Journal of the International Association of Providers of AIDS Care
Volume 17: 1-8

DOI: 10.1177/2325958218774775
journals.sagepub.com/home/jia
SAGE

Drivers of Patient Costs in Accessing HIV/AIDS Services in Tanzania

Thomas Mnzava, MSc[1], Eunice Mmari, MD[1], and Andres Berruti, PhD[2]

Abstract

Background: Patient costs pose a challenge in accessing antiretroviral therapy for people living with HIV in sub-Saharan Africa. The study aimed at identifying drivers for out-of-pocket (OOP) costs in Tanzania. **Methods:** In 2009, 500 adult patients who attended 10 HIV clinics across 7 regions of Tanzania were asked about time and resources consumed to access HIV services. Bivariate and multivariate median regression models were used to determine the main drivers for OOP costs. **Results:** Male and female patients have a median OOP costs of $40.37 and $28.01 per year, respectively ($P = .01$). Males spend significantly more on travel ($26.51) than females ($19.68; $P = .02$). Living in rural areas and poor social economic status (SES) are associated with greater OOP costs ($P = .001$) for both sexes. **Conclusion:** Poor SES and rural residence are main drivers of OOP costs. Patients are less likely to seek health care unless they are in dire need, leading to expensive services.

Keywords

out-of-pocket costs, HIV care and treatment, PLHIV, SES

Introduction

Access to antiretroviral therapy (ART) remains a challenge for people living with HIV/AIDS (PLHIV) in resource-limited countries. Cost is the main barrier to accessing and adhering to ART in sub-Saharan Africa where 69% of PLHIV reside.[1-5] On financing health, patient out-of-pocket (OOP) payment at the point of service delivery accounts for more than half of the total health expenditure in most countries of sub-Saharan Africa.[5,6] Particularly in Tanzania, in 2008, private OOP payments were $4.47 compared to Kenyans and Ugandans who paid $21.95 and $12.12, respectively.[7] These OOP costs can occur at point of service delivery or on accessing point of care like transport. Both of these payments are paid directly by the patients. For OOP costs that occur at point of care also known as user fees, whereby the fee may also be unofficial fee; where service providers expect or demand extra payments, over and above any official fee. Unofficial fees may be substantial; one study in Bangladesh indicated that informal fees were 12 times higher on average than formal fees.[8] On the other hand, OOP costs include monetary payments incurred by patients while seeking care and treatment, such as transportation, food, accommodation, drugs, and opportunity costs incurred by patients by paying another person to do his/her work due to his/her clinic attendance. To address barriers to care, many countries in Africa are moving away from policies requiring user fees and are instead providing ART free of charge while also decentralizing to minimize patient costs like transportation.[9] However, patients in countries without user fees still incur additional costs that create similar barriers to accessing services.[10-12] Among women who gave birth in rural Tanzania where user fees are waived, 73.3% experienced additional OOP expenses. For women who delivered in government facilities, 53.6% of their costs were for transportation and 26.6% were for unofficial fees.[13]

Tanzania began providing HIV and ART services universally free of charge in the public sector in 2004 through funds provided by the government and donors such as US President's Emergency Plan for AIDS Relief (PEPFAR) and the Global Fund to Fight AIDS, Tuberculosis, and Malaria.[9] Recent

[1] Division of Global HIV and TB, Center for Global Health, US Centers for Disease Control and Prevention, Dar es Salaam, Tanzania
[2] Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, US Centers for Disease Control and Prevention, Atlanta, GA, USA

Corresponding Author:
Thomas Mnzava, Division of Global HIV and TB, Center for Global Health, US Centers for Disease Control and Prevention, PO Box 9123, Dar es Salaam, Tanzania.
Email: thommzava@gmail.com

research indicates that the concept of "OOP payment" in general health service–seeking behavior is concentrated on the impact of user fees, with little emphasis on expenses outside of user fees.[9,14] A study conducted in Ethiopia assessing OOP costs for HIV-positive patients revealed that patients incur an average expense of $23 for transport to seek HIV/AIDS services.[15] In Haiti, the established program for HIV-/AIDS-positive patients' adherence to care and treatment reported to pay $6, $20, and $60 for covering user fee, ancillary tests and monitoring, and transportation fees, respectively.[16] A study conducted in Malawi looked at OOP costs by sex among HIV-positive patients with no user fee policy. The study indicated that HIV-positive males and females incurred different OOP expenses per visit when accessing HIV services: $3.63 for males and $2.23 for females.[17] However, there is little published data on levels of OOP costs related specifically to HIV care and treatment in a country that has waived all user fees in the health sector. With limited published data, in Tanzania, the previous studies have looked at OOP costs for women in the context of pregnancy, and no study in Tanzania looked at the difference in these costs by sex.

