

HIV-Positive Patients' Perceptions of Antiretroviral Therapy Adherence in Relation to Subjective Time: Imprinting, Domino Effects, and Future Shadowing

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Abstract

Antiretroviral treatment adherence barriers are major concerns in HIV care. They are multiple and change over time. Considering temporality in patients' perceptions of adherence barriers could improve adherence management. We explored how temporality manifests itself in patients' perceptions of adherence barriers. We conducted 2 semi-structured focus groups on adherence barriers with 12 adults with HIV which were analyzed with grounded theory. A third focus group served to validate the results obtained. Three temporal categories were manifest in HIV-positive patients' perceptions of barriers: (1) imprinting (events with lasting impacts on patients), (2) domino effects (chain of life events), and (3) future shadowing (apprehension about long-term adherence). An overarching theme, weathering (gradual erosion of abilities to adhere), traversed these categories. These temporalities explain how similar barriers may be perceived differently by patients. They could be useful to providers for adapting their interventions and improving understanding of patients' subjective experience of adherence.

Keywords

HIV, medication adherence, time perception, patient care management, antiretroviral therapy

Introduction

HIV is a chronic infection manageable with different regimens of antiretroviral drugs self-administered daily in pill form. Older regimens are still in use, but switching to newer and less-constraining ones (in terms of side effects and number of pills) is considered a means of improving patients' adherence.^{1,2} "Adherence," or the extent to which a person's medication uptake corresponds with their clinician's indications,³ is a major concern in HIV clinical practice.⁴⁻⁶ It is a condition for therapeutic success, particularly, a high CD4 count and an undetectable viral load, which reduces risks of disease progression, development of resistance, and secondary transmission.^{7,8} A meta-analysis suggests that almost half (45%) of HIV-positive patients in North America have suboptimal adherence (below 80%-100%, depending on the study).⁹

Antiretroviral treatment (ART) adherence is complex and difficult to measure. Adherence barriers vary between patients and over time.¹⁰⁻¹³ Moreover, studies demonstrate that clinicians' estimations of patients' adherence can be erroneous^{14,15} and that ART adherence barriers are not always adequately discussed during clinical consultations.¹⁶⁻¹⁸ Patients'

biomedical outcomes give only a partial assessment of adherence¹⁹ and supply no information on patients' subjective experiences of ART-taking.

Given this complexity, a review of interpretative models of adherence in chronic conditions concluded that adherence interventions should include analyses of patients' perceptions.¹⁰ "Patients' perceptions" refer here to patients' cognitive frameworks to make sense of their medical condition and treatments.²⁰ Patients build these frameworks based on received information, individual experiences, and beliefs. They may differ in important ways from clinicians' frameworks²¹ and influence how patients manage their treatment adherence.^{20,22} For instance, the association between HIV-positive patients' negative perception of ART and low adherence has been

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demonstrated.²³ In the investigation of patient's perceptions in relation to adherence, a growing literature analyzes their subjective experiences of time.²⁴

In HIV, few studies have examined how temporality affects patients' perceptions of adherence barriers or have done so while focusing on specific dimensions of temporality, such as biographical disruptions²⁵ or dailyART-taking.¹ A recent narrative review highlighted the need for analyses accounting for different patients' experiences of time.²⁶ This analysis could shed light on the meanings, for HIV-positive patients, of past events, ART-taking routines, and their future, and help improve adherence interventions. Our objective is thus to explore how time is experienced in patients' perceptions of their adherence barriers.

Methods

Context of the Study

Data were collected in the context of the Interference-Score (I-Score) Study, a 2-year multisited Canada/France project that aims to develop and validate a patient-reported outcome measure on ART adherence barriers for use in HIV care. A patient engagement project was initiated to integrate patients' perspective in the I-Score Study. It consists of a Montreal-based group of 10 HIV-positive patients, the I-Score Consulting Team (henceforth, the Team),²⁷ which meets periodically to discuss progress on the study. This article presents the results of the first research activity conducted with the Team. We obtained approval for the present study from the research ethics board of the McGill University Health Centre's Research Institute, in Montreal, Canada.

