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Reasons for ART non-adherence in the Deep South: Adherence needs of a sample of HIV-positive patients in Mississippi

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Abstract

HIV prevalence in the American Deep South has reached crisis proportions and greater numbers of patients are enrolling in clinical care and beginning antiretroviral therapy (ART). In order to gain maximum benefit from ART, patients must sustain high levels of adherence to demanding regimens over extended periods of time. Many patients are unable to maintain high rates of adherence and may need assistance to do so, which may be based upon an understanding of barriers to adherence for a given population. The current study sought to gain understanding of barriers to adherence for a mixed urban/rural HIV-positive patient population in Mississippi and to determine whether barriers to adherence may be specific to gender, employment, depressive symptoms or educational attainment status. Seventy-two patients who missed a dose of ART medication over the last three days endorsed the top five reasons for missing a dose as: (1) not having the medication with them, (2) sleeping through the dose time, (3) running out of the medication, (4) being busy with other things and (5) other. Reported barriers were fairly consistent across different groups, although women and those classified as having moderate to severe depressive symptoms reported different patterns of adherence barriers. Results suggest that adherence interventions implemented in the Deep South must take into account specific barriers faced by individuals within this region, where stigma, gender disparities and limited resources are prevalent.

Introduction

The southern US represents approximately one-third of the US population (36%) but is home to some 44% (95,141) of persons living with HIV/AIDS (PLWHA) in this country (Centers for Disease Control and Prevention [CDC], 2005a). This high rate of HIV infection

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is concentrated in the region known as the Deep South, which consists of Alabama, Georgia, Louisiana, Mississippi, North Carolina and South Carolina. The number of new AIDS cases increased by 37.6% in the Deep South from 2000 to 2005, compared to 12.6% in other southern states and 17% nationally (excluding the Deep South) (CDC, 2005b). This has led to increased HIV-prevention efforts to address what has now become recognized as an HIV crisis in the Deep South (Copello, 2004; Pfizer, Inc. 2005).

With the growing number of PLWHA in the Deep South, an increasing number are now enrolled in clinical care and receiving antiretroviral therapy (ART). Although ART medications offer numerous benefits to individuals living with HIV, including controlling disease progression and extending life (Arnsten et al., 2000; Bangsberg et al., 2004; Hogg et al., 2000; Manfredi et al., 2001) these benefits are obtained primarily by patients who are able to achieve near perfect adherence to their ART regimen (Chesney, 2003). However, it is well-documented that many individuals prescribed ART are not sufficiently adherent to their regimens, severely limiting their health and running significant risk of development of drug resistance (Mannheimer et al., 2004; Paterson et al., 2000; Pradier et al., 2003).

Substantial progress has been made in identifying factors that pose barriers to ART adherence, which is critical to the development of adherence interventions and support programmes. The most common reasons for ART non-adherence in patients in the US include changes in routine, wanting to avoid medication side-effects or the perception that medications are toxic, and being away from home (Berg et al., 2004; Boyle, 2004; Chesney, 2003; Murphy et al., 2000, 2004; Oggins, 2003; Roberts & Mann, 2000; Weidle et al., 1998). Simply forgetting to take a dose is also a commonly reported reason for non-adherence, although it appears that most patients who report ‘forgetting’ do remember that a dose is required but simply do not have access to their medication (Boyle, 2004).

Many of the most comprehensive studies assessing ART adherence barriers, have involved HIV-positive samples from California (e.g. Chesney et al., 2000; Murphy et al., 2000, 2004; Oggins, 2003; Roberts & Mann, 2000) and New York (Berg et al., 2004; Oggins, 2003). Reasons for having missed a dose identified by these studies are often assumed to be reflective of most HIV-positive patients prescribed ART across the US. There is, however, a gap in representation of HIV-positive patients residing in the US Deep South in the literature regarding reasons for ART non-adherence, and, in particular, Mississippi, which is ranked 17th among 50 US states for cumulative HIV cases (CDC, 2004), has not yet been represented in the literature on ART adherence barriers at all.