This study quantifies OOP costs, including transportation cost, drug-related cost, unofficial payments, and opportunity cost, that HIV-positive males and females incurred while receiving publicly funded HIV care and treatment services in Tanzania. Information from this study can be used for policy adjustment/formulation, planning, and resource allocation decisions during the initiation, scale up, and maturation of HIV treatment programs and can narrow differences in terms of OOP costs by sex.

Methods

Study Design

We conducted a cross-sectional analysis of OOP costs among a random sample of adult HIV-positive clients attending 10 HIV care and treatment clinics in Tanzania in 2009 as part of an HIV care and treatment costing study.[14]

Sampling

Ten HIV treatment facilities in Tanzania were chosen for inclusion in the study. Given the small sample size, these facilities were selected deliberately (rather than randomly) with the guidance of country-level stakeholders. Sites were selected to reflect a range in terms of facility-level criteria which thought to influence patient and program costs (including location, program size [number of ART patients], and type of administration) and to be generally representative of publicly funded outpatient HIV treatment sites in the country at the time. Nine sites were tertiary level facilities (hospitals) and 1 was an infectious disease stand-alone outpatient facility. Four sites were located in urban areas and 6 in rural areas. Eight were government-run and 2 were faith-based facilities. The HIV care and treatment centers (CTCs) at these facilities began enrolling HIV-positive patients between 2003 and 2005.

The study sample size was 500, with 50 patients per facility. Patient's appointment cards were used for random selection, whereby patients with appointment on the days of data collection were assigned numbers and Stata software was used to select 50 numbers randomly prior to clinic day. For patients who missed their appointments, replacement was made on the following day.

Inclusion and Exclusion Criteria

Inclusion criteria for the study required a client to be 18 years of age or older, to be registered in the HIV care and treatment program at that site, and to have at least 1 prior appointment at the clinic to ensure the participant had some experience with the HIV care and treatment - services offered by the clinic.

Data Collection

Clients were approached when leaving their appointment and asked in a private room to voluntarily consent to an interview for the study. Patients were asked about OOP costs incurred to access HIV care and treatment services during the 6 months prior to the interview. The OOP costs were captured from 3 sources: official and unofficial medical payments to the clinic, opportunity costs, and nonmedical payments. Indirect costs such as the loss of productivity due to illness were excluded. Official payments costs were collected by asking the patient how much she paid at a clinic cashier (eg, user fees, antiretroviral payments, and laboratory tests). Unofficial payment was collected by asking a patient if she provided a gift to health care provider for accessing HIV services; the item given as a gift was valued by the patients if it was not money. Nonmedical payment was assessed by asking the patient about the amount of money used for transportations, food, and accommodation. Opportunity costs which include costs for loss of work and child care at home were valued by asking the patient how much she paid for someone who performed his duty while attending the HIV clinic. In addition to patient costs, clients were also asked about socioeconomic status, demographic characteristics, health care utilization (note 1), and their patient type (pre-ART or on ART).

Data Analysis

Patient data were doubly entered into EpiData 3.1 software and followed by data cleaning through validation in which 2 data sets with the same information were compared and discrepancy resolved. Data were then transferred and analyzed using Stata/SE 12 (StataCorp LP, 2005). Using collected household social economic status (SES) information. Social economic status group was generated from wealth index (WI) after employing principal components analysis (PCA) model. The PCA model was populated using the patient's SE responses on education

level, occupation, household assets (eg, land), household financial status (eg, available bank accounts, existing household loan), and household ownership (eg, phone, motorcycle, bicycle). The PCA model adjusted and weighted the availability of the item at the household and assigned a rank known as WI. Wealth index was recorded into 5 SES quintiles, poor SES group represents low WI/lowest quintile and highest SES group represents high WI/highest quintile.

