AIDS and Behavior (2019) 23:2079–2087
https://doi.org/10.1007/s10461-018-2359-z

ORIGINAL PAPER

Demand and Supply Motivations for Antiretroviral Drugs in Illicit Street Markets: The Case of Atlanta, Georgia

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Published online: 8 December 2018
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Abstract

We studied the motivations behind supply and demand of antiretroviral drugs (ARVs) in the illicit street markets of the metropolitan statistical area of Atlanta, Sandy Springs, and Roswell, Georgia. We found that these two market actions were largely interdependent: 39.53% of participants said that they sold their ARVs to pay for personal needs, and 20.93% said that they bought ARVs because they had previously sold them to pay for personal needs. The pattern that emerged suggests that illicit street markets have become mechanisms through which HIV patients cooperate to achieve competing goals: cover personal needs and keep up, however imperfectly, with their medication regime. We also found that HIV patients used illicit street markets because they faced institutional deficiencies, such as exclusion from the Ryan White/ADAP program, long waiting times to see a doctor, and prescription delays.

Keywords HIV · ARVs · Diversion · Illicit Markets · Atlanta · Georgia

Resumen

Estudiamos las motivaciones de demanda y oferta de medicamentos antiretrovirales (ARVs) en el mercado negro del área metropolitana conformada por Atlanta, Sandy Springs y Roswell en Georgia. Encontramos que estas dos acciones de mercado son considerablemente interdependientes: 39.53% de los participantes indicaron que vendieron sus ARVs para pagar por necesidades personales, y 20.93% de los mismos indicaron que compraron ARVs porque los habían previamente vendido para pagar por necesidades personales. El patrón que emerge de estos resultados sugiere que los mercados negros de ARVs se han convertido en mecanismos a través de los cuales pacientes con HIV cooperan para satisfacer multiples objetivos: cubrir necesidades personales y mantener, aunque no perfectamente, su régimen medico. También encontramos que pacientes con HIV recurren a mercados negros de ARVs porque enfrentan deficiencias institucionales como la exclusión del programa Ryan White/ADAP, largos tiempos de espera para ser atendidos por un doctor y demoras en obtener sus prescripciones.

Introduction

The diversion of antiretroviral drugs (ARVs) (i.e., the unlawful channeling of ARVs from legal sources to illicit street markets) poses serious public health risks. HIV patients who divert their ARVs increase the probability of regime non-adherence, which can result in treatment failure and increasing rates of transmissibility [1].

Although the diversion of ARVs in the United States has been reported since at least the mid-1990s [2–5], the number of scientific studies designed to collect primary data and analyze the motivations of illicit street market participants remains relatively low [6–11]. Our goal was to fill this gap. In this study, we collected primary data and analyzed the

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10461-018-2359-z) contains supplementary material, which is available to authorized users.

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motivations of illicit street market participants in Atlanta, Georgia, a region characterized by high HIV prevalence.

The metropolitan statistical area of Atlanta, Sandy Springs, and Roswell, Georgia (henceforth "the Atlanta MSA") is home to approximately 5.6 million people. Although the economy of the Atlanta MSA has grown relatively fast and has a higher GDP per capita than the average MSA in the United States,[1] HIV prevalence in the area has reached alarmingly high levels. Indeed, in 2016, the Atlanta MSA ranked third in HIV diagnostic rates out of 108 MSAs, with a rate of 29.4 per 100,000. By the end of 2015, an estimated 30,884 people were living with HIV in the Atlanta MSA, a rate of 541.9 per 100,000 [13]. Reflecting on these numbers, Emory University's Center for AIDS Research noted that HIV prevalence in the Atlanta MSA was similar to those of Harare, Zimbabwe, and Durban, South Africa [14].

An important characteristic of HIV prevalence in the Atlanta MSA is its strong concentration on a very specific segment of the population (i.e., young African-American men who have sex with men (MSM)). The statistics for 2015 are notable: 81% of those diagnosed with HIV in Georgia were male; 72% of those diagnosed with HIV were African American; the highest number of HIV diagnoses occurred among males 20–29 years of age; and 83% of HIV diagnoses among males were attributed to male to male sexual contact [15]. According to the Fulton County Board of Infectious Disease, at these rates, one out of two African-American MSM in the Atlanta MSA will be HIV positive in their lifetime [16].