Design and Conceptual Framework

This exploratory study draws on the concept of life course^{28,29} which is based on specific assumptions: one's life events take place at specific moments, sometimes take time to fully unfold, and are influenced by those of others.^{28,29} It promises an understanding of complex phenomena that situates individual and dynamic experiences in relation to broader influences.³⁰ It grounds descriptive observations and analyses in theories on people's everyday lives^{1,31} and biographical disruptions.³² This framework has been employed in sociological studies of medical issues focused on chronic patients' "real life" experiences.^{24,26,32,33}

Sample, Data Collection, and Analysis

Participants were mainly recruited from the Team, constituted using a maximum variation sampling technique, a type of purposive sampling aimed at capturing a wide range of perspectives relating to a topic.³⁴ We recruited one additional individual for each focus group, to compensate for any cancellations or no-shows.³⁵ A total of 11 participants took part in 2 sex-specific focus groups in November 2015 led by I.T. and observed by D.L. and A.L. Focus groups lasted 120 and 135 minutes, respectively. They employed a semistructured format

including an introductory round table discussion and open-ended questions on ART adherence barriers participants would like to report to their clinician and how they would like to report them. Participants were compensated (CAN\$50).

Focus groups were audiotaped and transcribed. D.L. entered the transcriptions into the software Altas.ti (version 7.5.10, 1993-2016, by ATLAS.ti GmbH) and analyzed the data following the first 5 stages of the Grounded Theory method (coding, categorizing, association, integration, and modeling).^{36,37} These concurrent stages can inductively generate descriptions of "real life" dynamics and, by deconstructing and reconstructing the data, identify essential content, abstract concepts, and models.³⁶ Analyses centered on all focus group content relevant to participants' perceived adherence barriers. To improve the reliability of results, the coding grid employed was discussed with coauthors.

In order to validate our modeling,³⁸ we conducted a third audio-recorded focus group to discuss the preliminary analyses with the Team, facilitated by D.L. (n = 8, 140 minutes). This focus group was held within one of the Team's regular meetings. It thus included 1 participant (P12, a female Team member) who had been invited but could not participate in the first focus group. During this third focus group, D.L. asked participants to consider and explain in their own words the main categories developed and to confirm or qualify key statements of the model.³⁸ This discussion was transcribed and integrated into the analysis, adjusting the coding grid as necessary. This exercise sought to validate our analysis, avoid biases, increase the soundness of our interpretations and conclusions in relation to the data,³⁹ and refine our understanding of the categories and their interrelations.⁴⁰

Results

Table 1 presents participants' characteristics. Our analysis identified 3 temporal categories manifest in participants' perceptions of adherence barriers: (1) imprinting, (2) domino effects, and (3) future shadowing. An essential theme, weathering, ran through these categories. We illustrate these temporal categories and the overarching theme in Table 2.

Imprinting

"Imprinting" refers to the processes by which unpleasant and emotionally charged ART- or HIV-related events etch persistent memories with long-lasting and significant impacts on perceptions of ART and, consequently, adherence. This occurred in participants who lived for an extended period of time with HIV either without ART or with limited access to it (Example 1) and participants who witnessed (Example 2) or had (Example 3) unpleasant ART-related experiences (eg, side effects, interactions between ART and treatments for other health conditions, discrimination).

Domino Effects

"Domino effects" denote chain reactions in personal (eg, moving to another province or country, finding a new partner),

Table 1. Characteristics of Participants in Each Focus Group, at the Exploratory and Validation Phases of Data Collection.

Participant	Age Group (in Years)	Group	Number of Years on ART	Exploratory Phase		Validation Phase
				Focus Group 1	Focus Group 2	Focus Group 3
P1	20-29	African woman self-identified as queer	Over 10 years	x		
P2	50-59	African WSM	Over 10 years	x		x
P3	50-59	White WSM	1-3 years	x		
P4	50-59	Latin American WSM	Over 10 years	x		
P5	40-49	African WSM	Over 10 years	x		x
P6	30-39	White MSM	3-6 years		x	x
P7	60-69	African MSW	Over 10 years		x	x
P8	30-39	White MSM	Over 10 years		x	x
P9	50-59	White MSW	Over 10 years		x	
P10	30-39	European White MSM	Less than 1 year		x	x
P11	50-59	White MSM	Over 10 years		x	x
P12	50-59	White WSM	Over 10 years			x

Abbreviations: ART, antiretroviral treatment; MSM, man who has sex with men; MSW, man who has sex with women; WSM, woman who has sex with men.

professional (eg, academic or professional career changes), and/or medical events (eg, an ART regimen switch, the appearance of another health condition) that can impact perceptions of ART and/or adherence. Domino effects can reactivate a previously dormant barrier (Example 4), a barrier experienced in the past. They can also lead patients to consider ART a lower priority (Example 5) or as potentially detrimental to their well-being (Example 6). Finally, they can impact patients' life choices which, in turn, can affect their behavior, contributing to adherence barriers (Example 7).