HIV-positive patient populations studied to date do not often share the defining characteristics of HIV-positive patients in the Deep South. People living with HIV/AIDS from the Deep South are predominantly African-American, have low levels of education, live in poverty, lack health insurance and have acquired HIV infection through heterosexual contact (Reif, Geonnotti, & Whetten, 2006; Reif et al., 2006). The male:female ratio tends to be more balanced and the social climate for both genders is generally one of stigma, embarrassment and fear, which, together with distrust of the healthcare system, pose substantial barriers to accessing healthcare (Krawczyk et al., 2006; Lichtenstein, 2004; Lichtenstein et al., 2005). The Deep South is also home to comparatively more groups experiencing health inequities (Minority Health Initiatives, 2006; Whetten & Reif, 2006) and has a long and persistent history of disparities based on gender and economic class (Collins, 2000; Royster et al., 2006). Moreover, mental health problems, complicated by poor access to treatment and poverty, are problematic for PLWHA in the Deep South (Reif et al., 2006; Whetten & Reif, 2006). Given the potential uniqueness of the HIV-positive patient population in the US Deep South, reasons for ART non-adherence in this population may be unique as well and merit specific study.

The current study assessed ART adherence barriers in an urban/rural population of PLWHA in clinical care in the Deep South state of Mississippi who reported missing at least one dose of their HIV medication in the past three days. The present study sought to identify common reasons for non-adherence to ART and the impact of gender, economic disparities, employment status and feelings of dysphoria on reported barriers to adherence, to add to our understanding of challenges to adherence and avenues for intervention for PLWHA in clinical care in the Deep South.

Methods

Procedures

People living with HIV/AIDS prescribed ART as part of their care in a large public Infectious Diseases clinic in Jackson, Mississippi were recruited to complete an anonymous survey between May and June 2005. The clinic provides primary care to approximately 1,500 PLWHA residing in urban and rural surrounding areas. Clinic patients with HIV/AIDS were approximately 40% female, 60% heterosexual, 50% without health insurance and 90% living below the federal poverty guideline. Convenience sampling was used, where HIV-positive patients attending the clinic on selected days during a seven-week period in mid-2005 were sequentially approached by one of the authors (D. Konkle-Parker) when they checked into the clinic, asked whether or not they were currently prescribed ART medication and, if so, if they would be interested in completing a computer delivered survey. Of the 410 patients approached, 298 were currently prescribed ART and of these 240 (80%) expressed an interest in learning more about participation, while 58 (20%) were not interested in participation. Of the 240 interested patients, 194 (81%) agreed to participate. Because surveys were implemented at the clinic on the same day as the consent and some patients, though interested, were unable to remain at the clinic long enough to complete the survey, 151 of the 194 interested patients completed the full survey. Thus, of the 298 patients on ART, 20% refused participation after initial inquiry and another 14% were interested but unable to complete the survey. Surveys took approximately 45 minutes to complete and participants were compensated $15. Procedures were approved by the IRBs at the participating institutions.

Measures

The computer-assisted survey included demographic items (e.g. level of education), the well-validated CES-D (Burrack et al., 1993; Eaton & Kessler, 1981; Phillips et al., 2005; Radloff, 1977; Savetsky et al., 2001) measure of depressive symptoms, a measure of ART adherence and a checklist assessing reasons for last having missed a dose of ART medication.

Adherence to ART was assessed with a modified 3-day ACTG (Chesney et al., 2000). The modified ACTG asked patients to identify the ART medications in their prescribed regimen from an ART medication chart and to report dose times and number of pills required for each dose for each of their medications. Patients were then asked whether they took the full dose, more than the full dose or less than the full dose, for each prescribed daily dose of each medication, starting with ‘yesterday’ and moving through to ‘three days ago.’ Adherence was calculated as the total number of doses taken as prescribed divided by the total number of doses prescribed summed across all ART medications in the patient’s regimen. It is important to note that previous research has found self-report (SR) adherence assessments to be associated with indices of disease progression and other biological markers (Haubrich et al., 1999; Moatti & Spire, 2000; Murri et al., 2000). More recently, Nieuwkerk and Oort’s (2005) meta-analysis of SR measures of adherence found a significant association between SR adherence and viral load indices (OR = 2.31; CI: 1.99–

2.68) and Simoni et al.'s (2006) review found 84% of the adherence-VL relations reviewed were significant, while 62% of the SR adherence-CD4 relations were significant. While SR assessments of adherence tend to generate higher estimates of adherence than more objective measures (e.g. electronic monitoring), SR continues to receive support as a viable assessment method (Pearson et al., 2006; Simoni et al., 2006).

