Examining catastrophic costs and benefit incidence of subsidized antiretroviral treatment (ART) programme in south-east Nigeria

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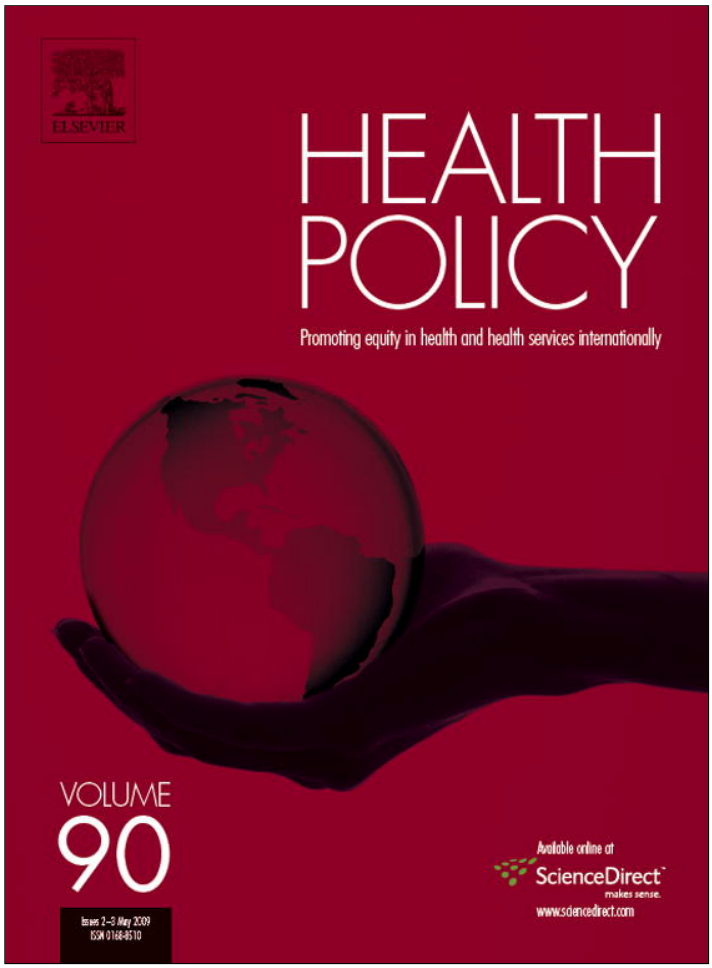

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Examining catastrophic costs and benefit incidence of subsidized antiretroviral treatment (ART) programme in south-east Nigeria

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ABSTRACT

Objectives: To examine the extent to which costs of subsidized antiretrovirals treatment (ART) programmes are catastrophic and the benefit incidence that accrues to different population groups.
Methods: Data on expenditures to patients for receiving treatment from a government subsidized ART clinic was collected using a questionnaire. The patient costs excluded time and other indirect costs. Catastrophic cost was determined as the percentage of total expenditure on ART treatment as a proportion of household non-food expenditures on essential items.
Results: On average, patients spent 990 Naira (US$ 8.3) on antiretroviral (ARV) drugs per month. They also spent an average of $8.2 on other drugs per month. However, people that bought ARV drugs from elsewhere other than the ART clinic spent an average of $88.8 per month. Patients spent an average of $95.1 on laboratory tests per month. Subsidized ARV drugs depleted 9.8% of total household expenditure, other drugs (e.g. for opportunistic infections) depleted 9.7%, ARV drugs from elsewhere depleted 105%, investigations depleted 112.9% and total expenditure depleted 243.2%. The level of catastrophe was generally more with females, rural dwellers and most poor patients. Females and urbanites had more benefit incidence than males and rural dwellers.
Conclusion: Subsidized ART programme lowers the cost of ARV drugs but other major costs are still incurred, which make the overall cost of accessing and consuming ART treatment to be excessive and catastrophic. The costs of laboratory tests and other drugs should be subsidized and there should also be targeting of ART programme to ensure that more rural dwellers and the most-poor people have increased benefit incidence.

1. Introduction

In 2005, the Nigerian government began a subsidized programme that aimed at providing antiretroviral (ARV) drugs to about 250,000 HIV-positive residents through treatment centres throughout the country and by 2006 had established seventy-four ARV treatment centres across

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the country. Nigeria is estimated to have 2.9 million people living with HIV/AIDS [1]. The national sero-prevalence rates were 1.8% (1991), 5.8% (2001), 5.0% (2003), 4.4% (2005) [2]. The prevalence of HIV in south-east Nigeria is 4.0% [2]. Around 550,000 people were estimated to require antiretroviral therapy at the end of 2006, of which 81,000 were receiving the drugs [3] and with an increase to 135,000 in 2007 [4].