Future Shadowing

"Future shadowing" characterizes participants' concerns raised by the long-term ART-taking, which can impact perceptions of ART and/or adherence. These concerns include the difficulty of projecting themselves into the long term (Example 8), pre-occupations for ART toxicity and long-term side effects (Example 9), and the anticipation of repeatedly facing similar barriers (Example 10).

Overarching Theme: The Weathering of Adherence

Weathering refers here to the gradual erosion of patients' well-being or ability (Example 11) or resolve (Example 12) to adhere by impacting perceptions of ART and/or adherence. It is caused by an accumulation over time of ART-related concerns or episodes of managing adherence barriers that stem from the dynamics of imprinting, domino effects, and future shadowing.

Discussion

Our analysis of focus groups conducted with HIV-positive patients revealed 3 temporalities and one theme relevant to patients' perceptions of adherence barriers. First, imprinting refers to a linear temporality in which unpleasant events have lasting impacts on adherence. Second, domino effects form a

processual temporality in which barriers emerge from life circumstances. Third, future shadowing refers to a prospective temporality underlining patients' ambivalence toward life-long adherence. Like in other studies reporting on temporalities in chronic patients' perceptions,²⁶ temporal narratives "collide" in patients' accounts. An overarching theme, "weathering," related to participants' reports of gradually losing motivation and capacity for adherence, runs through these categories.

Similar metaphorical usages of these terms were found in other scientific publications. "Imprint" has been used in psychology and ethology to designate phase-sensitive unconscious learning processes,⁴¹ to illustrate the impacts of experiences of care on patients' memory and perception of treatment,⁴² and to refer to repercussions of sociopolitical conditions on how people define the HIV epidemic.⁴³ The "domino effect" metaphor has been used to highlight interactions between different dimensions of a health condition and its treatment.⁴⁴ The notion of "future shadowing" was inspired by that of a "dark future" which is used in a measure of pessimism.⁴⁵ Weathering refers to the breaking down of minerals due to contact with elements.⁴⁶ It has been used to refer to premature health deterioration due to adversity.⁴⁷ We chose these terms as they illustrated well the participants' temporal perceptions of adherence barriers.

Participants mentioned perceived barriers as diverse as side effects, meanings of life-long ART and of its costs, and discrimination. These barriers coincide with studies that show that nonadherence to ART is exacerbated by socioeconomic vulnerability,⁴⁸ age,^{49,50} discrimination,⁵¹ and ART characteristics (eg, number of doses, side effects).⁵² Our results are coherent with an ART adherence model which presents adherence as a compromise between the conflicting demands of everyday life (including work demands, [disrupted] routines, and eating habits), side effects, depression, perceived ART effectiveness, and social support.⁵³ They also provide rationales for how patients may give differential meaning to a similar barrier

Table 2. Illustration of the Participants' ART Adherence Barriers in Relation to the Temporal Categories.

