Dimensions of Poverty and Health Outcomes among People Living with HIV Infection: Limited Resources and Competing Needs

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Abstract

HIV infection is concentrated in populations living in poverty. We examined the overlapping and independent effects of multiple poverty indicators on HIV-related health status. Because substance use can create competing survival needs when resources are limited, we also sought to objectively measure expenditures on food relative to alcohol and tobacco products. To achieve these aims, 459 men and 212 women living with HIV infection in Atlanta, GA completed measures of socio-demographic and heath characteristics as well as multiple indicators of poverty including housing stability, transportation, food insecurity, and substance use. Participants were given a $30 grocery gift card for their participation and we collected receipts which were coded for alcohol (beer, wine, liquors) and tobacco purchases. Results showed that participants with unsuppressed HIV replication were significantly more likely to experience multiple indicators of poverty. In addition, one in four participants purchased alcohol or tobacco products with their gift cards, with as much as one-fourth of money spent on these products. A multivariable logistic regression model showed that food insecurity was independently associated with unsuppressed HIV, and purchasing alcohol or tobacco products did not moderate this association. Results confirm previous research to show the primacy of food insecurity in relation to HIV-related health outcomes. Competing survival needs, including addictive substances, should be addressed in programs that aim to alleviate poverty to enhance the health and well-being of people with HIV infection.

Introduction

Advances in antiretroviral therapy have transformed HIV infection from a universally fatal disease to a nearly completely controllable chronic illness. HIV treatments have achieved this remarkable success by controlling viral replication, reducing inflammatory disease processes, improving and restoring immune function, and ultimately extending the lives of people living with HIV (Volberding & Deeks, 2010). Since the advent of combination antiretroviral therapy (ART) in 1996, AIDS diagnoses have been reduced, hospitalizations due to HIV-related illness have become rare, and AIDS-related deaths have dramatically declined (Gardner, McLees, Steiner, Del Rio, & Burman, 2011). Unfortunately, the potential for ART to change the course of HIV infection is not realized by all those infected. In the

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United States, only half of people aware of their HIV infection are actively engaged in medical care, of which three of four receive ART, with 20% failing to achieve the optimal clinical outcome of complete viral suppression or undetectable viral load (Gardner et al., 2011). Multiple factors account for the clinical management of only one in five HIV infected individuals, nearly all of which stem from poverty-driven health disparities (Pellowski, Kalichman, Matthews, & Adler, 2013).

Among the facets of poverty that have emerged as being closely associated with HIV treatment failure are unstable housing (Leaver, Bargh, Dunn, & Hwang, 2007), lack of transportation (Tuller et al., 2010), food insecurity (Singer, Weiser, & McCoy, 2014; Weiser et al., 2009) and substance use (Hendershot, Stoner, Pantalone, & Simoni, 2009). While most studies have focused on dimensions of poverty that interfere with ART adherence, few have examined poverty markers in relation to HIV viral suppression, a clinical outcome that reflects linkage to care and receiving treatment as well as ART adherence.

Co-occurring conditions of poverty create conflicts for meeting basic survival needs and therefore utilizing limited resources to meet those needs. In this study, we were interested in the independent association of poverty indicators in relation to HIV viral suppression among people living with HIV in poverty. Of particular interest is the relationship between food insecurity and substance use, which can evolve into competing survival needs, especially in the context of addiction. Expending limited resources on addictive substances likely contributes directly to poor health outcomes by interfering with immune functioning and impeding healthy behaviors, and indirectly by exacerbating food insecurity. Limited and lost resources can serve causal roles in illness coping and health management, which in turn directly affect adaptive health behaviors and health outcomes (Hobfoll & Jackson, 1991). To our knowledge, no study has examined the use of limited financial resources to obtain food versus substances on health outcomes among people living with HIV infection in poverty.

The current study examined multiple co-occurring conditions of poverty, including housing, transportation, food insecurity and substance use among individuals living with HIV who have suppressed and unsuppressed HIV replication. We hypothesized that food insecurity would uniquely contribute to health status as indexed by viral suppression, and that expending funds to obtain alcohol and tobacco would exacerbate this relationship. To test this hypothesis we prospectively examined the use of a financial incentive for participating in the study to obtain alcohol and tobacco among those who were viral suppressed and unsuppressed.