Barriers to adherence were assessed via responses to a checklist that asked, 'When you last missed a dose of your HIV medication, which of the following describes why you didn't take it?' The measure was developed for use in the current study through detailed review of the current ART adherence qualitative and quantitative literature to identify reasons commonly reported by patients for having missed a dose of ART medication. Both the content and wording used to represent 'reasons for non-adherence' were heavily influenced by the works of Chensey et al. (2000), Murphy et al. (2004) and Walsh et al. (2001). The final list detailed 14 different reasons for missing a dose of ART medication that were consistent with previous research (Chesney et al., 2000) and judged by experts on the research team to be most representative of potential barriers. Additionally, a final item of 'other' was added to the checklist. Participants selected *all* reasons that applied to their last missed dose.

Analyses

Data analysis focused on participants who reported missing at least one dose of their ART medication in the past three days ('non-adherent participants'). After characterizing this sample, participants were categorized into the following groups: men versus women; employed versus unemployed; none to mild versus moderate to severe depressive symptoms; and education level at or below high school versus beyond high school. Influence of group membership on reports of reasons for last having missed a dose of medication was evaluated with independent *t*-tests and chi-square (χ^2) tests.

Results

Participants

Of 194 patients who agreed to participate, 151 had the time to complete the survey at the clinic on the day of consent. Of these, 72/151 (47.7%) reported having missed one or more doses of ART medication in the past three days. Because reasons for non-adherence were assessed with respect to one's last missed dose of ART medication, only those participants who reported having missed a dose over the last three days, and thus would have a very recent event to recall, were included in the analyses.

As indicated in Table I, patients were fairly evenly distributed in terms of gender, mostly African American, heterosexual, currently unemployed and living in poverty. Few participants reported active injection drug use. CES-D scores (M = 18.61; SD = 11.46) placed the sample in the mildly depressed category. The most frequently reported route of HIV infection was heterosexual sex and on average participants had been living with HIV/AIDS for some nine years. The number of different medications in participants' ART regimens varied from 1–4, with an average of two (note that some of the medications consisted of combination pills containing two or more medications). Three-day adherence scores for this sample of non-adherent PLWHA averaged 61% (SD = 27; range 0–92%; median 67%). Of the grouping variables used in the current study, only CES-D classification demonstrated a relation with percent adherence. Those in the 'not at all to mildly depressed' group averaged 66% adherence, whereas those in the 'moderately to severely depressed' group averaged 54% for adherence over the last three-days ($t_{(70)} = 1.65$; $p = 0.053$). It is also important to note that clinic patients fund their ART medications typically through

Medicaid, although those without such insurance can enrol in Mississippi's AIDS Drug Assistance Program (ADAP). While the survey did not ask specifically about type of insurance coverage, participants were asked about the relative difficulty of paying for their medications, which likely relates to cost of co-pays for most participants. Seventy-six percent of those reporting having missed a dose of ART medication in the past three days reported that paying for their medications was not difficult, with 46% reporting that they pay nothing. This distribution was virtually identical for those participants who had not missed a dose of ART medication over the past three days.

Reasons for having last missed a dose of ART medication

The number of reasons for having missed a dose of medication ranged from 0–9, with an average of two reasons (SD = 1.88). One participant did not endorse any of the reasons provided and eight participants reported 'other' as their only response. As indicated in Table II, the most frequent reasons for having missed a dose of ART medication were: not having the medication with them (39%), sleeping through the dose time (25%), running out of the medication (22%), being busy with other things (21%) and 'other' (20%). Total number of reasons endorsed was not correlated with rates of adherence within this non-adherent sample ($r = -0.108$; $p = 0.37$).