Temporal Category 1: Imprinting	
Focus Group Excerpt	Imprinting Process and Impacts
<p>Example 1</p> <p>PI1: "I was diagnosed in the winter of 83-84. My doctor told me my chances of survival, with the first cocktails, were almost nothing. (...) If I've been here this long, I must have been doing something right.</p> <p>Today, it's not enough for me just to take the drug, the right dose, at the right time. No, I'd be dead if I did just that. So many people who just took the drugs, relying on the drugs like a crutch, are dead.</p> <p>I did my own research; I'm very aggressive when it comes to my health, very proactive, it's my responsibility. The doctor's there to help you with the diagnostic, but the first question I asked was what can I do?</p> <p>PI: "What interests me as a patient [who had limited access to ART for years before I learned my diagnosis] is to understand how I survived before I was officially HIV positive. What are the other drugs? Or, my aunts who raised me, what did they give me on the nutrition side? What kept me healthy while being HIV-positive? (...) I ate well. Do I need another advice like doing sports to simulate my immunity? I would like (the clinician) to inform me on natural products that we sometimes look for elsewhere."</p>	<p>Imprint Unpleasant and emotionally charged event: Survival despite the threat of death due to a lack of access to efficient ART for a long period after diagnosis</p> <p>Impact on perception of ART Perception that only taking ART is not enough to maintain health and that doing so may be hazardous to one's health.</p> <p>Impact on ART adherence Proactive approach where adherence becomes one practice among others (researching, eating well, exercising, etc) to maintain health and manage HIV combined with an interest in alternative medicine</p>
<p>Example 2</p> <p>P2: "In the past, I saw people with lipodystrophy. It was scary. When I began treatment, I thought: I will begin to be like this. (...)</p> <p>When I received my diagnosis, I thought about these people with HIV I had seen: they did not look good. I could see they were sick. Nowadays, there are no signs. People look healthy. But I put myself in this image. I thought: 'This is what will happen to me.' People will reject me if I start to lose weight. If I look sick, they will be afraid. (...)</p> <p>I would skip doses: 'If I do not take it every day, maybe the effects will be less strong. It will not show as much.'</p>	<p>Imprint Unpleasant and emotionally charged event: Seeing HIV-infected persons with severe lipodystrophy</p> <p>Impact on perception of ART While recognizing that the side effects of newer ART regimens have changed, an association between ART and lipodystrophy persists, with the fear that ART will make one visibly sick, leading to social exclusion</p> <p>Impact on ART adherence Skipped doses to limit lipodystrophy</p>
<p>Example 3</p> <p>P9: "I noticed my body odor changed with a drug. It is not really important, but when I have sexual intercourse, it is obvious for my partner. (...)</p> <p>It's the first thing I think about when I switch drugs: 'Ah! It will maybe change my smell.'</p> <p>We'll take the drug anyway. At the end of the day, I'm still alive. It doesn't matter if I stink like Pepe le Pew."</p>	<p>Imprint Unpleasant and emotionally charged event: Side effect (odor) that impacts one's sex life</p> <p>Impact on perception of ART View that other ART regimens may have a similar effect</p> <p>Impact on ART adherence Adherence for survival, despite possible side effects</p>
Temporal Category 2: Domino Effects	
Focus Group Excerpt	Domino Effects and Impacts
<p>Example 4</p> <p>P2: "I was on a drug. When you took it, you fell asleep. I worked night shifts then. It was complicated to take it: working in health, I couldn't sleep. Sometimes, I would agree with the person working with me and I could take a break. I would take my med and sleep on the break.</p> <p>But if I worked with another person who wasn't used to it, it was a problem.</p> <p>I was obliged to skip a dose."</p>	<p>Dormant barriers (shift work in the health field and a side effect—drowsiness) that can usually be accommodated</p> <p>Domino effect Change in coworker reactivates adherence barriers of shift work and side effect</p> <p>Impact on ART adherence Skipped doses</p>

(continued)

Table 2. (continued)

Temporal Category 2: Domino Effects	
Focus Group Excerpt	Domino Effects and Impacts
<p>Example 5 P8: “Before I was on welfare. I went back to school and lost welfare [because I got student loans], so I was obliged to pay for my meds. I was broke, so I either ate or I took my meds. I decided to eat and I didn’t take my meds for a year.”</p>	<p>Welfare provides full coverage for medication Domino effect Return to school precipitates loss of welfare and change in medication coverage status. Income remains low, leading to difficult choices between basic necessities and ART Impact on ART adherence Treatment interruption</p>
<p>Example 6 P5: “I took iron supplements, but they changed my med. There is an interaction between the two. I cannot take the iron supplement. So it changes my habits. I have to eat iron-rich food and it requires more follow-up. (...) [Anybody could need iron.] The problem is the drug for HIV. It’s the iron supplement I should take!”</p>	<p>ART regimen switch during treatment for other health condition (anemia) Domino effect Interactions between medications require new eating habits and more follow-up, which complicate health management Impact on perception of ART ART is seen as <i>the</i> problem</p>
<p>Example 7 P2: “I really wanted to work. I found a job in a hospital. The first day of the training, they took our blood. They saw I was HIV-positive. I was the only one they dismissed. [I was discriminated against.] So in my next jobs, I worked in the private sector, where I was paid half the salary, because I didn’t want them to see again. I prefer to be underpaid, at the minimum wage, where they won’t ask me questions, where there is no health insurance, with no health exams. And poverty exposes you (...) There were times I did not take (ART). Why? Because every month, I have to spend \$154. I do not have it, even if I look for it. So I say: ‘Today, I do not take it’ to make it last more days. These drugs are expensive’.”</p>	<p>Desire to find employment Domino effect 1 Finding a job led to a health screening and the person’s subsequent dismissal Domino effect 2 Felt discrimination (Domino effect 1) led to seeking employment in lower paid private sector to avoid health screening, resulting in reduced health coverage Impact on ART adherence Consequent financial strain led to skipped doses to stretch the ART prescription</p>
Temporal Category 3: Future shadowing	
Focus Group Excerpt	Future Shadowing and Impacts
<p>Example 8 P8: “[When taking ART,] you shouldn’t consider what will happen in more than 2 years because we don’t know. (...) It’s like the unknown. It’s better to say: ‘I’m lucky to be alive now’ and take your meds one by one.”</p>	<p>Future shadowing Difficulties in projecting oneself into the future Impact on ART adherence Taking one dose at a time</p>
<p>Example 9 P7: “We know these drugs are toxic and I talked about it with my doctor. He tells me that I will not die of AIDS. It will be a stroke, or the kidneys, the pancreas, or the arteries. So we must take them and keep a positive way of thinking. (...) This is a concern for me.”</p>	<p>Future shadowing Understanding that death will come from the long-term toxicity of ART Impact on ART adherence Resignation to take ART despite concerns about this</p>
<p>Example 10 P10: “The only barrier that kept me from accessing treatments was linked to my status here in Canada. We must get my meds through crooked paths. As long as I haven’t fixed my status as a foreigner, sooner or later, the access will be blocked. We can only postpone this barrier. It will come back.”</p>	<p>Immigrant status precludes receiving coverage of ART, leading to precarious solutions to access ART Future shadowing Unless immigrant status is changed, this adherence barrier will likely return</p>