To describe sociodemographic characteristics and health utilization behaviors, frequencies and percentages were used. In this study, OOP costs distribution did not meet normality distribution criteria to enable the use of means; therefore, median regression analysis was applied. Before running median regression analysis, residence, age category, patient type, and SES variables were tested for predictors association with sex using cross tabulation with χ^2 statistic. Also, descriptive analysis on patient age was performed using median and interquartile range (IQR) statistic as age distribution was not normally distributed.

The outcome variable was the total annual OOP costs, which were calculated by taking the sum of official and unofficial medical expenditures, nonmedical expenditures, and opportunity costs incurred by a patient to seek HIV care and treatment services. Per patient costs excluded indirect costs that happened due to illness (eg, productivity loss).

Annual average total OOP cost was compared by demographics and SES. Due to non-normal distribution of OOP cost data, bivariate median regression tested contribution of individual predictor on OOP costs. All covariates identified to be statistically significantly different ($P = .05$) using bivariate model adjusted for confounding effects using multivariate median regression analysis. Covariates regressed on bivariate median model against OOP costs includes education level, SES, residence, and HIV services utilizations. Both bivariate and multivariate median regression analyses estimated median, IQR, and decrease or increase in OOP costs as driven by covariates. Equation below was used to generate median regression:

$$\mathrm{OOP}_i = A + \sum_{i=1,2,\, j=1}^{j=n} K_{ij} C_{ij},$$

where i is gender, 1 for male and 2 for female; j is the number of covariates included in the model, C is the covariate, n is number of covariates, and K is the coefficient indicating increasing or decreasing of OOP costs as a result of imputed covariates.

Results

A majority of the respondents, 70.2%, were female (Table 1). The median ages (IQR) were 38 years (12) for women and 43 years (13) for men. Females were less educated with only 11.1% having at least some secondary education versus 20.8% of males ($P = .009$). Social economic status was similar across sex. Most of females were unpaid workers (70 [20.2%]) compared to males (6 [4.1%]; $P < .001$); however, the majority of males (72 [49.0%]) and females (144 [41.5%]) were farmers/fishermen. The number of annual clinic visits differed by sex as follows: males had 12 visits per year compared to females who reported 10 visits per year ($P < .0001$; Table 1). Almost a quarter of males and females reported not being able to attend scheduled visits due to OOP cost, and 12.8% of males and 13.3% of females reported missing unscheduled clinic visits due to OOP costs (Table 1).

Females spent more time with the health care provider than time spent on travelling (Table 2). The mean amount of hours spent with the health care provider (95% confidence interval [CI]) was 3.7 (3.2-4.2) for males and 3.8 (3.5-4.2) for females compared to travel time of 3.6 (3.1-4.1) and 3.2 (2.8-3.5) for males and females, respectively. There were no statistical differences between travel and time spent with health care providers across sex (Table 2).

Table 1. Sociodemographic and Health Care Utilization Characteristics of Patients Enrolled in 10 HIV Care and Treatment Clinics in Tanzania, by Gender, 2008.

Characteristics	Male (n = 149), n (%)	Female (n = 351), n (%)	*P* Value
Demographics			
Residence			
Urban	91 (32.0)	191 (67.7)	.17
Rural	58 (26.6)	160 (73.4)	
Age			
19-29	14 (9.4)	60 (17.1)	<.01
30-39	41 (27.5)	142 (40.5)	
40-49	58 (38.0)	104 (29.6)	
50-59	28 (18.8)	34 (9.7)	
60+	8 (5.4)	9 (2.6)	
Median age (IQR)	43 (13)	38 (12)	
Education			
None	13 (8.7)	58 (16.5)	.01
Some primary	24 (16.1)	57 (16.2)	
Complete primary	81 (54.4)	197 (56.1)	
Some/complete secondary	31 (20.8)	39 (11.1)	
Socioeconomic status			
Poorest quintile	27 (18.1)	72 (20.5)	.66
2nd quintile	33 (22.1)	68 (19.4)	
3rd quintile	29 (19.4)	72 (20.5)	
4th quintile	26 (17.4)	74 (21.1)	
Least poor quintile	34 (22.8)	65 (18.5)	
Occupation[a]			
Farming/fishing	72 (49.0)	144 (41.5)	<.01
Paid employees (government or private sector)	31 (21.1)	33 (9.5)	
Self-employed	28 (19.0)	64 (18.4)	
Unpaid workers[b]	6 (4.1)	70 (20.2)	
Not working	10 (6.8)	36 (10.4)	