Despite this evidence, the statistics of continuum HIV care for African-American MSM fall below other segments of the population. According to the Georgia Department of Public Health, only 43% of African-American adult and adolescent MSM living with HIV achieved viral suppression in 2014. This rate was lower than the corresponding rate for Hispanic/Latino (46%), White (54%) or multiracial (60%) adult and adolescent MSM living with HIV that year. A similar disparity can be found in care retention rates in 2014: only 46% of African-American adult and adolescent MSM living with HIV were retained in care in 2014. This rate was lower than the corresponding rates for Hispanic/Latino (48%), White (52%) or multiracial (64%) adult and adolescent MSM [17].

These statistics are obviously problematic: the segment of the population presenting the highest HIV risk in the Atlanta MSA has received one of the lowest rates of HIV care. This situation is attributable to multiple factors, one of which is the diversion of ARVs. We found that HIV patients who diverted their ARVs recognized that this behavior significantly compromised their HIV care regime. Understanding the motivations that lead those patients to engage in this behavior is, therefore, critical.[2]

Our contribution is twofold. First, to our knowledge, the current study is the first to collect primary data and to analyze the motivations of HIV patients who divert their ARVs in the illicit street markets of the Atlanta MSA. Second, our approach jointly analyzed the motivations behind the supply and demand for ARVs in those markets. This approach is conceptually different from other related studies. In a study conducted for Miami, Florida, for example, the authors analyzed the motivations behind the demand for ARVs in illicit street markets by surveying only buyers [6]. Their results indicate, however, that several buyers resorted to illicit street markets because they had previously sold their medication in the same markets. Our own observations of illicit street markets for ARVs in the Atlanta MSA suggest that buying and selling are often interdependent actions. Thus, we can gain a better understanding of the diversion of ARVs by surveying and analyzing both sides of the market.

Methodology

We interviewed HIV patients who had participated in illicit street markets for ARVs in the Atlanta MSA. We defined this participation in two ways: (a) selling their medication to other HIV patients who were unable or did not want to obtain them through formal venues (e.g., pharmacies, clinics, hospitals) and/or (b) buying their medication from other HIV patients because they were unable or did not want to obtain them through those same formal venues.

We used a targeted sampling approach to recruit participants for interviews.[3] We posted information flyers about the study in a hospital and a clinic located in two zip codes with the highest HIV rates in the Atlanta MSA: 30303 and 30308 [13]. As interested participants called to volunteer for the study, we conducted screening phone interviews to determine eligibility. Participants were eligible if they (a) were at least 18 years old, (b) had a documented HIV-positive serostatus, (c) were currently under formal treatment (i.e., had obtained prescriptions within the previous six months), and (d) had purchased or sold ARVs in illicit street markets

[1] The Atlanta MSA's GDP per capita for 2016 was $55,300 and ranked 50 among 383 MSAs in the U.S. The average MSA GDP per capita that year was $42,276 [12].

[2] The obvious risk of participating in illicit street markets for ARVs is non-adherence. Selling medication that was part of a strict treatment increases the probability of missing scheduled intakes. Buying ARVs without a prescription or the supervision of pharmacists or medical personnel increases the probabilities of taking the wrong medication, taking expired medication and/or using wrong doses.

[3] This methodological approach is commonly used to identify and recruit potential participants that are difficult to reach [18–21].

at least once in the previous six months. We did not impose any gender, race, or sexual behavior eligibility requirements.

The recruitment process lasted approximately four weeks during June and July 2016. A total of 60 people called and expressed interest in participating. From this pool, 43 people met the eligibility criteria and were scheduled for individual and confidential interview appointments at the field site in downtown Atlanta. With no help from other researchers or research assistants, we conducted interviews during July 2016.[4]

Before conducting interviews, we re-screened participants for eligibility. After re-confirming eligibility, we obtained informed consent and started the interview, which included 25 questions about individual characteristics, experience living with HIV, access to formal HIV care, and experience either buying or selling ARVs in illicit street markets in the Atlanta MSA. No identifying information was collected. Interviews lasted an average of 20 minutes, and we paid participants a $30 stipend upon completion. We then transcribed each recorded interview verbatim.

We obtained web-based certification for protection of human subjects, and the protocols of the study were approved by the Office of Research Compliance at Mercer University.