The assumption behind free or subsidized ART programme is that they improve financial access, decrease incidence of catastrophic health expenditures and offer equitable benefits. However, these programmes cover only the cost of the ARV drugs and patients still pay for other drugs including those for opportunistic infections and for investigations, mostly through out-of-pocket spending.

The costs of other drugs and routine laboratory and X-ray investigations could be excessive or catastrophic and lead to people not adequately utilizing the services, not consuming them at all, or having to forgo many essential household needs so as to cope up with the burden of paying for treatment. Payment for laboratory and other tests are pre-requisites for enrollment into the programme and many patients visit the treatment centres repeatedly without being enrolled as they are unable to pay for the required investigations [5].

A study estimated that the average annual per patient cost of drugs under the government programme is about $368, representing 50% of the total cost and that monitoring and screening costs (totaling $256 per year) are borne exclusively by the patients [6]. This is equivalent to almost 75% of annual per capita gross domestic product, well beyond the resources of most Nigerians [6]. Such high levels of expenditure, may lead to increasing impoverishment for households [7]. High levels of expenditure on drugs and investigations due to HIV/AIDS, as well as people paying mostly out-of-pocket, could lead to catastrophic payments and prevent people from seeking and obtaining needed care because they cannot afford to pay the charges levied for diagnosis and treatment [8,9].

HIV is increasingly affecting the poor and those who already have barriers to access [10], and policy makers have overtime been concerned with protecting people from occurrence of catastrophic financial payments and subsequent impoverishment. Three key preconditions for catastrophic payments which include the availability of health services requiring payment, low capacity to pay, and the lack of prepayment of health insurance [11], abound in the Nigerian health system, especially in the treatment of HIV/AIDS. Expenditures are catastrophic if a household's financial health payments exceed 40% of income remaining after subsistence needs have been met [11]. In some cases, especially among the poor, expenses of 10–15% of income are typically characterized as in the catastrophic range [12].

It is important to understand the equity issues of financial burden on people living with HIV/AIDS (PLWHA) for treatment [13,14]. HIV/AIDS could lead many households, especially those belonging to the poor socio-economic status (SES) groups, into poverty. Poor patients receiving ART may also not be retained in ART programmes due to the heavy costs associated with ART. Patient's geographic location is also likely to have an effect on access and costs of ART, as large numbers of HIV-positive people live in rural areas, but treatment is largely confined to urban areas [1]. Thus, treatment often entails an overnight stay, which could considerably add to costs [1].

Also, as important as determining whether the costs of ART programmes are catastrophic, is determining who benefits from the subsidized or free programmes. In most HIV-endemic countries, there is lack of data determining who is benefiting from funding of HIV/AIDS [13]. If the benefits are being captured predominantly by certain segments of the society, then the programmes are inequitable and this may defeat the aim of introducing them. Benefit incidence can be determined using the technique of benefit incidence analysis (BIA) [15] which assesses whether public spending improves the distribution of welfare, proxied by household income or expenditure [16,17].

This paper examines the extent to which costs of subsidized antiretrovirals treatment programmes are catastrophic to different socio-economic status groups and rural–urban dwellers, as well as the level of benefit incidence that accrues to different socio-economic status groups and rural–urban dwellers. There is paucity of literature on existence of catastrophic costs and benefit incidence of free and/or subsidized ART and hence policy makers are poorly equipped to make decisions regarding the optimal allocation of resources to meet the needs of vulnerable people [13]. The information will be invaluable in developing equitable ART programmes, which can reduce incidence of catastrophic costs.

2. Methods

2.1. Study area

Patients were interviewed at the ART clinic situated at the University of Nigeria Teaching Hospital (UNTH), Enugu, south-east Nigeria. UNTH is a government-owned hospital which runs a government subsidized ART programme which started in 2002 but the provision of subsidized drugs to patients commenced in 2006. Poverty is endemic in Enugu as in the rest of Nigeria, where per capita gross domestic product (GDP) was US$ 485 in 2004 and US$ 582 in 2005. About 54% of Nigerians are poor and income inequality is very high with Gini index of 0.52 [18]. In the study area as in most parts of Nigeria, economic hardship is rife and people struggle everyday to eke out a living. In order to determine how homogenous in terms of SES the study sample was with the general population, the data from the study was compared with the random sample from a larger study that was undertaken in the same study area during the same period.