Abbreviation: IQR, interquartile range.
[a]Missing responses from 1 patient.
[b]Unpaid workers are those working but not receiving monetary compensation.

Table 2. HIV Services Utilization by Gender.

HIV Care Services	Male (n = 149)	Female (n = 351)	*P* Value
Patients on ART, n (%)	114 (76.5)	280 (80.0)	.38
Time in care (years), mean (95% CI)	1.3 (0.8-1.9)	1.4 (1.1-1.9)	.71
Time on ART (years), mean (95% CI)	2.0 (1.7-2.3)	1.9 (1.7-2.1)	.40
Median number of visits in a year			
Among clients in care	12.0 (6.0-12.0)	10.0 (6.0-12.0)	<.01
Among clients on ART	12.0 (8.0-12.0)	12.0 (12.0-12.0)	
Per visit travel time (hours), mean (95% CI)	3.6 (3.1-4.1)	3.2 (2.8-3.5)	.20
Per visit wait time (hours), mean (95% CI)	2.0 (1.7-2.3)	2.3 (1.9-2.8)	.32
Per visit time with health care provider(s) (hours)	3.7 (3.2-4.2)	3.8 (3.5-4.2)	.76
Missed an appointment due to payments			
Missed a scheduled visit, n (%)	37 (25.0)	91 (26.8)	.68
Unable to come to clinic for unscheduled visits, n (%)	19 (12.8)	45 (13.3)	.90

Abbreviations: ART, antiretroviral therapy; CI, confidence interval.

Table 3. Average OOP Costs per Year by Type of Expense and by Male and Female Patients Attending Care and Treatment Clinics in Tanzania, 2008.

Out-of-Pocket Patient Payments	Male (n = 149)	Female (n = 351)	*P* Value
Travel payments	$26.51	$19.68	.02
Accommodation payments	$4.75	$3.00	.12
Drug payments	$0.92	$1.48	.74
Informal payments	$0.00	$0.37	.82
Other payments	$8.15	$2.76	.02
Total payments	$40.37	$28.01	.01

Abbreviation: OOP, out-of-pocket.

Travel cost was significantly different by sexes ($P = .02$). Males paid higher ($26.51) compared to female ($40.37). In total, males paid $40.37 compared to female $28.01; the difference of payment was significant at $P = .01$ (Table 3).

Males in rural areas incurred 3.6 times higher OOP costs compared to males in urban areas; rural females had 3.12 times higher OOP costs than females in urban areas. Males living far from health care facilities paid nearly 3 times more OOP costs than those living close to health care facilities ($17.18 versus $6.87, $P = .03$). Similarly, female patients living far from a facility paid almost 4 times more costs ($17.18 versus $4.30, $P < .01$) than females living close to health care facilities (Table 4).

Given reported 12 clinic visits for rural residents and 12 clinic visits for urban residents, when comparing median total OOP costs by sociodemographic factors and health care utilization behaviors through bivariate analysis, males ($P < .01$) and females ($P < .001$) from rural area were more likely to incur higher OOP costs than males and females from urban areas (Table 4).

In bivariate analysis (Table 5), both male and female patients of poor SESs had higher OOP costs ($P = .0001$) of $21.47 ($8.51-$34.44) and $7.16 ($1.80-$12.52) compared to the non-poorest SES group ($P = .001$). Male patients of 40 years or older had lower OOP payments of $14.32 ($23.67-$4.96) compared to males under the age of 40 ($P = .001$). Urban residents reported low OOP costs (−$13.46; −$19.41 to −$7.51) compared to rural residents ($P < .01$).