Results

We used an iterative coding process to analyze the data. We first identified motivations for participating in illicit street markets for ARVs in a small sample of interviews. We assigned a code to each motivation. We then added, modified, or consolidated codes as we found new motivations in the rest of the interviews [22, 23]. Coding required careful attention to word choice, tone, and idiomatic expressions. We listened to each interview at least twice. We each conducted the coding process independently. Careful documentation of each coding allowed us to resolve discrepancies efficiently.

The coding process revealed five motivations for buying and four motivations for selling ARVs in illicit street markets in the Atlanta MSA (see Tables 1 and 2). We realized we had reached a saturation of motivations by the 25th interview we coded.

Table 1 Individual characteristics of participants (n = 43)

Characteristic	Number	Percentage
Age (range = 24–64 years; average = 43.28 years)		
18–25 years	1	2.33
26–40 years	16	37.21
41 years +	26	60.47
Gender		
Male	30	69.77
Female	2	4.65
Female transgender	11	25.58
Sexual orientation		
Straight	10	23.26
Homosexual	27	62.79
Bisexual	6	13.95
Race		
Black/African-American	43	100
Education		
No high school	2	4.65
Some high school	4	9.30
Completed high school	17	39.53
Some college	13	30.23
College degree	4	9.30
Higher ed degree (including trade and associate's)	3	6.98
Insurance covering ARVs		
Ryan White	20	46.51
Other public insurance (e.g., Medicaid, etc.)	12	27.91
None	8	18.60
Private	1	2.33
Other (e.g., VA health care)	2	4.65
Permanent residence		
Yes	37	86.05
No	6	13.95
Average years of homelessness	3	
Length of time HIV+ (range = 0.16–28 years; average = 12.66 years)		
0–3 years	7	16.28
4–10 years	9	20.93
11–20 years	16	37.21
21 years +	11	25.58
Substance use		
Alcohol	4	9.30
Marijuana	4	9.30
Cocaine	2	4.65
None	33	76.74

[4] Although we had not surveyed HIV patients before this study, we both had ample experience conducting qualitative research.

Table 2 Primary motivations for buying ARVs in illicit street markets (n = 43)

Motivations	Number	Percentage	Examples
Sold ARVs and need to buy back	9	20.93	"Well, because I have to sell in order to eat, get food, personal hygiene. And if I come up on extra money, I buy it back." "I need them. Times are tight. I've had to sell in order to eat." "I was taking Atripla [I sold or gave away] and I ran out. And a friend had some, so I bought 20 pills."
No Ryan White (ADAP) or other insurance	7	16.27	"I needed it, because I didn't have insurance, and I was very sick from my silicone injections." "You can get it for free if you have zero income. I have zero income but I've run into problems about that. I have to get so many documents to verify I have zero income. I can't get a hold on some of those documents." "I don't have any insurance and...the way that things are going now, with so many people HIV positive it makes it harder for us to get the medication." "Yeah, ADAP runs out because you don't re-certify. Like, recently my ADAP has ran out because I didn't get the documents I need to certify. Because sometimes you know I don't remember dates."
Long waiting times to see a doctor	1	2.33	"The schedule is the biggest issue. It's difficult to schedule getting off of work to go to a doctor's appointment, so you don't know how long you're going to be there, so you're losing money."
Delays getting the prescription	1	2.33	"I ordered my prescription but they were out at the time."
ARVs are cheaper on the streets	1	2.33	"Sometimes I run out, and sometimes I can get cheaper prices as opposed to going to the pharmacy."

Participants often cited multiple motivations for buying ARVs

Individual Characteristics

Table 1 describes the individual characteristics of the 43 participants. All participants were African American.[5] The age range was 24–64 years old with an average of 43.28. Approximately 70% (n = 30) of the participants were male, 25.58% (n = 11) were male-to-female transgender, and 4.65% (n = 2) were female. The vast majority of our participants, 86.05% (n = 37), had completed high school or acquired some type of education beyond high school. In terms of sexual orientation, 23.26% (n = 10) identified themselves as straight, 62.79% (n = 27) as homosexual, and 13.95% (n = 6) as bisexual.