The UNTH ART clinic, supported by the Federal Ministry of Health, receives patients from all over Enugu State as well as from the adjacent states. The centre conducts once a week HIV treatment clinic sessions and an average of 200 patients (both old and new) are seen during each session. All enrolled patients are required to visit the clinic once a month to receive the ARV drugs and have their vitals measured. Patients receive formal pre-treatment adherence education/counselling as well as three drugs: Lamivudine (3TC), Nevirapine (NVP), and Stavudine (d4t). The cost of

the ARV drugs is 10,000–12,000 Naira ($83.3–$100) per month in Nigeria, but patients pay only 1000 Naira ($8.3) per month for the ARV drugs at the UNTH ART clinic. However, they pay the full cost for other drugs and investigations received at the clinic.

2.2. Data collection

Data was collected from 301 consenting patients attending the ART clinic. Sample size was computed based on a 95% confidence limit and power of 80%, which gave an adequate sample size of 250. However, more patients were interviewed so as to take care of refusals. There were 1000 registered patients at the clinic. Patients attending the clinic were PLWHA with a CD4 count below 250. Before they could register at the clinic and begin to receive ART, they were screened and tested. The patients were recruited consecutively over a 12-month period. The data was collected by trained interviewers after getting informed consent from the patients using an interviewer-administered questionnaire. The patients were interviewed just after registering their attendance to the clinic for the day but before they saw the medical team. This was because patients usually left quickly after seeing doctors and collecting their drugs. The questionnaire was used to find out monthly expenditures on ARV drugs and other drugs, payment mechanisms for the treatment and how they coped with payment. The questionnaire also explored how much patient's spent on medication elsewhere if ARV drugs were not available at the ART clinic, average monthly expenditures on laboratory and other investigations, and how much they spent on transportation per visit to the clinic (to and fro). Ethical approval for the study was obtained from the research ethics committee of the University of Nigeria Teaching Hospital, Enugu.

2.3. Data analysis

Patients' expenditures on treatment, investigations and transportation were compared for people from urban and rural areas as well as for different SES groups. The comparison of homogeneity of SES of the study sample with the general population was based on a random sample from another larger study that the study team also conducted (on acceptability of malaria treatment) in the same study area (Enugu), which was conducted at the same time and both data sets was undertaken using the same asset-based index that was generated for the merged data set. This analysis aided inferences that were made from SES differences in the ART data, since it was essential to ensure that computed SES differences in benefit incidence analysis (BIA) and catastrophe were reflective of the general population.

2.3.1. Costs

Only the expenditures to patients for receiving treatment were computed. Hence, the patient costs excluded time and other indirect costs. Since costs were collected over a transaction period of 12 months, there was no need to discount them. The level of catastrophic expenditures was computed by dividing average ART expenditure by average monthly household expenditures on various items (minus food expenditure) multiplied by 100.

2.3.2. Benefit incidence analysis

The benefit was computed to be 14,000 Naira ($116.7) per visit. This comprised the ARV drugs subsidy of 9000 Naira ($75.0) plus hospital costs, which has been estimated to be 5000 Naira ($41.7) per visit. The hospital costs comprise cost of consultation, nursing services, counseling services and facilities (at the UNTH ART clinic, patients do not pay these hospital costs). The framework for data analysis follows key elements for a BIA as follows [15–17]: (1) identification of the users of ART programme on the basis of a cross-sectional survey; (2) aggregation of users into SES groups and place of residence (urban–rural abodes); (3) computing the cost of providing ARV drugs, which represents the value of the benefit; (4) controlling for beneficiaries' out-of-pocket spending to access the benefit. Note: 1 US$ = 120 Naira.

2.3.3. Equity analysis

Urban–rural differences as well as SES differences in the variables were compared. Principal components analysis (PCA) was used for developing an asset-based SES index [19,20]. For bivariate analysis the index was analysed as a categorical variable (divided into quartiles), with the ratio of the lowest SES to the highest SES (Q1:Q4 ratio) computed as the measure of inequity.