(continued)

Table 2. (continued)

Overarching Theme: Weathering	
Focus Group Excerpt	Weathering Process and Impacts
<p>Example 11</p> <p>P5: "It's not worth it with the side effects, let's say, with the money we can barely find, with life that goes wrong, with the relationships that don't go well. It's all of that that does that adherence can lead us to drop treatment, and even to death."</p>	<p>Weathering</p> <p>Accumulation over time of challenging life events associated with HIV and ART</p> <p>Impact on ART adherence</p> <p>Combined effect of the above can lead to abandoning ART with its associated impacts on health</p>
<p>Example 12</p> <p>P3: "You have a little problem that appears. They [clinicians] tell you: 'It may be due to the drug.' This puts a small weight on your back. Then, you do not feel good: 'Is it because I still take these drugs? It might also be because I feel lonely,' but the drugs might be the cause of that too. All these problems become so heavy, you say: 'Why do I keep on taking this?'"</p>	<p>Weathering</p> <p>Growing burden of experiencing multiple symptoms and attempting to interpret their origin</p> <p>Impact on perception of ART</p> <p>Utility of ART becomes questionable</p>

Abbreviations: ART, antiretroviral treatment, The significance of boldface is to emphasize mechanisms of, respectively, imprinting, domino effects, future-shadowing, and weathering, in each of the examples.

depending on its temporal quality and highlight how adherence barriers can gain traction in patient perceptions to ultimately impact adherence. Moreover, we show that adherence barriers may stem from concerns for one's health or situation, for example, when one looks for alternative health practices, seeks to avoid discrimination, or faces financial difficulties.

Tentative implications for practice include the following points: (1) adherence should be recognized as a process, (2) perfect life-long adherence as a universal, "one-size-fits-all" objective is unrealistic, (3) adherence barriers must be considered in the context of each patient's particular circumstances, and (4) interventions should include regular assessments of patients' perceptions of adherence barriers and employ multi-dimensional tools that cover such elements as patient-reported barriers, values, perception of alternative health practices, significant life changes, and key moments of vulnerability, such as regimen switches. Indeed, the latter may jeopardize adherence by exposing patients to different side effects, indications, and costs.⁵² These could help identify potential sources of imprinting, domino effects, or future shadowing.

The 2 focus groups give this study an exploratory status, relevant for the subsequent steps of the I-Score Study. Further research and a larger sample could lead to a more complete model of adherence and temporality that is transferable to different contexts. The focus groups' centering on adherence barriers may have emphasized negative aspects of ART at the expense of a more balanced perspective. We did not reach saturation with our analyses. However, rich data were collected from a diverse sample of people living with HIV and included a third focus group to maximize the analyses' trustworthiness. Moreover, our results indicate that inquiring about HIV-positive patients' temporal experiences of adherence may represent an interesting and relevant avenue for further research. The strength and originality of this study lie in its articulation

of adherence barriers within a temporal framework that could prove useful for clinical evaluations.

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