In terms of insurance coverage, 46.51% (n = 20) of our participants reported having coverage through Ryan White/ADAP (Aids Drug Assistance Program), 32.56% (n = 14) through some other type of public insurance (e.g., Medicaid or VA Health Care), and 2.33% (n = 1) through private insurance. Approximately 18.60% (n = 8) of our participants did not have any type of insurance coverage.[6] Only 23.26% (n = 10) of our participants reported having used illegal drugs or alcohol within the previous six months.[7] Participants who reported having used cocaine, 4.65% (n = 2), alcohol, 9.30% (n = 4), or marijuana, 6.98% (n = 3), in the previous six months mentioned that they did so only "occasionally." Only one of our participants reported using marijuana on a weekly basis. None of our participants indicated that they had sought treatment or were too concerned about substance abuse.

The average number of years the participants had lived with HIV was 12.66.

Primary Motivations for Buying and Selling ARVs

Table 2 shows the primary motivations for buying ARVs and Table 3 shows the primary motivations for selling ARVs in the illicit street markets of the Atlanta MSA. We found that demand and supply were, to a large extent, interdependent.

[5] This aspect of our sample did not occur by design. Every person who called interested in participating of the study was African American. HIV in the Atlanta MSA is most prevalent in the African-American population.

[6] Georgia's ADAP is a state-administered program that provides ARVs to lower income individuals who live with HIV but have no insurance coverage except for Medicare. ADAPs across the country were originally authorized by the Ryan White Comprehensive AIDS Resources Emergency Act of 1990. ADAP funds are used only for the purchase of ADAP formulary drugs that patients cannot afford through other means (i.e., ADAP must be the payer of last resort). There are currently 74 medications on the Georgia ADAP Formulary. Georgia's ADAP services are available to all eligible residents in the state: 27 enrollment sites in 18 public health districts, including 7 sites in metro Atlanta alone [24].

[7] We defined "illegal drugs" as any drug listed in Schedules I or II of the Drug Enforcement Administration's Resource Guide [25].

Table 3 Primary motivations for selling ARVs in illicit street markets (n = 43)

Motivations	Number	Percentage	Examples
To get money for personal needs	17	39.53	"For food, transportation. I don't have any income so I sell them. They don't give me disabilities, so..." "Well, because I have to sell in order to eat, get food, personal hygiene. And if I come up on extra money, I buy it back." "When I need to get food or gas or whatever." "Times are tight, I've had to sell in order to eat." "Because of poverty. People's necessities and circumstances. Some people with HIV have children so they have to feed their children."
To help fellow HIV patients	11	25.58	"Going through the situation of not having the ID and not being able to obtain the Ryan White program until you get your ID. I've known other people in that situation, and I guess, caring about them I offer my pills, I give my pills for free." "The same way I feel about my health I feel about the next person's health. So that's why I don't mind selling my medication so I can help out somebody who's in the same boat that I'm in."
Because I had extra ARVs	6	13.95	"Sometimes, with mail order they'll give you additional until the next order. So sometimes I have a month's supply, and then two extra weeks with that."
Didn't want them	1	2.33	"Because I didn't want them. At the beginning I didn't want them. I didn't believe. So many people were dying, and I was scared, and everyone kept telling me that the medication was infecting me."

Participants often cited multiple motivations for selling ARVs

The motivation for buying ARVs most often cited by our participants was that they had previously sold them and needed to buy them back: 20.93% (n = 9) of the participants cited this motivation.

> "Well, because I have to sell in order to eat, get food, personal hygene. And if I come up on extra money, I buy it back."

> "I need them. Times are tight. I've had to sell in order to eat."

Correspondingly, as Table 3 reports, 39.53% (n = 17) of participants reported that they had to sell their medication to satisfy personal needs[8]:

> "When I need to get food or gas or whatever."

> "For food, transportation. I don't have any income so I sell them. They don't give me disabilities, so..."

Together, these two motivations for participating in the illicit street markets of the Atlanta MSA suggest that the diversion of ARVs is largely driven by financial needs. Moreover, none of our participants indicated that they had to sell their ARVs to buy alcohol or illegal drugs. This information is consistent with the information in Table 1, which shows that only 23.25% (n = 10) of our participants reported having used illegal drugs or alcohol within the previous six months, and, in most cases, did so only occasionally.

Most of the participants who sold ARVs and bought them back admitted that this behavior made following their prescriptions correctly difficult, for they sometimes missed taking their pills for a few days or even entire weeks:

> "Yeah, you sacrifice your personal health. If you pick up pills this month and you sell that means you can't go back until next month. Then I have to constantly check my count."