3. Results

Of the 301 questionnaires filled out by the interviewers, 24 were rejected due to missing/incomplete data. Thus, 277 questionnaires with complete information were used for data analysis. 66.8% of the respondents were from urban areas and the rest were from rural areas (Table 1). Majority of the respondents were females, married, completed senior secondary school, and engaged in petty trading. Radio sets and electric fans were the most common household movable assets. The SES distribution of the HIV patients was not statistically significantly different from the general population ($p > 0.05$).

A total of 126 respondents had been receiving treatment from the UNTH ART clinic for between 6 months and 2 years. All the 277 (100%) respondents spent money on ARV drugs in the ART clinic 1 month to the date of the interview. However, 28 (10.1%) of them also purchased ARV drugs from outside the ART clinic when medication was not available at the clinic. It was also found that 125 (45.1%) of the respondents spent money on other drugs such as drugs for opportunistic infections. Most of the patients spent money on investigations. The major tests that respondents spent money on were CD4 counts (94.2%), and confirmatory tests (54.1%). However, 23.5, 22.4, 23.8, 13.4 and 8.3% spent money on full blood count/erythrocyte sedimentation rate (FBC/ESR), Mantoux, X-ray, serum electrolytes urea and creatinine (S/E/U/C) and liver function test (LFT), respectively. The main payment mechanism for drugs and tests was through out-of-pocket spending – OOPS – without reimbursement (93.5%). There was no use of health insurance. People used multiple coping mechanisms to source the

Table 1
Socio-economic and demographic characteristics of the respondents.

	n (%) *n* = 277
Place of residence of respondents	
Urban	185 (66.8%)
Rural	92 (33.2%)
Female respondents	164 (59.2%)
Number of household residents [mean (S.D.)]	4.8 (S.D. = 2.4)
Number that had any formal education	272 (98.2%)
Marital status	
Single	82 (29.6)
Married	124 (44.8)
Bereaved	71 (25.6)
Level of education attained	
Still in primary school	0 (0)
Primary	85 (30.7)
Junior secondary	20 (7.2)
Senior secondary	94 (33.9)
University	30 (10.8)
Polytechnic	28 (10.1)
Others	20 (7.2)
Household heads' major source of getting money	
Farmer	16 (5.8)
Unemployed	15 (5.4)
Petty trading	84 (30.3)
Government worker	65 (23.5)
Employed in private sector	22 (7.9)
Big business	18 (6.5)
Self-employed professional	8 (2.9)
Others	49 (17.7)
Household ownership of movable assets	
Radio	260 (93.9)
Television	197 (71.1)
Air conditioner	21 (7.6)
Bicycle	37 (13.4)
Motorcycle	58 (20.9)
Car	52 (18.8)
Fridge	147 (53.1)
Generator	51 (18.4)
Electric fan	222 (80.1)
Amount spent last week by patients' household spend to purchase food items	2750.1 Naira (US$ 22.9)
Monetized value of home produced food that patients' household consumed in the last 1 week	1241.3 Naira (US$ 10.3)
Per capita weekly food expenditure [mean (S.D.)]	783.5 (US$ 6.54)
Amount patients' household spend in the last month on basic household needs	
Total expenditure	10103.5 Naira (US$ 84.2)
Per capita expenditure	2398.4 Naira (US$ 20.0)

money for the payment, but the major sources were own money (70.4%) and altruistic contributions/payments by other people.

Table 2 shows gender and urban–rural differences in the numbers and proportions of people that spent money on various investigations and it shows that more males and urbanites purchased ARV drugs elsewhere. More than 95% of people belonging to all SES quartiles spent money on ARV drugs in past month (Table 3). The equity ratios for CD4 count, serum electrolytes, urea and creatinine (S/E/U/C) pointed to equitable numbers of people spending money on the items, whereas the majority of other equity ratios showed that the proportions of least poor spending money were more than that of the most poor.

On average, patients spent 990 Naira (US$ 8.3) on ARV drugs per month. They also spent an average of $8.2 on other drugs in past month. However, people that bought ARV drugs from elsewhere apart from the ART clinic spent on average of $88.8 per month. The average expenditure on other drugs such as those for opportunistic infections was $8.2. Investigations were major expenditure items and patients spent an average of $95.1 per month on this item. The average costs of the most expensive tests were CD4 counts ($45.9), confirmatory test ($20.9) and others ($35.5). The average transportation expenditure on visits to and from the ART clinic was $4.5.