Reason for last having missing a dose of ART medication was examined in relation to gender. Thirty-nine patients could be classified as men and 32 as women. Women reported more reasons for having missed a dose than men (2.84 versus 1.74; $t_{(df = 43.68)} = 2.40$; $p = 0.02$). A significantly larger proportion of women than men endorsed the following reasons for a missed dose: 'didn't have the medication with me' (53 versus 28%), 'was feeling sick' (28 versus 10%), 'didn't want people to see me taking HIV medication' (22 versus 3%) and 'was taking a break from my HIV medications' (22 versus 0%) (see Table II).

The influence of PLWHA's employment status on reasons for having missed a dose was also evaluated. Those who were not currently employed ($n = 51$) reported a greater number of reasons for missing a dose than those currently employed ($n = 21$; M = 2.57 and 1.40, respectively; $t_{(df = 68.79)} = 3.47$; $p = 0030.001$). A significantly greater number of those who were not currently employed endorsed 'didn't want people to see me taking HIV medication' (16 versus 0%). Missing a dose because they were feeling sick tended to differ as well ($p < 0.06$), with a greater proportion of those not employed endorsing this reason.

We assessed whether those with moderate to severe depressive symptoms ($n = 28$) reported different reasons for their last missed dose compared to those with no or mild depressive symptoms ($n = 44$). Those who were classified in the 'moderately to severely depressed' group reported more reasons for missing a dose of medication than those who were in the not at all to mildly depressed group (M = 2.90 and 1.81, respectively; $t_{(df = 36.46)} = 2.16$; $p = 0.04$). Significantly higher proportions of participants who were in the moderately to severely depressed group reported feeling sick, taking a break from their HIV medication, wanting to avoid side-effects of their HIV medication and having trouble swallowing their medication as reasons for having missed a dose. As indicated in Table II, trends in the same direction were seen for the reasons of being busy with other things and not wanting to mix ART medications with alcohol or street drugs.

Finally, reasons for missed medication doses were evaluated in relation to whether the participant's education level was at or below high school ($n = 48$) or beyond high school ($n = 23$). There was a trend for those whose educational attainment was high school level or below to report more reasons for having missed a dose then those who pursued education beyond high school (M = 2.48 versus 1.74; $t_{(df = 69)} = 1.57$; $p = 0.12$). The only specific

reason reported with greater frequency by those who had a high school education or lower was ‘Didn’t want to mix my HIV medication with alcohol or street drugs’ (15 versus 0%).

Discussion

People living with HIV/AIDS receiving care at a Mississippi infectious disease clinic, who reported having missed one or more doses of their ART medication over the preceding three days, completed an assessment of reasons for last having missed a dose of medication. The five most frequently reported reasons for missing a dose were: (1) not having the medication with them (39%), (2) sleeping through the dose time (25%), (3) running out of the medication (22%), (4) being busy with other things (21%) and (5) other reasons not listed (20%).

The most frequently reported reasons for last having missed a dose of ART medication in the current sample share some commonality with reasons reported by patients in research with samples outside the Deep South (Chesney et al., 2000; Murphy et al., 2004; Walsh et al., 2001). For example, the most frequently endorsed reason in the current sample (‘didn’t have the medication with me’) has frequently been reported in numerous studies across various geographic regions (Boyle, 2004). Specific to other samples within the Deep South, not having the medication on hand was also reported as a common reason for missing a dose in Hill et al.’s (2003) Louisiana-based study and Kalichman et al.’s (1999) Atlanta-based study. Similarly, sleeping through the medication dose was also reported as a reason for non-adherence in Kalichman et al.’s (1999) sample. However, ‘not wanting others to see me taking my medications’ was *less* frequently endorsed (11%) in the current sample than in past research (e.g. Ferguson et al., 2002; Hill et al., 2003; Kalichman et al., 1999).

