in HIV/AIDS field, town and country planners who approve the types of buildings to be constructed in rural regions, policy makers and extension officers concerned against its spread.

ORCID iD

Omolola T. Alade   https://orcid.org/0000-0002-7972-9755

References

1. Hajizadeh M, Sia D, Heymann SJ, et al. Socioeconomic inequalities in HIV/AIDS prevalence in Sub-Saharan African countries: evidence from the demographic health surveys. *Int J Equity Health* 2014; 13: 18.
2. Auerbach JD, Parkhurst JO and Cáceres CF. Addressing social drivers of HIV/AIDS for the long-term response: conceptual and methodological considerations. *Global Public Health* 2011; 6: S293–S309.
3. Djukpen R. *The geography of HIV/AIDS and an assessment of risk factor perspectives in Nigeria: the case of Benin city and Makurdi.* Champaign: University of Illinois at Urbana-Champaign, 2013.
4. Jewkes R and Morrell R. Gender and sexuality: emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. *J Int Aids Soc* 2010; 13: 6.
5. Kalipeni E, Flynn KC and Pope C. *Strong women, dangerous times: gender and HIV/AIDS in Africa.* New York: Nova Science Publishers, 2009.
6. Gilbert L and Walker L. Treading the path of least resistance: HIV/AIDS and social inequalities—a South African case study. *Soc Sci Med* 2002; 54: 1093–1110.

7. Djukpen R. Mapping the HIV/AIDS epidemic in Nigeria using exploratory spatial data analysis. *GeoJournal* 2012; 77: 555–569.

8. Kalipeni E and Zulu LC. HIV and AIDS in Africa: a geographic analysis at multiple spatial scales. *GeoJournal* 2012; 77: 505–523.

9. Mutinta G, Gow J, George G, et al. The influence of socio-economic determinants on HIV prevalence in South Africa. *Rev Econ Finance* 2011; 1: 96–106.

10. Adedigba MA, Naidoo S, Abegunde A, et al. The economic burden of HIV and AIDS on households in Nigeria. *Afr J Aids Res* 2009; 8: 107–114.

11. Adebayo AA and Iweka ACO. Dwelling density variability across government-built multifamily apartments in Lagos. *Ethiop J Env Stud & Manag* 2013; 6: 517–522.

12. Agbola T and Agbola EO. The development of urban and regional planning legislation and their impact on the morphology of Nigerian cities. *Niger J Econ Soc Stud* 1997; 39: 123–144.

13. Badiora AI and Abegunde AA. Crime incidence in postcommunal crisis areas of southwestern Nigeria: the effects of socio-physical characteristics. *J Appl Secur Res* 2015; 10: 77–96.

14. Obidoa CA and Cromley RG. A geographical analysis of HIV/AIDS infection in Nigeria, 1991-2001. *J Soc Behav Health Sci* 2012; 6: 2.

15. Jha PK, Narayan P, Nair S, et al. An assessment of comprehensive knowledge of HIV/AIDS among slum and non-slum populations in Delhi. *Ojpm* 2015; 05: 259–268.

16. Magadi MA. Household and community HIV/AIDS status and child malnutrition in Sub-Saharan Africa: evidence from the demographic and health surveys. *Soc Sci Med* 2011; 73: 436–446.

17. Parkhurst JO. Understanding the correlations between wealth, poverty and human immunodeficiency virus infection in African countries. *Bull World Health Organ* 2010; 88: 519–526.

18. Madise NJ, Ziraba AK, Inungu J, et al. Are slum dwellers at heightened risk of HIV infection than other urban residents? Evidence from population-based HIV prevalence surveys in Kenya. *Health Place* 2012; 18: 1144–1152.

19. Zulu EM, Dodoo F, and Ezeh AC. Urbanization, Poverty and Sex: Roots of Risky Sexual Behaviors in Slum Settlements in Nairobi, Kenya (chapter 12). In E. Kalipeni; J. Oppong, S. Craddock and J. Ghosh, (eds.), *HIV/AIDS in Africa: Mapping the Issues* 2003; 167–174. Malden, MA: Blackwell Publishing.

Author Biographies

Omolola T. Alade is a researcher with postgraduate degrees in International Public Health and Public Health Dentistry. Her research interests are disease prevention and the determinants of health.

Albert A. Abegunde (PhD) is a full professor of Urban and Regional Planning at Obafemi Awolowo University (OAU), Ile-Ife, Nigeria. His research interests are Community Participation &Development Planning, Post Disaster Planning & Conflict Mitigation, Urban Land Development & Strategic Planning. He is the current co-ordinator of Laboratory Interdisciplinary Statistical Analysis (LISA) in the Faculty of Environmental Design and Management in OAU.

Joseph A. Adedigba is from Saki, Nigeria. He holds a Bachelors degree in Chemistry from Saint Olaf College in Northfield, MN. He is currently a graduating 4th year medical student at Tulane University School of Medicine. After medical school, he plans to complete residency training in Diagnostic Radiology.

Ibiyemi Fakande Ibiyemi Fakande is a nurse and CEO of an HIV/AIDS care support group.

Michael A. Adedigba a professor and consultant in public health dentistry with an interest in the oral health of people living with HIV/AIDS.