There were no statistical significant differences in the amount of money that males and females spent on all the items, except for transportation where males spent more money than females. There were only urban–rural statistical significant differences in amounts of money spent on X-rays and on transportation, where the urbanites spent more than the rural dwellers. All SES groups spent similar amounts of money on ARV drugs and investigations, with the exception of other drugs where the most-poor SES spent the least amount of money (Table 4).

Total expenditure on treatment (drugs and investigations) depleted more than 100% of household income or total household expenditure (minus food expenditure) (Table 5). Overall, subsidized ARV depleted 9.8% of expenditure, other drugs depleted 9.7%, ARV from elsewhere depleted 105%, investigations depleted 112.9% and total expenditure depleted 243.2%. The level of catastrophe was generally more with females, rural dwellers and most poor patients. Females and urbanites had more benefit incidence than males and rural dwellers, but there were no SES differences in benefit incidence (Table 6).

4. Discussion

Almost all costs associated with ART were catastrophic to almost all the patients who attended the clinic, no matter the geographic location, sex or SES, although the level of catastrophe varied and was inequitable. The fact that people paid mostly using out-of-pocket spending resonates the argument that people, particularly people in poor households, can be protected from catastrophic expenditures by reducing a health system's reliance on out-of-pocket payments and providing more financial risk protection [11]. Even assuming that the patients overstated their expenditures and lowering the total expenditures by 100%, the costs were still catastrophic. It was very catastrophic for rural dwellers and for females. The level of catastrophe increased as SES class decreased, hence the most-poor suffer more and this could possibly lead to increased incidence of poverty, deprivation, vulnerability and adverse coping mechanisms such as selling their assets (which some of the patients did) and the ARV drugs that they received at subsidized costs, for profit.

Issues related to the gender of beneficiaries are of concern to many developing country policy makers, especially as women are 30% more likely to be infected with HIV than

Table 2
No. of males/females and urbanites/rural dwellers that spent money on different items.

Variables	Female $N=164$ n (%)	Male $N=113$ n (%)	Urban $N=185$ n (%)	Rural $N=92$ n (%)
No. that spent on ART in past month	162 (98.8)	113 (100)	185 (100)	92 (100)
No. that spent on other drugs in past month	79 (48.2)	46 (40.7)	86 (46.5)	39 (42.4)
No. that purchased ART elsewhere past month	8 (4.9)	20 (17.7)	25 (13.5)	3 (3.3)
No. that spent on various tests in past month				
CD4 count	145 (88.4)	113 (100)	179 (96.8)	82 (89.1)
Confirmatory test (RVS)	91 (55.5)	60 (53.1)	107 (57.8)	44 (47.8)
FBC/ESR	44 (26.8)	21 (18.6)	49 (26.5)	16 (17.4)
Mantoux	40 (24.4)	22 (19.5)	45 (24.3)	17 (18.5)
LFT	18 (11.0)	5 (4.4)	20 (10.8)	3 (3.3)
S/E/U/CR	22 (13.4)	15 (13.3)	28 (15.1)	9 (9.9)
X-ray	43 (26.2)	23 (20.4)	49 (26.5)	17 (18.5)
Other	94 (57.3)	87 (77.0)	126 (68.1)	55 (59.8)
No. that spent money on transportation to the clinic	156 (95.1)	113 (100)	185 (100)	87 (94.6)

Table 3
No. of people from different SES that spent money on different items.

Variables	Q1 (most poor) $N=69$ n (%)	Q2 (very poor) $N=69$ n (%)	Q3 (poor) $N=69$ n (%)	Q4 (least poor) $N=70$ n (%)	Q1:Q4 ratio
No. that spent on ARV drugs in past month	68 (98.6)	69 (100)	66 (95.7)	68 (97.1)	1.0
No. that spent on other drugs in past month	31 (44.9)	27 (39.1)	31 (44.9)	28 (40.0)	1.1
No. that purchased ARV drugs elsewhere past month	5 (7.3)	8 (11.6)	5 (7.3)	9 (12.9)	0.6
No. that spent on various tests in past month					
CD4 count	61 (88.4)	59 (85.5)	58 (84.1)	60 (85.7)	1.0
Confirmatory test (RVS)	30 (43.5)	32 (46.4)	36 (52.2)	42 (60.0)	0.7
FBC/ESR	13 (18.8)	14 (20.3)	17 (24.6)	17 (24.3)	0.8
Mantoux	13 (18.8)	13 (18.8)	15 (21.7)	17 (24.3)	0.8
LFT	3 (4.3)	4 (5.8)	4 (5.8)	11 (15.7)	0.3
S/E/U/C	9 (13.0)	7 (10.1)	11 (15.9)	9 (12.9)	1.0
X-ray	14 (20.3)	13 (18.8)	17 (24.6)	17 (24.3)	0.8
Others	41 (59.4)	44 (63.8)	42 (60.9)	36 (51.4)	1.2
No. that spent money on transportation to the clinic	63 (91.3)	63 (91.3)	64 (92.8)	59 (84.3)	1.1