A noteworthy difference between the current sample and previous research with samples outside the Deep South was that the current sample had a very low rate of endorsement of ‘there was a change in my routine’ and ‘wanted to avoid the side effects of my HIV medication’. In the current sample, only 7% reported avoiding side-effects as a reason for missing a dose, whereas this has been a common reason reported by samples from other regions. A final distinction between the current results and previous findings was the greater frequency with which running out of medications was reported by the current sample. Whereas other studies have found this to have very low rates of endorsement (e.g. Murphy et al., 2004; Walsh et al., 2001), almost a quarter (22%) of the current sample endorsed it. Thus, reasons for missing a dose of ART medication shared some consistencies with previous findings but also suggested that the current sample of HIV-positive patients in clinical care in Mississippi also had unique adherence challenges. Unique to this sample was their infrequent endorsement of reasons such as wanting to avoid side effects, changes in daily routine, problems with food and drink requirements and not wanting to be seen by others taking a dose; and their more frequent endorsement of running out of medications. It is not likely that running out of medication was secondary to medications being financially unattainable. Most participants reported not paying anything out of pocket for their ART medications and there are numerous AIDS Drug Assistance programmes available in 82 Mississippi counties for individuals without Medicaid or private insurance. However, difficulties in accessing care or making use of existing services, common in the Deep South (Napravnik et al., 2006; Reif et al., 2006) may have contributed to ‘running out of medications’. Results suggest that further exploring and specifically targeting barriers to having ART medications on hand would be beneficial.

Reasons for last having missed a dose were explored in relation to gender, employment status, depressive symptoms and education. These grouping variables were not related to each other. Although females, the unemployed and those with moderate to severe depressive

symptoms endorsed a greater number of reasons for non-adherence, the top-five-to-six reasons endorsed were similar across most groups. Exceptions to this were found between men and women and between those who were classified as having no or mild depressive symptoms and those with moderate or severe depressive symptoms.

Men endorsed the same top-five reasons for last having missed a dose of ART medication as the overall sample, although in somewhat different order. The second most frequently endorsed reason for men was the 'other' response category (23%), suggesting that the list of reasons may not have been sufficiently comprehensive. Although 16% of the women also indicated that there were other reasons for missing their dose, 'other' was not one of their five most frequently endorsed responses. Clearly, it would be important to further explore what additional barriers exist to medication adherence for patients in the Deep South, particularly for men. The main area where women differed from men, however, was in their endorsement of 'feeling sick' as a reason for missing their dose; this was the second most frequently listed reason for women and was listed by a significantly larger percentage of women than men (28 versus 10%). It cannot be assumed that feeling sick refers to the experience of side-effects, since only 9% of women endorsed wanting to avoid side-effects as a reason for missing their medication. Regardless of exactly what kind of ill-feeling was experienced, results suggest that medical providers closely monitor their female patients with respect to how they feel physically and work with them to ensure that feelings of sickness are minimized so as to potentially maximize women's medication adherence. Clinician-patient discussion regarding the impact of feeling sick on one's medication taking behavior should also be explored.

Another area where men and women differed was in their endorsement of 'taking a break' from their ART medications. Fully 22% of women (versus 0% of the men) indicated that they missed a dose of their medication because they were 'taking a break' from their HIV medication. Possibly, 'feeling sick' contributed to women's decision to stop their medication; however, further research is required to determine that potential relationship. Finally, similar to previous studies with Deep South, HIV-positive populations (Ferguson et al., 2002; Hill et al., 2003) women endorsed not wanting others to see them taking their ART medications more than men (22 versus 3%). Addressing these kinds of concerns and potentially their association with HIV-related stigma may be particularly important when working with HIV-positive women from this geographic region.

Those with moderate or severe depressive symptoms most frequently endorsed: (1) 'not having the medication with me', (2) 'being busy with other things', (3) 'feeling sick', (4) 'running out of medications' and (5) 'taking a break from my medications'. Of these, feeling sick and taking a break from medications were endorsed by those with depressive symptoms significantly more than those with no or mild symptoms. These results suggest the need for clinicians to attend to the emotional, as well as physical, functioning of their HIV-positive patients. When depressive symptoms are present, extra or specialized support for medication-taking behavior and symptom relief may be needed.