Methods

The study was conducted in Atlanta, GA, a city with over 23,000 reported cases of AIDS. The poverty rate in Atlanta is 21% compared to the state of Georgia's 14%; 12% of Atlanta residents have incomes below 50% of the poverty line. The University Institutional Review Board approved all of the study measures and procedures.

Participants

Participants were 459 men and 212 women living with HIV infection recruited from clinical and community services throughout Atlanta.

Measures

Participants completed a computer-administered survey to assess demographic, social, and health characteristics, HIV treatment access, ART adherence and multiple indicators of poverty including housing stability, transportation, food insecurity, and substance use. Surveys were collected anonymously with assistance provided to participants as requested. Participants were also weighed and their height was measured to calculate body mass index (BMI). Finally, we determined whether participants purchased alcohol and tobacco products with their study incentive by collecting and coding their purchase receipts.

Demographic and health characteristics—Participants were asked their gender, age, years of education, income, ethnicity, and employment status. We also asked participants their current CD4 cell count and their most recent HIV RNA viral load, indicating whether the result of their most recent viral load test was either 'detectable' or 'undetectable'. This format for collecting self-report viral load has been found valid when compared to medical record chart abstractions (Kalichman, Rompa, & Cage, 2000). Participants reported the year they first tested HIV positive and whether they were currently taking ART. For those who were receiving ART, we used a visual analogue rating scale to assess ART adherence over the previous month. The adherence rating scale asks individuals to indicate how much of their ART they have taken in the past month using a 100-point continuum, anchored by 0%, 50% and 100%. The standard instructions are designed to counter socially desirable response biases by acknowledging that it can be difficult to take ART (Simoni et al., 2006). Scores on the adherence rating scale correlate with unannounced pill counts ($r = .48$) and are significantly associated with HIV viral suppression (Amico et al., 2006; Giordano, Guzman, Clark, Charlebois, & Bangsberg, 2004). In addition, we dichotomized adherence ratings using 85% of medications taken as a cut-off for acceptable adherence (Bangsberg, 2006). We also asked participants to indicate whether they had run out of ART or had to choose between ART and food in the previous month. Finally, we calculated BMI from height and weight obtained at the time of the survey.

Poverty Indicators—All poverty indicators were asked with reference to the previous month. We asked participants if they had stable housing and whether they had reliable transportation to both their health care provider and where they obtain food. Specifically, participants indicated whether they did not have a place to stay in the past month, and whether they were unable to get to a health care appointment or were unable to get to where they obtain their food/meals. In addition, we asked whether they received food stamps. To measure food insecurity we adapted eight items from a standard food insecurity measure (Coates, Swindale, & Bilinsky, 2007). Each indicator of food insecurity was responded to as having occurred or not occurred and responses were summed to provide an index score.

Substance use—To assess global alcohol use we administered the Alcohol Use Disorders Identification Test (AUDIT), a 10-item scale designed to measure alcohol consumption and

identify risks for alcohol abuse and dependence (Saunders, Aasland, Babor, DeLaFuente, & Grant, 1993). Scores on the AUDIT range from 0 – 40 and the AUDIT has demonstrated acceptable reliability and validity. Scores of 8 or greater indicate high-risk for alcohol use disorders and problem drinking, with demonstrated specificities between .80 and .90 (Maisto, Conigliaro, McNeil, Kraemer, & Kelley, 2000). The first three items of the AUDIT were used to index current alcohol use and consumption quantities. We also asked participants if they used other drugs in the previous month, including marijuana, cocaine, inhalants, amphetamines, and other drugs.

Alcohol and tobacco purchases—Participants were provided with a $30 grocery gift card for their participation in the survey. To determine whether participants purchased alcohol and tobacco with their grocery gift card, we collected all receipts returned and coded whether alcohol products (beer, wine, liquors) and any smoked or smokeless tobacco products were purchased. For participants who purchased alcohol or tobacco products, we also recorded the amount of money spent on these items and the total amount of monetary value spent from the gift card to calculate the proportion of the gift card value spent on substances relative to total purchases.