Note: serum electrolyte urea and creatinine = S/E/U/C.

Table 4
Differences in expenditures by SES.

Variables	Q1 (most poor) Mean (S.D.)	Q2 (very poor) Mean (S.D.)	Q3 (poor) Mean (S.D.)	Q4 (least poor) Mean (S.D.)	Chi^2 (p-value)	Q1:Q4 ratio
Amount spent on ARV drugs in past month	1000.0 (149.6)	971.0 (117.7)	984.9 (86.4)	1014.7 (121.3)	5.2 (.16)	0.98
Amount spent on other drugs in past month	552.6 (1106.6)	1264.8 (1702.3)	764.5 (1093.9)	1530.7 (2148.7)	8.4 (.038)	0.4
Amount spent to purchase ARV drugs from elsewhere in past month	9760.0 (2947.5)	9375.0 (3889.1)	10630.0 (3081.7)	12388.9 (3998.3)	3.3 (.35)	0.8
Amount spent on lab and other investigations in past month						
CD4 count	5209.8 (1763.7)	5398.3 (2220.2)	5681.0 (2000.0)	5835.0 (2365.0)	2.8 (.42)	0.9
Confirmatory test (RVS)	2267.0 (851.9)	2231.3 (849.3)	2246.1 (806.4)	3135.2 (4182.9)	.61 (.90)	0.7
FBC/ESR	773.1 (398.0)	1162.9 (1159.6)	1419.4 (965.5)	1202.4 (1004.6)	5.6 (.13)	0.6
Mantoux	269.2 (170.2)	480.8 (419.1)	343.3 (311.0)	437.7 (443.4)	4.0 (.26)	0.6
LFT	1206.7 (790.3)	965.0 (734.6)	927.5 (784.2)	1090.0 (646.0)	.31 (.96)	1.1
S/E/U/CR	1660.0 (714.5)	1650.0 (701.6)	1926.4 (866.5)	1025.6 (622.8)	6.2 (.10)	1.6
X-ray	460.7 (78.9)	526.9 (310.0)	585.3 (305.0)	491.2 (124.2)	2.1 (.56)	0.9
Other	4804.9 (3127.9)	4553.9 (2334.7)	3973.8 (1784.8)	3773.9 (2452.7)	5.2 (.16)	1.3
Total	12052.0 (5890.8)	10722.9 (2981.8)	11011.8 (2443.3)	12274.6 (5755.3)	2.2 (.53)	0.98
Amount spent on transportation to visit this clinic (to and fro)	420.2 (382.4)	591.3 (859.8)	430.5 (649.4)	764.8 (1967.0)	5.8 (.12)	0.6
Amount household spend in the last month on various important needs						
Total expenditure	4403.4 (5362.7)	8621.8 (11670.3)	11670.3 (8228.5)	18911.4 (20619.3)	64.7 (.00001)	0.2
Per capita expenditure	1142.3 (1147.3)	2105.3 (2119.3)	1839.5 (1373.8)	4796.1 (4745.5	58.9 (.00001)	0.2

Note: 1 US$ = 120 Naira.

Table 5
Differences in catastrophic expenses on ART by sex, geographic location and SES.