Due to likelihood of having confounding effects on bivariate median regression, multivariate median regression analysis model was used to control confounding effects (Table 5). Both male and female patients who lived in rural areas made significantly higher OOP payments, nearly $12 higher than their urban counterparts. Patients of the poorest SESs had higher OOP costs than the non-poorest SES groups, with OOP costs (95% CI) $21.89 ($10.41-$33.36) and $6.30 ($2.83-$9.77) for males and females, respectively (Table 6).

Discussion

In this study of OOP costs in Tanzania, adult clients attending care and treatment spent an average of $40.37 and $28.01 per year for males and females, respectively. Mean per capita household income in mainland Tanzania in 2007 was $406.20 (note 2; at the 2008 Tsh to USD conversion rate)[18]; therefore, 10% and 7% of household income of males and females were spent on OOP costs for HIV care and treatment payments in that year. Furthermore, OOP payments may in some way be related to ability to pay, and this may be the factor influencing the difference in OOP costs for men and women. Being less able to meet OOP payments, women may decline taking on avoidable costs and instead adopt measures which take more time but reduce their OOP costs. For example, women may choose to use cheaper means of transport; women have less unit cost for travel compared to male. These measures reduce opportunity costs when going to the clinic.[19]

Poorer SES was associated with greater OOP costs. This is of great concern, as we know that those who are poorest due to OOP costs are least able to manage health shocks and often sacrifice food and education to compensate expenses for health.[20] Furthermore, high OOP costs can lead to greater impoverishment and/or reduced adherence and retention in HIV care for this vulnerable group.[2,21] This finding is

Table 4. Median Total Patient OOP Costs per Year by Demographic and Health Care Utilization Characteristics for Male and Female Patients Attending Care and Treatment Clinics in Tanzania, 2008.

Characteristics	Males, Median (IQR)	*P* Value	Females, Median (IQR)	*P* Value
Residence				
Urban	$6.87 ($1.07-$31.71)	.02	$5.15 ($0-$12.88)	<.01
Rural	$21.48 ($8.59-$51.54)		$18.61 ($8.59-$45.82)	
Age, years				
19-29	$20.04 ($0.00-$51.54)	.09	$8.59 ($1.57-$34.36)	.12
30-39	$25.77 ($8.59-$81.61)		$12.03 ($5.73-$34.46)	
40-49	$10.38 ($4.30-$25.77)		$8.59 ($0.00-$41.95)	
50-59	$15.03 ($8.59-$47.25)		$22.19 ($8.59-$42.95)	
60+	$21.48 ($10.02-$67.29)		$5.15 ($4.30-$11.45)	
Education				
None	$17.18 ($2.86-$57.27)	.13	$17.18 ($5.73-$42.95)	.13
Some primary	$25.77 ($8.59-$74.45)		$17.18 ($2.58-$42.95)	
Completed primary	$12.89 ($4.30-$41.24)		$10.02 ($4.30-$34.36)	
Completed some secondary or more	$12.89 ($5.15-$51.54)		$7.87 ($4.30-$19.32)	
Socioeconomic status				
Poorest quintile	$34.36 ($10.02-$51.54)	.38	$17.18 ($7.73-$42.95)	.18
2nd quintile	$21.48 ($5.15-$51.54)		$13.31 ($2.34-$32.79)	
3rd quintile	$12.60 ($5.73-$49.40)		$9.02 ($0-$29.35)	
4th quintile	$20.04 ($2.15-$42.95)		$8.59 ($0.72-$34.36)	
Least poor quintile	$10.95 ($5.15-$25.77)		$11.45 ($5.44-$25.77)	
Occupation				
Farming/fishing	$25.77 ($8.59-$51.54)	.14	$25.77 ($7.16-$51.54)	.01
Paid employees	$8.59 ($2.58-$29.35)		$7.16 ($4.30-$12.89)	
Self-employed	$15.03 ($5.15-$51.54)		$8.59 ($2.43-$17.25)	
Unpaid workers	$8.73 ($12.31-$12.89)		$8.59 ($0.00-$25.77)	
Not working	$13.60 ($5.73-$36.65)		$ 9.31 ($0.43-$27.49)	
Health care utilization				
Patient on ART	$17.18 ($6.87-$51.54)	.54	$11.45 ($4.15-$36.65)	.84
Patient not on ART	$11.45 ($0.71-$57.27)		$11.45 ($5.15-$28.64)	
Duration on ART years				
Less than 1 year	$11.45 ($2.86-$41.24)	.12	$11.45 ($4.00-$35.79)	.87
1-2 years	$17.18 ($8.59-$60.71)		$12.89 ($4.30-$25.77)	
Above 2 years	$12.89 ($5.73-$42.95)		$10.02 ($4.30-$42.95)	