Procedures

We conducted a cross-sectional survey of people living with HIV in Atlanta, GA, USA in November 2013 at a community-based research site. People living with HIV were reached through notices posted at local infectious disease clinics and AIDS-related social services as well as word-of-mouth that they could obtain a grocery store gift card ($30 value) for completing an anonymous survey. Individuals phoned the research office to schedule a time to complete the survey. Participants were required to prove their HIV positive status by presenting a photo-identification along with a name matching ART prescription, medication bottle, HIV clinic card, or other verification of HIV status, none of which was recorded. Surveys were delivered using a computer-assisted administration (Gribble, Miller, Rogers, & Turner, 1999). We also weighed and measured height of participants to calculate their BMI at the time of the survey. Participants were informed that they could use the gift card to purchase anything they wished at any location of the major chain grocery store. However, unspent balances on the gift card could not be redeemed for cash. We then informed participants that we were interested in the grocery purchases of people living with HIV and we would give them an additional $10 cash if they returned with the receipt(s) from their purchases made with the gift card. Surveys and receipts were linked using a numbering system to retain anonymity of all study procedures.

Data Analyses

We constructed logistic regression models to examine the social and health characteristics of people living with HIV who's most recent HIV viral load was suppressed (undetectable) or unsuppressed (detectable). Among the 693 survey participants, 22 (3%) could not recall the last time they had been tested for HIV viral load and were not included in the analyses. We examined demographic and health characteristics, poverty indicators and substance use in relation to viral suppression. We also examined the associations between HIV viral suppression, food insecurity and substance use, as well as alcohol and tobacco purchases.

Store receipt data were available for 498 (74%) participants. Finally, we performed a multivariable logistic regression entering all factors that were significantly associated with viral suppression in the initial unadjusted models. For all analyses, we report odds ratios with associated 95% confidence intervals, defining statistical significance as p < .05.

Results

Among the 671 participants who recalled their most recent HIV viral load, 536 (79%) indicated that their viral load was suppressed and 135 (21%) indicated that their HIV viral load was unsuppressed. Table 1 shows the demographic and health characteristics of viral suppressed and unsuppressed persons living with HIV. Individuals who were viral load unsuppressed had significantly lower CD4 cell counts, were less likely to be receiving HIV treatment and were less likely to be medication adherent. This pattern of health indicators was expected to correspond with HIV suppression and demonstrates internal consistency of the data. Unsuppressed HIV replication was also associated with younger age and fewer years of education. On average participants' BMI indicated the sample was overweight and BMI was unrelated to viral suppression.

Indicators of Poverty and Substance Use

Results showed that viral suppression was significantly associated with multiple indicators of poverty. (Table 2) Individuals with unsuppressed HIV were more likely to experience unstable housing, lacked transportation, and had less access to food, including experiencing more hunger and having to go without food. As shown in Table 3, more than half of the sample reported current alcohol use and more than one-third of participants indicated recent use of other drugs. HIV viral suppression was significantly related to alcohol and other drug use; individuals with unsuppressed HIV drank more alcohol and used more drugs than their HIV suppressed counterparts.

Alcohol and Tobacco Purchases

As shown in Table 3, nearly one in four participants who returned receipts had purchased alcohol or tobacco products with their grocery gift cards. Among individuals who did purchase alcohol or tobacco, these participants spent more than 25% of their grocery gift card value on alcohol or tobacco products. Overall, a greater proportion of gift card expenditures went on tobacco than alcohol products. Viral unsuppressed participants were significantly more likely to have purchased tobacco products than participants who were viral suppressed.

In addition, participants who reported one or more indicators of food insecurity were significantly more likely to report alcohol use, OR = 1.46, 95%CI=1.07-1.98, p < .01, and other drug use, OR = 2.35, 95%CI=1.71-3.23, p < .01, and were significantly more likely to purchase tobacco products using their grocery gift card, OR = 1.85, 95%CI=1.14-2.99, p < .01. Food insecurity was not associated with purchasing alcohol with the gift card, OR = 1.29, 95%CI=0.75-2.20, p > .05.