	Subsidized ARV drug costs	Other drugs	Purchased ARV drugs	Investigation costs	Total costs
Sex					
Female	11.0%	11.9%	121.5%	125.2%	273.3%
Male	8.5%	7.2%	90.7%	100%	213.2%
Geographic location					
Urban	8.3%	8.7%	91.2%	92.7%	205.3%
Rural	16.2%	14.1%	133.5%	199.4%	372.0%
Socio-economic status (SES)					
Q1 (most poor)	22.7%	12.6%	221.7%	273.7%	540.2%
Q2 (very poor)	11.3%	14.7%	108.7%	124.4%	265.9%
Q3 (poor)	8.4%	6.6%	91.1%	94.4%	204.1%
Q4 (least poor)	5.4%	8.1%	65.5%	64.9%	147.9%
Everybody	9.8%	9.7%	105%	112.9%	243.2%

men, and they also do not have equal access to care [3,13]. There were more female than male beneficiaries in this study, which could be attributed to the higher numbers of females being infected, but also as a function of pregnant women being routinely tested in ante-natal care (ANC) clinics. It may also be because the men with more economic power attend and receive treatment from private establishments [21]. The finding that majority of the beneficiaries are from the urban areas is reflective of the fact that the treatment centre, as most treatment centres in Nigeria, is located in an urban area.

Free or subsidized provision of ARV drugs is not enough as costs of treatment of opportunistic infections, supportive drugs, and investigations are enormous and provide serious challenges to the monitoring and evaluation as well as the success of the treatment programmes. The costs of the investigations are more than the costs of the drugs and no subsidy exists for these investigations that must be done by every patient before they are able/qualify to receive the subsidized drugs provided by the clinic. The Nigerian government's decision to provide ARV drugs free of charge to people enrolled in the treatment clinic, although laudable, should be seen as the first step towards offering completely free investigations and supportive drugs to the people living with HIV/AIDS. What is needed is completely holistic free services for both ARV drugs, drugs for opportunistic infections, as well as for investigations, especially for the poor.

Financing care for PLWHA has been and remains a big concern because of the high level of expenditures involved [8], but there should be the development of better payment mechanisms and this implies moving away from OOPS to more insurance-based mechanisms and cash transfers to the patients so as to reduce their financial burden of accessing ART. This is especially as ARV drugs sustained use can lower expenditures on other categories of medical care [22]. Also, there should be targeting of ART programme to ensure that more rural dwellers and the most-poor people have increased benefit incidence, which can reduce the level of catastrophe that they are exposed to. This is because the costs were more catastrophic to rural people who had lower benefit incidence than urban dwellers. Additionally, vertical equity should be stressed because of the finding that equal benefit accrued to all SES quartiles, whereas the cost were most catastrophic to the most-poor SES group.

The limitations of the study include the relatively small sample size, non-inquiry into treatment outcomes and follow-up of patients to determine how they cope or the consequences of the high catastrophic costs of consuming services from the subsidized ART programme. There was also no distinction between HIV carriers and AIDS patients, which could have affected expenditures on drugs outside of the clinic. One could also query the generalization of the findings of inequity to the general population. Another limitation of the study is that the sample is selective and although it was comparable to the wider population in

Table 6
Differences in benefit of government expenditures.

	Number of beneficiaries *n* (%)	Benefits (subsidy in Naira)	Benefit incidence total (%)	US$
Sex				
Male	113 (40.8)	14,000	1,582,000 (40.8%)	13183.3
Female	164 (59.2%)		2,296,000 (59.2%)	19133.3
Geographic location				
Urban	185 (66.8%)	14,000	2,590,000 (66.8%)	21583.3
Rural	92 (33.2%)	14,000	1,288,000 (33.2%)	10733.3
Socio-economic status (SES)				
Q1	69 (24.9%)	14,000	966,000 (24.9%)	8050.0
Q2	69 (24.9%)	14,000	966,000 (24.9%)	8050.0
Q3	69 (24.9%)	14,000	966,000 (24.9%)	8050.0
Q4	70 (25.3%)	14,000	980,000 (24.9%)	8050.0
Everybody	277 (100%)	14,000	3,878,000	32316.7

terms of economic characteristics, there may be other axes of diversity that enable some people to participate in therapy and others not. However, since there was no difference in SES of patients with the general population, the findings of SES differentials are robust and would be expected if a similar test is applied to the general population of people receiving similar treatment.

Further research questions have been raised by this study and they include: what are the coping mechanisms that are available to patients and their households to militate the catastrophic costs of ART? For instance, how people are selling their drugs and assets? To what extent are people pushed into poverty or deeper into poverty by spending on ART? What are the treatment outcomes or disease burden in patients with different expenditure profiles? It will also be interesting using larger sample sizes to further disaggregate incidence of catastrophic costs and BIA of ART programme by age as well as by symptomatic and asymptomatic HIV respondents. Also, further interviews are required to understand the why males spent more than females on transportation and the factors responsible for the higher level of catastrophe amongst women. Studies are also needed to determine obstacles to implementing policy recommendations especially to increasing the number of ART centres in rural areas and decreasing financial access to ART.