Abbreviations: ART, antiretroviral therapy; OOP, out-of-pocket; IQR, interquartile range.

consistent with other research that shows OOP payments are inversely related to income in that the poorest spend a larger proportion of their income on health care than the wealthiest.[8] Given the large expense relative to income, poorer patients are less likely to seek health care unless they are in dire need of services, leading to more complicated and expensive care and treatment for this group. In the case of HIV treatment, research has shown that the efficacy of first-line treatment is often compromised when patients are unable to pay for the treatment regularly, which may call for these patients to be prescribed more costly, second-line drugs.[9] Research conducted by the World Bank found that even when care is free, the richest quintiles still benefit more since they feel more empowered to express their demands and in turn are more able to influence health care professionals.[6] Therefore, even in Tanzania where user fees are waived for HIV care and treatment, the poorest segment of the population still shoulders more of the cost burden for health care than wealthier Tanzanians.

Living close to the health facility was associated with lower OOP payments for both men and women. Transport has been found to be a substantial component of cost (exceeding 20% of all direct costs) in other studies of OOP costs,[22-25] as well as a major component for PLHIV seeking health care.[26,27] Having facilities nearby is not only about convenience but also makes a major difference to the financial and health impact HIV can have on women and thus their households. Historically, CTCs were established in urban settings and care provision was still centralized in Tanzania until 2008. Rural dwellers very likely lived much further away from any available facility and thus had greater travel costs; some had to find accommodation to stay overnight near the facility in order to manage the long distance safely. However, with recent decentralization of HIV services into all health facility levels, the patient has the opportunity to utilize HIV services near their residential area, resulting in lowering their OOP costs. In addition with decentralization which happened after 2009, Ministry of Health, Community Development, Gender, Elderly, and Children with PEPFAR collaboration have established a pivot structure to provide HIV services to patients by decentralization of medication pickup and larger supplies,

Table 5. Bivariate Analysis for Median OOP Costs for Male and Female Patients Attending Care and Treatment Clinics, Tanzania, 2008.

Covariate	Male (n = 149), Adjusted OOP Costs (95% CI)	Female (n = 351), Adjusted OOP Costs (95% CI)
Residence (rural area = reference)		
Urban area	−$14.60[a] (−$23.24 to −$4.87)	−$13.46[a] (−$19.41 to −$7.51)
Age (39 years or younger = reference)		
40 years or older	−$14.32[b] (−$23.67 to −$4.96)	−$1.43 (−$7.02 to $4.15)
Education level (completed primary education or less = reference)		
Completed some secondary education or more	−$4.30 (−$17.32 to $8.73)	−$4.15[a] (−$13.50 to $5.20)
Socioeconomic score (4 higher SES quintiles = reference)		
Poorest SES quintile	$21.47[b] ($8.51 to $34.44)	$7.16[b] ($1.80 to $12.52)
Health care utilization (patient in care = reference)		
Patient on ART	$5.727 (−$8.69 to $20.15	$0 (−$6.89 to $6.89)
Years receiving ART treatment at the clinic	−$1.17 (−$4.53 to $2.19)	$0[a] (−$1.90 to $1.90)

Abbreviations: ART, antiretroviral therapy; CI, confidence interval; OOP, out-of-pocket; SES, social economic status.
[a]$P < 0.1$.
[b]$P \leq .01$.

Table 6. Multivariate (Adjusted) Median OOP Costs for Male and Female Patients Attending Care and Treatment Clinics, Tanzania, 2008.