Multivariable Model

We entered all non-redundant variables associated with viral suppression in the unadjusted models into a multivariable logistic regression to test the main study hypothesis that food insecurity would uniquely contribute to health status as indexed by viral suppression. To test whether diverting available funds on substances would exacerbate this relationship, we included the interaction term between food insecurity and purchasing tobacco products. Table 4 shows the resulting adjusted odds ratios, indicating that only food insecurity was significantly associated with viral suppression over and above all other demographic, poverty, and substance use factors in the model. The interaction between food insecurity and purchasing tobacco products was not significant.

Discussion

The current study replicates previous research to show that a constellation of poverty indicators is closely associated with poor health outcomes among people living with HIV (Leaver et al., 2007; Weiser et al., 2012). In our study, a robust and independent association occurred between multiple indicators of food insecurity and HIV viral suppression. Individuals with unsuppressed HIV were more than twice as likely to have unstable housing and more than twice as likely to have unreliable transportation to health care and food sources. Unsuppressed HIV infection was related to every indicator of food insecurity, including experiencing hunger and going at least a day without food. Confirming our main study hypothesis, food insecurity was associated with unsuppressed HIV replication over and above alcohol and drug use, housing stability, transportation, and purchasing substances. However, we did not confirm our hypothesis that purchasing alcohol or tobacco products would exacerbate the adverse effects of food insecurity on HIV suppression. These findings therefore show the primacy of food insecurity in predicting poor health and treatment outcomes in people living with HIV infection.

A unique feature of our study was the use of purchase receipts to index expended resources on addictive substances in relation to food insecurity and health outcomes. We found that more than one in four participants used their grocery gift card to purchase alcohol or tobacco products, and among those who did purchase alcohol and tobacco more than one-fourth of their available funds were spent on these items. Thus, tobacco, an addictive substance, diverted limited resources away from food and other competing survival needs. While alcohol use is a known and robust predictor of poor health in people with HIV including in the current study, alcohol purchases were not related to unsuppressed HIV (Hendershot et al., 2009). One possible explanation for this pattern of results is that tobacco purchases may reflect an addictive behavior, and therefore a competing survival need, whereas alcohol purchases may or may not be indicative of addiction. These results suggest the need for additional research with objective measures of resource utilization in relation to health behaviors and health outcomes of people living in poverty with HIV infection.

These findings should be interpreted in light of the study limitations. First, we relied on a convenience sample that cannot be considered representative of people living with HIV infection. We aimed to over-sample people living in poverty by using a food gift card as the incentive to participate. Thus, our study cannot be taken as a prevalence estimate of food

insecurity among people living with HIV. The sample also consisted of people who may not have been in care as well as those receiving care from a wide-range of providers that likely varied in health services and prescription practices. While we used state-of-the-science measures of self-reported ART adherence, health status, and food insecurity, these data may still be subject to social response biases. With these limitations in mind, we believe that our findings have implications for future research.

Individuals with limited resources are challenged to meet multiple survival needs on a daily basis. Adding addictive behaviors to the competing survival needs within an array of poverty conditions likely has diminishing effects on health. Our data suggest that for people living with HIV who use substances, particularly alcohol and tobacco, as much as one-fourth of their resources may be expended on these products. Programs to alleviate the impact of poverty on HIV treatment outcomes must therefore address food insecurity and concomitant substance use. For persons with HIV who experience food insecurity and co-occurring substance use, these competing needs will complicate health improvement efforts. While alcohol treatment is often prioritized in alleviating conditions of poverty, our data show that tobacco use consumes significant resources in addition to contributing to poor health in people with HIV. Conditions of poverty are clearly undermining the promise of HIV treatment. Poverty relief that includes substance use treatment, should be considered an essential element of advancing HIV treatment and care.

Acknowledgments

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Table 1

Demographic and health characteristics of people living with HIV who have suppressed and unsuppressed HIV replication.