All in all, the subsidized ART programme lowers the cost of ARV drugs since the drugs bought from outside the programme are at least ten times more than what patients spend in the UNTH ART clinic. However, other major costs are also incurred in the ART programmes, which make the overall expenditure/cost of accessing and consuming ART programme to be excessive and catastrophic. The skewed incidence of benefits to females and urbanites should also be addressed so that all segments of the population that have HIV have equal benefits from the ART programme.

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References

[1] UNAIDS. The 2006 report on the global AIDS epidemic. Geneva, Switzerland: UNAIDS; 2006.
[2] Federal Ministry of Health. Technical Report on 2005 National HIV/Syphilis Sero-prevalence Sentinel Survey. FMOH: Abuja;2006.
[3] UNADS. AIDS Epidemic Update, Geneva;2004.
[4] http://www.vanguardngr.com/articles/2002/features/health/gh311092007.html [accessed September 13, 2007].
[5] Onyedum CC. Free anti retroviral drugs in Nigeria—we want more than free drugs! A letter to the editor. Africa Health 2006;28(5):3.
[6] Kombe G, Galaty D, Nwagbara C. Scaling up antiretroviral treatment in the public sector in Nigeria: a comprehensive analysis of resource requirements. Bethesda, MD: The Partners for Health Reformplus Project, Abt Associates, Inc.; 2004.
[7] Ichoku HE, Fonta W. The distributive effect of health care financing in Nigeria, Poverty and Economic Policy Network Working Paper 021, CIRPEE, University of Laval, Canada; 2006.
[8] The Henry Kaiser Family Foundation. Financing HIV/AIDS care: a quilt with many holes. HIV/AIDS Policy Issue Brief. Washington DC: The Henry Kaiser Family Foundation;2004.
[9] Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic health spending. Health Affairs 2007;26(4):972–83.
[10] Karon JM, Fleming PL, Steketee RW, De Cock KM. HIV in the United States at the turn of the century: an epidemic in transition. American Journal of Public Health 2001;91(7):1060–8.
[11] Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJL. Household catastrophic health expenditure: a multi-country analysis. The Lancet 2003;362:111–7.
[12] Feder J, Moon M, Scanlon W. Medicare reform: nibbling at catastrophic costs. Health Affairs 1987;(Winter):5–17.
[13] Dmytraczenko T, De S, Chanfreau C, Kidane L. The value of beneficiary analyses: who benefits from funds targeted for HIV/AIDS? Bethesda, MD: The Partners for Health Reformplus Project, Abt Associates, Inc.; 2006.
[14] Kristin P, Olatubosun O. Access to Drugs for HIV/AIDS and Related Opportunistic Infections in Nigeria. A status report on the sociopolitical, economic, and policy climate on drug availability for People Living with HIV/AIDS (PLWHA) and recommendations for future access POLICY Project/Nigeria; 2002.
[15] Lanjouw P, Ravallion M. Benefit incidence and the timing of program capture. Washington, DC: World Bank; 1998.
[16] Sabir M. Benefit incidence analysis of public spending on education. Karachi: Social Policy & Development Centre (SPDC); 2003.
[17] Demery L. Benefit incidence: a practitioners guide. In: Poverty development group Africa region. Washington, DC: The World Bank; 2000.
[18] Ichoku HE. A distributional analysis of healthcare financing in a developing country: a Nigerian case study applying a decomposable Gini index. PhD thesis, Health Economics Unit, School of Public Health, University of Cape Town; 2006.
[19] Filmer D, Pritchett LH. Estimating wealth effects without expenditure data—or tears: an application to educational enrollments in states of India. Demography 2001;38:115–32.
[20] Onwujekwe O, Uzochukwu B. Socio-economic and geographic differentials in costs and payment strategies for primary health care services in Southeast Nigeria. Health Policy 2004;71:383–97.
[21] Chukwuka JC. Demographic characteristics of HIV/AIDS patients at University of Nigeria Teaching Hospital Enugu. Journal of College of Medicine 2005;10(2):79–81.
[22] Duggan MG, Evans WN. Estimating the impact of medical innovation: a case study of HIV antiretroviral treatments. Forum for Health Economics and Policy (Economics of the HIV Epidemics) 2008;1(2) [Article 1].