Covariate	Male (n = 149), Adjusted OOP Costs (95% CI)	Female (n = 351), Adjusted OOP Costs (95% CI)
Residence (rural area = reference)		
Urban residence	−$12.64[a] (−$21.77 to −$3.51)	−$12.89[b] (−$15.88 to −$9.90)
Age (39 years or younger = reference)		
40 years or older	−$8.55 (−$17.42 to $0.32)	−$0.86 (−$3.66 to $1.94)
Socioeconomic score (4 higher SES quintiles = reference)		
Poorest SES quintile	$21.89[a] ($10.41 to $33.36)	$6.30[a] ($2.83 to $9.77)
Education level (completed primary education or less = reference)		
Completed some secondary education or more	$3.60 (−$7.33 to $14.53)	$0.0 (−$4.47 to $4.47)
Health care utilization (patient in care = reference)		
On ART	$4.91 (−$5.41 to $15.23)	$0.0 ($3.47 to $3.47)
Years receiving ART treatment at the clinic	−$0.74 (−$3.45 to $1.98)	$0[c] (−$0.96 to $0.96)

Abbreviations: ART, antiretroviral therapy; CI, confidence interval; OOP, out-of-pocket; SES, social economic status.
[a]$P < .01$
[b]$P < .05$.
[c]$P < .1$.

along with fewer clinic visits to reduce both overall costs. It is anticipated that the pivoting will serve more patients with reduced patient costs and burdens.

The rural/urban variance undermines equitable access to services and endangers drug adherence[1,2] and thus increases resistance risk in rural areas. The highlighted costs as a barrier for HIV service utilization motivates the pivot structures to facilitate attendance of both urban and rural HIV-positive patient with low OOP costs by having few visits. Also, the costs differences across location may also be influenced by model of transport in which rural patients use motorcycles which is more expensive than using public transport, common in urban areas.

Lastly, this study revealed that one quarter of patients missed appointments in the past year due to OOP costs, providing further evidence that costs can be a barrier to uptake and adherence to treatment.[21] The cost as a barrier for HIV service utilization might be resolved as HIV services are moving toward few drug pickup visits.

Limitations

We recognize that our study has several limitations. Firstly, we used a random sample of 500 patients selected from a convenience sample of 10 sites across Tanzania. Thus, our patient group is not necessarily representative of all HIV care and treatment patients in Tanzania. Secondly, one known source of bias is that this sampling strategy may oversample those patients who attend the clinic more frequently. This has the potential to overestimate patient costs in the general patient population (patients incur costs to attend the clinic, and more frequent attendance could result in higher costs); the strategies required to prevent this bias (eg, home-based follow-up of a randomized patient sample) was infeasible for the present

study. Due to the way costs were collected in this study and the sample size, it is not possible to accurately ascertain the costs per visit type, so we have limited our discussion to overall OOP costs for any visit type.

Despite these limitations, this study has demonstrated that there are significant OOP costs associated with HIV care in Tanzania, highlighting the challenges patients face when accessing care even when it is free at the point of services. Variations in determinants of OOP cost payments for men and women suggest that distant or lower quality services may impact men and women differently. High costs might be mitigated by bringing services closer to patients.

Authors' Note

The findings and conclusions in this publication are those of the authors and do not necessarily represent the official position of the US Centers for Disease Control and Prevention. All authors contributed to the conception and design of the study. All authors participated in manuscript writing.

Acknowledgments

Thanks to John F. Vertefeuille and late Gilly Arthur for their contributions on this manuscript and Katherine Raum for manuscript editing. We also appreciate the efforts of the staff members and clients at each of the 10 health facilities and their district and regional officers involved in the study—Mount Meru Regional Hospital, Karatu Designated District Hospital, Infectious Diseases Clinic-Dar es Salaam, Mafinga District Hospital, Kagera Regional Hospital, Haydom Lutheran Hospital, Rungwe District Hospital, St. Francis Designated District Hospital–Ifakara, Shinyanga Regional Hospital, and Lushoto District Hospital.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research has been supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through Centers for Disease Control and Prevention (CDC) under the terms of No. 200-2006-F-15331.

Notes

1. Health care utilization behavior is defined in this study as number of scheduled and unscheduled appointments made by a patient for seeking HIV services in a period of 6 months. It includes type of services a patient received and the duration served.
2. Monthly income = 39 362 Tsh. At 2007 conversion rate (1 USD = 1165.25 Tsh) = $32.64 per month.

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