The current study was limited by breadth of the 'reasons for having missed a dose' assessment measure and the self-administered survey format that did not allow for open-ended exploration of unique barriers and reasons for missing a dose. While the measure of reasons for last having missed a dose was developed with close attention to previous research, it would be improved by adding or removing reasons based on further research and focus groups with PLWHA in specific target populations. Given that almost a quarter of the sample endorsed the 'other' option, it is likely that there are additional 'reasons' of import not captured by the current list. Future research could identify additional reasons by using open-ended or 'fill-in' strategies in conjunction with the 'other' option. It is also important

to note that the current version of the checklist measure does not contain specific reasons that may relate to issues surrounding the patient-provider relationship, which also may prove important. Finally, results should be replicated with a larger sample of non-adherent HIV-positive patients. The current sample size did not allow for more detailed explorations of the relation between endorsing specific reasons with actual rates of adherence. With larger cell sizes, comparisons of mean differences in rates of adherence relative to specific reasons endorsed would be warranted.

While the 'reasons for missing a dose' checklist should be further refined and developed to increase its inclusion of diverse reasons and potential barriers, it does, in its current form, provide a starting point for gaining a better understanding of the concrete barriers faced by a given population. What is of potential clinical utility is that participants in this research were able to quickly complete the 'reasons' checklist. This type of checklist, with the inclusion of a write-in area for 'other,' may be a useful addition to clinical care. In practice, patients could complete the checklist prior to meeting a clinical provider and their responses could be used as a tool to stimulate and organize adherence-related discussions and exploration. Encouraging patients to work together with their provider to identify the reason(s) why a dose was missed and come up with possible strategies for dealing with the cause of the missed dose can be an important part of a comprehensive and collaborative approach to patient care. Clearly, such a strategy would be most effective if the 'reasons for missing a dose' items were first piloted and tailored to a given population and a compendium of patient resources developed for use by clinical staff to address each 'reason'.

Overall, the current results suggest that not having the medication on hand, running out of medication, being busy with other things and sleeping through one's dose time were clearly issues for this Deep South clinical sample. Interventions targeting ART adherence in this population could explore and target the specific barriers to keeping medications accessible and in full supply and include practical skills-building to assist patients to develop reminder strategies and negotiate changes in regimen schedules that would minimize dose times when the patient often sleeps. Additionally, and particularly for women, it may be essential to provide skills-building in maintaining privacy when taking medications and strategies for carrying medications in a manner that avoids HIV status disclosure. With the HIV epidemic approaching crisis proportions in the Deep South and increased numbers of patients enrolled in clinical care and prescribed ART, the need for targeted ART adherence support and intervention in this geographic region is critical.

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Table I

Sample characteristics (n = 72).

Characteristic of the sample	*n* (%)
Gender	39 (54) men
	32 (44) women
	1 (1) transgender
Ethnicity	60 (83) African-American
	4 (6) white
	6 (8) multiple ethnicities/races
Sexual orientation	46 (64) heterosexual
	19 (26) gay or lesbian
	2 (3) bisexual
	4 (6) unsure
Employment status	51 (71) unemployed, retired or on sick leave
Income	64 (89) with annual incomes of $10,000 or less
Living situation	55 (76) lived in their own or a family or friend's residence
Living environment	17 (24) rural
	29 (40) urban
	11 (15) suburban
Education level	48 (67) completed high school or less
HIV risk category	32 (44) heterosexual contact
	17 (24) men who reported sexual contact with other men
	1 (1.3) women who reported sexual contact with other women
	1 (1.3) sexual contact (gender unknown)
	1 (1.3) blood transfusion
	4 (6) multiple modes (3 reported sharing needles/works as well as engaging in 1 or more other risk behaviors; 1 reported MSM and heterosexual sex)
	14 (19) unknown
	3 (2) skipped this item
Degree of depressive symptomology (CES-D)	32 (44) not depressed (CES-D score 0–15.5)
	12 (17) mildly depressed (CES-D score 16–20.5)
	16 (21) moderately depressed (CES-D score 21–30.5)
	12 (18) severely depressed (CES-D score 31–60)

Table II

Reasons for last having missed a dose of ART medication for the full sample and by groups.