> "It depends how bad your situation is. If I got something else going, and I say I'm going to be straight this month, then I'm not going to sell it, I'll take my pills. But if something else is going on, well, there's no income. Sure, I'll sell my pills and risk it."

> "In the past eight months I have sold half of my medication each month. I know I need to stay healthy, correct? But at certain times it's because I need food and just go from there. It's about surviving. Surviving comes first."

Participants also mentioned that they were often unsure about whether the ARVs they bought on the streets were exactly what they had been prescribed, had not expired, or had not been adulterated. In fact, participants mentioned that unopened and sealed containers of ARVs ("clean bottles") commanded a higher price on the streets precisely because they reduced this risk:

[8] The most frequently cited personal needs included food, transportation and family support. Most participants did not have a stable job and 13.95% (n = 6) of them did not have a permanent residence.

"Oh yeah, same medication that I'm taking, yeah. Exactly the same. I've been taking the same medication since 2006, so I know when I see it... but you are never 100% sure unless the bottle is sealed."

"You don't know if they are the same. You can't trust everybody. So if I can't get in contact with the two people I'm used to dealing with, it's kind of leery."

"Open bottles you never know. Depends on who sells them. Some I know; some I don't. I'm taking a big risk, really. Clean bottles are more expensive."

As these examples show, the selling-and-buying-back behavior poses the obvious risk of non-adherence, which could jeopardize viral suppression. Interestingly, only two participants (4.65%) mentioned that they had developed resistance due to this behavior and had to switch medications:

"I go back to the doctor, and they do the blood work, and the doctor said, this ain't working no more, so now here we go. We've got to go through the whole nine yards again. And you refuse to take that even more, because you've been selling it. So your system doesn't even want it anymore. It's not going to work no more, because you've been selling it. So you have to start all over on this and this, but then you're on that no more, and you're on this."

The second most cited motivation for buying ARVs in illicit street markets was not having access to Ryan White/ADAP or some other form of insurance: 16.28% (n = 7) of the participants cited this motivation. Participants often cited that they did not have the required enrollment documents, which include proof of HIV-positive serostatus, proof of Georgia residency, proof of low income (below 400% of the federal poverty guidelines), and proof of insufficient health insurance coverage [26].[9]

"It's hard to get in the system."

"You do have to go through a few things, you have to get a wage form, tell them your income, you have to tell them if you've ever had drug problems. It's a lengthy process."

"I think they should do something about the Ryan White program to make it easier for us to get our medication. I think it's ridiculous that we have to have all this documentation. This is our lives. Basically they're killing us. We can't get the medication and we bend some rules just to get our medication."

"To me it's like the doctors want to make it feel like 'we want to help you,' but then when you get to the business side dealing with getting the medication from the pharmacy the feeling doesn't mirror what the doctor says. The doctor's like 'we really want to make sure you're taken care of' but then when you get to the other side and it's like 'oh I'm sorry you don't have this paperwork, you don't have this.' Or, 'Sorry, you are out of luck.' "

Some participants cited that a waiting list prevented them from enrolling in the program. This response was surprising given that the Ryan White/ADAP waiting list in Georgia was reduced to zero in 2012.

Participants also cited long waiting times to see a doctor, prescription delays, and the cheaper price of ARVs on the streets than in the pharmacies, as additional motivations for buying ARVs in illicit street markets. Each of these motivations was cited by 2.33% (n = 1) of the participants.

"I pay a very lowered price because I go to the pharmacy and get it, but it's a lot cheaper at the street."

"Sometimes the price is variable. This year I'm paying out of pocket $150 at the pharmacy. In the streets is like $10."

"I buy at the pharmacy for $150 but on the streets is maybe $20."

"Well, if you're unemployed you don't have to pay. But if you do work you have a co-payment. And the co-pay is so high like $50 or $60."

"Aw man some days you go in for an appointment, and it's time for your 3 month follow-up, and they don't counsel you for another 3 months, so you may not be able to see the doctor, you might have to wait a couple of months. And the way they set your medication for your every three months follow-up, and you can't make your follow up, then you might not have medication for 3 months. It seems like to me, the people that specialize in this stuff, they want this disease to overtake us. I don't feel we're in the best care we should be given."