Characteristic	Suppressed HIV (n = 536)		Unsuppressed HIV (n = 135)		OR	95% CI
	N	%	N	%		
Male	366	68	93	69		
Female	170	32	42	31	1.02	0.68-1.55
Identify Transgender	35	6	11	8	1.27	0.63-2.57
African American	489	91	126	93		
White	29	5	5	4		
Latino	17	3	4	3	0.83	0.42-1.62
Employed	81	15	24	17	1.10	0.86-1.41
Hospitalized for HIV	224	42	56	42	1.01	0.69-1.48
CD4 < 500	221	46	75	71	2.93[**]	1.85-4.64
Receiving ART	473	88	94	69	0.30[**]	0.19-0.47
<85 adherent	82	18	35	39	2.92[**]	1.80-4.75
Ran out of ART	47	10	12	13	1.33	0.67-2.61
Had to choose between food and medications	65	12	23	17	1.49	0.88-2.49
	M	SD	M	SD		
Age	48.6	9.0	45.1	9.9	0.96[**]	0.94-0.98
Education	12.6	1.8	12.2	1.9	0.90[*]	0.82-0.99
CD4 count	604.4	399.1	422.8	319.3	0.99[**]	0.98-0.99
ART adherence	90.1	16.6	80.6	22.8	0.97[**]	0.96-0.98
Body Mass Index	27.2	8.8	26.4	7.8	0.98	0.96-1.01

Note:

[*] $p < .05$

[**] $p < .01$.

Table 2

Poverty indicators reported by people living with HIV who have suppressed and unsuppressed HIV replication.

Characteristic	Suppressed HIV (n = 536)		Unsuppressed HIV (n = 135)		OR	95% CI
	N	%	N	%		
Housing instability	34	6	19	14	2.41**	1.32-4.38
Lacks transportation	54	10	26	19	2.12**	1.27-3.54
Received food stamps	358	67	79	59	0.69+	0.47-1.02
Food Insecurity Indicator						
Worried whether food would run out before got more.	205	38	66	49	1.54*	1.05-2.25
Food bought just did not last and did not have money to get more.	188	35	66	49	1.76**	1.21-2.58
Couldn't afford balanced meals.	155	29	54	40	1.63**	1.10-2.41
Adults in household or self cut the size of our meals or skipped meals because not enough food.	108	20	47	35	2.11**	1.39-3.18
Ate less than should because there was not enough food.	143	26	52	39	1.71**	1.15-2.55
Hungry but did not eat because could not afford enough food.	101	19	39	29	1.75**	1.13-2.68
Lost weight because did not have enough money for food.	84	15	30	22	1.53+	0.96-2.44
Others in household or I did not eat for a whole day because there was not enough food.	58	11	26	19	1.96**	1.18-3.25
Total Food Insecurity Indicators						
0	284	53	54	40	1.24**	1.08-1.42
1	51	10	9	6		
2	33	6	14	10		
3+	167	31	58	43		

Note:

*
p < .05

**
p < .01.

Table 3

Substance use and substance purchases among people living with HIV who have suppressed and unsuppressed HIV replication.

Characteristic	Suppressed HIV (n = 536)		Unsuppressed HIV (n = 135)			
	N	%	N	%	OR	95% CI
Currently drinks alcohol	279	52	89	66	1.77**	1.19-2.63
Consumes > 3 drinks	99	19	28	21	1.15	0.72-1.86
Consumes > 6 drinks at least monthly	49	9	19	14	1.27+	0.96-1.69
AUDIT score > 7	68	12	16	11	0.92	0.51-165
Uses other non-alcohol drugs	196	36	69	51	1.81**	1.23-2.65
Purchased alcohol[a]	49	12	13	13	1.14	0.59-2.21
Purchased tobacco[a]	61	15	23	24	1.79*	1.04-3.08
Purchased either alcohol or tobacco[a]	95	23	39	30	1.42	0.87-2.33

Note:

[a]Data restricted to 498 participants who returned grocery gift card receipts

*
p < .05

**
p < .01.

Table 4

Multivariable test of association with HIV viral suppression (N = 498).

Factors	OR	95% CI
Age	0.97	0.95-1.00
Education	0.89	0.79-1.01
Alcohol Use	1.02	0.91-1.15
Drug Use	1.12	0.86-1.45
Housing stability	129	0.57-2.90
Transportation	1.15	0.56-2.36
Purchased tobacco products	1.33	0.53-3.38
Food Insecurity	1.22[*]	1.01-1.49
Food insecurity × purchased tobacco products interaction	1.06	0.69-1.61

Note: Model included complete cases for 498 participants who returned grocery gift card receipts

** p < .01.

* p < .05