Reported reason for having missed a dose of ART medication	Full sample (*n* = 72) *n*(%)	Men (*n* = 39) *n* (%)	Women (*n* = 32) *n* (%)	*p*-value for $\chi^2_{(71,1)}$	Not employed (*n* = 51) *n* (%)	Employed (*n* = 21) *n* (%)	*p*-value for $\chi^2_{(72,1)}$	Mild or no depression (*n* = 44) *n* (%)	Depressed (*n* = 28) *n* (%)	*p*-value for $\chi^2_{(72,1)}$	HS or lower (*n* = 48) *n* (%)	Beyond HS (*n* = 24) *n* (%)	*p*-value for $\chi^2_{(72,1)}$
Didn't have the medication with me	28 (39)	11 (28)	17 (53)	0.03	21 (41)	7 (33)	0.54	14 (32)	14 (50)	0.12	22 (46)	6 (25)	0.09
Slept through the dose	18 (25)	10 (26)	8 (25)	0.95	11 (22)	7 (33)	0.30	14 (32)	4 (14)	0.09	12 (25)	6 (25)	1.0
Ran out of my HIV medication	16 (22)	7 (18)	9 (28)	0.31	14 (28)	2 (10)	0.10	9 (21)	7 (25)	0.65	11 (23)	5 (21)	0.84
Was busy with other things	15 (21)	7 (18)	8 (25)	0.47	13 (26)	2 (10)	0.13	6 (14)	9 (32)	0.06	8 (17)	7 (29)	0.22
Other/none of the above	14 (20)	9 (23)	5 (16)	0.43	11 (22)	3 (14)	0.48	10 (23)	4 (14)	0.38	10 (21)	4 (17)	0.67
Was feeling sick	13 (18)	4 (10)	9 (28)	0.05	12 (24)	1 (5)	0.06	4 (9)	9 (32)	0.01	10 (20)	3 (12)	0.39
There was a change in my daily routine	10 (14)	4 (10)	6 (19)	0.31	9 (18)	1 (5)	0.15	7 (16)	3 (11)	0.53	7 (15)	3 (12)	0.81
Was drinking or getting high	10 (14)	5 (13)	5 (16)	0.74	8 (16)	2 (10)	0.49	4 (9)	6 (21)	0.14	9 (19)	1 (4)	0.09
Didn't want people to see me taking HIV medication	8 (11)	1 (3)	7 (22)	0.01	8 (16)	0	0.05	3 (7)	5 (18)	0.15	7 (15)	1 (4)	0.18
Didn't want to mix my HIV medication with alcohol or street drugs	7 (10)	4 (10)	3 (9)	0.90	6 (12)	1 (5)	0.36	2 (4)	5 (18)	0.06	7 (15)	0	0.05
Was taking a break from my HIV medication	7 (10)	0	7 (22)	0.002	6 (12)	1 (5)	0.36	1 (2)	6 (22)	0.007	6 (12)	1 (4)	0.26
Wanted to avoid the side-effects of my HIV medication	5 (7)	2 (5)	3 (9)	0.49	5 (10)	0	0.14	1 (2)	4 (14)	0.05	4 (8)	1 (4)	0.51
Had trouble swallowing my HIV medication	5 (7)	3 (8)	2 (6)	0.81	4 (8)	1 (5)	0.64	1 (2)	4 (14)	0.05	4 (8)	1 (4)	0.51
My HIV medication has rules about food or drink that I didn't follow	2 (3)	1 (3)	1 (3)	0.89	2 (4)	0	0.36	1 (2)	1 (4)	0.74	2 (4)	0	0.31
Was NOT feeling sick	1 (1)	0	1 (3)	0.27	1 (2)	0	0.52	1 (2)	0	0.42	0	1 (4)	0.15

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