After "having to sell to pay for personal needs," the second most cited motivation for selling ARVs in illicit street markets was to help fellow HIV patients: 25.58% (n = 11) of the participants cited this motivation. Participants often spoke about the "community" of HIV patients that had developed over time in the Atlanta MSA and how HIV patients helped each other when they ran out of medication. Participants noted that patients often knew each other personally because they frequented the same hospitals, participated in the same outreach programs, and even participated in the same research studies. Most had low or zero income

[9] All Ryan White/ADAP participants are required to recertify their eligibility for the program every six months [24].

and benefited from the same charitable organizations, shelters, or churches. Over time, most of these patients became part of a social network that allowed them to share information and help each other through trade, which often took the form of barter:

> "I sell mostly to help people out."

> "I sell to mostly people I know. I don't advertise, but I sell to those that I know that are on the streets, homeless. Like I said, without that ID, you can't do anything at the Fulton County Health Department. Some people are waiting on birth certificates, other documentations to get your ID, and until you get your ID you can't be enrolled in the Ryan White program to get free medicine."

> "I know some people who are going through hard times and they need it and they have to go through so much red tape. I've been there too and so I help them out."

> "The same way I feel about my health I feel about the next person's health. Just trying to be in compliance with it so you can live a healthy life too. So that's why I don't mind selling my medication so I can help out somebody who's in the same boat that I'm in. If I go buy 10 tablets I don't mind taking three of those 10 tablets and keeping those to myself and selling three just to make sure they can have it and get the medication they need."

The third most cited motivation for selling ARVs in illicit street markets was having a surplus of the medication: 13.95% (n = 6) of the participants cited this motivation. In particular, participants referred to occasional overlaps in prescription refills when ordering by mail, allowing them to sell or give away their medication to people who needed it. Therefore, these participants did not have to miss a prescribed dosage because they only sold their surplus:

> "Sometimes, with mail order they'll give you additional until the next order. So sometimes I have a month's supply, and then two extra weeks with that."

> "With mail order they're giving you extra medication. Because they're not here in Atlanta, and they ship it with FedEx. So to account for the days because of mail service. Sometimes I do end up with extra medication."

> "My pharmacy delivers to me, and I have a well-hidden supply. They're supposed to deliver them within a certain timeframe, but for some reason they deliver them sooner than my run out time. And I know I'm getting a 90-day supply instead of 30. I used to get 30. And they just build up. I start watching the dates. I could start a pharmacy now."

These last two motivations, together with the previously described selling-and-buying-back behavior, suggest that illicit street markets have become mechanisms that allow HIV patients to cooperate with one another to achieve competing goals: cover financial needs and keep up, however imperfectly, with their treatment.

Finally, one of our participants (2.33%) indicated that he sold his ARVs because he didn't want to take them, fearing that the medication would make him sick. This motivation illustrates the continuous importance of HIV/AIDS education.

Discussion

Our findings suggest that buying and selling ARVs in illicit street markets are, to a large extent, interdependent actions. The most frequently cited buying and selling motivations demonstrate this connection. On the one hand, 39.53% (n = 17) of our participants said that they sold their ARVs to pay for personal needs. On the other hand, 20.93% (n = 9) of our participants said that they bought ARVs because they had previously sold them to pay personal needs.

The pattern that emerged suggests that illicit street markets have become mechanisms through which HIV patients can cooperate to achieve competing goals: cover personal needs and keep up, however imperfectly, with their medication regime. While the development of illicit street markets for ARVs is clearly not ideal from a public health perspective (e.g., jeopardizes adherence and viral suppression, increasing the probability of transmission), HIV patients facing difficult financial choices use these markets to manage their economic circumstances. Thus, criminalizing participation in illicit street markets for ARVs in the name of protecting public health would not address one of the fundamental reason for their existence: financial vulnerability.

One of the puzzling results of our study is that 81.40% (n = 35), the vast majority of our participants, reported having some type of insurance coverage yet participated in illicit street markets for ARVs.[10] Our interpretation of this finding is twofold. First, while a large percentage of our participants both sold and bought ARVs in illicit street markets,

[10] One of the eligibility criteria required participants to be under formal treatment (defined as having obtained a prescription within the previous six months). Eight of our participants (18.60%) had obtained prescriptions within the previous six months yet reported having no insurance coverage. The reason is that they had received their prescriptions in a different state but had recently moved to the Atlanta MSA and were in the process of gathering documentation to be admitted into the Ryan White/ADAP program.

our sample included more participants who sold, 81.40% (n = 35), than participants who bought, 44.20% (n = 19). Given that none of our participants acted as intermediaries or brokers, those who sold were most likely able to do so because they had some form of insurance coverage that enabled them to obtain ARVs in the first place. Most of these patients sold their medication in order to pay for personal needs. Second, some participants with insurance coverage mentioned that they faced significant barriers procuring ARVs through formal venues. These barriers included relatively high out-of-pocket costs, long waiting times to see a doctor, and prescription delays. These barriers might have led patients to participate in illicit street markets despite having insurance coverage.

For patients without insurance coverage, outreach and charitable HIV/AIDS programs played an important role. These efforts supplement the work done by the Ryan White/ADAP program and help reduce the number of HIV patients who have to resort to illicit street markets for ARVs. While many such programs offer services in the Atlanta MSA, all have limited resources, different eligibility criteria, and limited medication formularies.[11] In fact, one of our participants expressed frustration with one of these organizations for not having enough staff available to serve patients seeking help.

Our results should be interpreted in light of some important limitations. One is the possibility of recall bias. Our study relied on what participants recalled to be their motivations for buying and selling ARVs in illicit street markets during the six months prior to the interview. Recall bias might also have affected what participants reported in terms of individual characteristics (e.g., insurance coverage, number of years living with HIV, substance use, etc.). Another limitation is the possibility of social desirability bias. Participants might have responded with what they perceived to be the socially desirable answers. Finally, our findings might be specific to the geographical area and study sample we used, limiting their generalizability. The Atlanta MSA is an area characterized by much higher HIV prevalence than other U.S. MSAs.

The number of scientific studies designed to collect primary data and analyze the motivations of illicit street market participants remains low. The closest available reference is a study conducted in Miami, Florida, an area also characterized by high HIV prevalence [6]. Our findings are consistent with this earlier study. After surveying 44 buyers in illicit street markets in Miami, the authors found that 56.81% (n = 25) of the participants had bought ARVs in illicit street markets because they had previously sold them to pay for personal needs. They also found that 40.91% (n = 18) of the participants did so because they faced barriers accessing HIV care or experienced low quality care.[12]

The diversion of ARVs creates significant risks for HIV patients and the population in general. Our study shows that financial vulnerability and institutional deficiencies accessing health care are what prompt most HIV patients to divert their ARVs to illicit street markets. The obvious policy implication is the establishment of public programs that can ensure free or low-cost continuous access to ARVs particularly for the most vulnerable segments of the population (e.g., African-American MSM). In addition, these programs should include institutional and organizational changes designed to reduce waiting times to see doctors and obtain prescriptions. We would also recommend investigating the occasional overlaps in prescription refills when patients order by mail. These overlaps seem to generate surpluses that are then diverted to illicit street markets. Of course, all of these programmatic recommendations are likely to require significant resources. Careful cost-benefit analyses, which are outside the scope of this study, should be undertaken to better inform their adoption.

Perhaps the most important policy implication of our study is that, rather than stigmatizing and keeping illicit street markets for ARVs in the dark, these markets should be recognized as the natural response of individuals facing difficult financial choices.

Funding This study was funded by The Quality Enhancing Program office at Mercer University (grant awarded on February 25, 2016).

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

[11] A list of outreach and charitable HIV/AIDS programs can be found at the Positive Impact Health Centers website [27].

[12] The MSA of Miami–Fort Lauderdale–West Palm Beach, Florida, ranked number 1 in HIV diagnostic rates in 2016 out of 108 MSAs with a rate of 38.7 per 100,000. Recall that the Atlanta MSA ranked third in diagnostic rates that year with a rate of 29.4 per 100,000 [13].

References

1. Bangsberg DR, Perry S, Charlebois ED, Clark RA, Roberston M, Zolopa AR, Moss A. Non-adherence to highly active antiretroviral therapy predicts progression to AIDS. AIDS. 2001;15(9):1181–3.
2. Associated Press. AIDS drugs surface on the black market. New York Times. 1995.
3. Dorschner J. Activists: HIV care scam uses homeless. Miami Herald. 2005;30:2005.
4. Flaherty M, Gaul G. Florida Medicaid fraud costs millions, report says. Washington Post. 2003;19:2003.
5. Glasgow K. The new dealers: they're poor, black, and HIV-positive. Their product? The AIDS medications intended to cure them. Miami New Times. 1999;21:1999.
6. Tsuyuki K, Surratt H, Levi-Minzi M, O'Grady C, Kurtz S. The demand for antiretroviral drugs in the illicit marketplace: implications for HIV disease management among vulnerable populations. Aids Behav. 2014;19:857–68.
7. Surratt H, Kurtz S, Levi-Minzi M, Chen M. Environmental influences on HIV medication adherence: the role of neighborhood disorder. Am J Public Health. 2015;105(8):1660–6.
8. Surratt H, Kurtz S, Levi-Minzi M, Tsuyuki K, O'Grady C. Pain treatment and antiretroviral medication adherence among vulnerable HIV-positive. AIDS Patient Care STDs. 2015;29(4):186–92.
9. Surratt H, Kurtz S, Cicero T, O'Grady C, Levi-Minzi M. Antiretroviral medication diversion among HIV-positive substance abusers in South Florida. Am J Public Health. 2013;103(6):1026–8.
10. Surratt H, O'Grady C, Levi-Minzi M, Kurtz S. Medication adherence challenges among HIV-positive substance abusers: the role of food and housing insecurity. AIDS Care. 2015;27(3):307–14.
11. Levi-Minzi M, Surratt H. HIV stigma among substance abusing people living with HIV/AIDS: implications for HIV treatment. AIDS Patient Care STDs. 2014;28(8):442–51.
12. U.S. Department of Commerce, Bureau of Economic Analysis Regional Data. GDP and personal income. https://www.bea.gov/iTable/index_regional.cfm. Accessed 15 Jan 2018.
13. Centers for Disease Control and Prevention. HIV surveillance report. 2016;28. https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html. Accessed 16 Jan 2018.
14. Staples G. Despite progress, Atlanta's HIV epidemic is worse. Atlanta J. Const. 2017;30:2017.
15. Georgia Department of Public Health. HIV surveillance fact sheet 2015. 2017. https://dph.georgia.gov. Accessed 10 Jan 2018.
16. Bloeme S. The Atlanta HIV epidemic that remains. The Signal. Georgia State University. 2018:16:2018. http://georgiastatesignal.com/hiv-epidemic-remains/. Accessed 29 Dec 2017.
17. Georgia Department of Public Health, HIV/AIDS Epidemiology Program. HIV care continuum surveillance report, Georgia, 2014. 2016. https://dph.georgia.gov. Accessed 28 Dec 2017.
18. Braunstein M. Sampling a hidden population: noninstitutionalized drug users. AIDS Educ Prev. 1993;5(2):131–9.
19. Watters J, Biernacki P. Targeted sampling: options for the study of hidden populations. Soc Probl. 1989;36(4):416–30.
20. Carlson R, Wang J, Siegal H, Falck R, Guo J. An ethnographic approach to targeted sampling: problems and solutions in AIDS prevention research among injection drug and crack-cocaine users. Hum Organ. 1994;53(3):279–86.
21. Coyle S. Women's drug use and HIV risk: findings from NIDA's cooperative agreement for community-based outreach/intervention research program. Women Health. 1998;27(1/2):1–18.
22. Abbott A. Methods of discovery: heuristics for the social sciences. New York: Norton; 2004.
23. Strauss A, Corbin JM. Basics of qualitative research: grounded theory procedures and techniques. Thousand Oaks: Sage Publications; 1990.
24. Georgia Department of Public Health, Division of Health Protection. Georgia Ryan White Part B, AIDS Drug Assistance Program (ADAP), and Health Insurance Continuation Program (HICP) Policies & Procedures 2017. 2017.
25. U.S. Department of Justice, Drug enforcement Administration. Drugs of Abuse: A DEA Resource Guide. 2017.
26. Georgia Department of Public Health. Ryan White required rocuments checklist 2016. www.gacapus.com. Accessed 20 Feb 2018.
27. Positive Impact Health Centers. HIV resources and support in metro Atlanta. https://www.positiveimpacthealthcenters.org/advocacy-resources/hiv-advocacy/. Accessed 25 Feb 2018.

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