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Changes in marijuana use and associated attitudes and health behaviors among patients in HIV care in the U.S. in the post-legalization era: a qualitative study

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We sought to understand the impact that state-level marijuana policy changes had on marijuana use behaviors among people with HIV (PWH), including patterns of use (e.g., frequency, modality), access, goals for use, use of other substances, and perceived health effects. We conducted 1:1 interviews at 3 U.S. HIV clinics with PWH aged ≥18 reporting weekly or more marijuana use; 2 clinics were in states that legalized recreational marijuana use. We coded interviews based on sub-topic areas of clinical interest. Among PWH (n=29, 80% cisgender male; mean age=50; 66% non-white), one-third reported increased use of marijuana products since legalization in their state, primarily related to exploring products for therapeutic needs. In legalized states, PWH reported easier product access. The most-cited therapeutic goals for use included relaxation/sleep (66%), appetite stimulation (41%), stress/anxiety relief (31%), and pain relief (28%), among others. Additionally, some reported marijuana helped maintain sobriety from other substances. In legalized settings, increased product diversity and attribute labeling facilitated decision-making, allowing individuals to tailor use to specific goals. Concern over the long-term impact of smoking marijuana was limited to respiratory effects, with no concerns regarding potential cognitive impacts of use, or effects from using edible formulations. Among a sample of PWH who use marijuana, the broad variety and availability of products following legalization increased use for a third of participants from affected states and was consistently described as offering a means for facilitating decision-making for targeted therapeutic use, including as an aid for sleep, anxiety, appetite, and pain, as well as minimization of craving alcohol and 'harder' substances. While the short-term benefits of using marijuana were clearly described, concern over long-term health effects was limited.

Key words: Marijuana use, HIV care, health beliefs.

INTRODUCTION

Compared to those without HIV, marijuana use among people with HIV (PWH) has been associated with worse health outcomes including increased risk of cardiovascular and lung disease (independent of smoking

tobacco) (Lorenz et al., 2017; Lorenz et al., 2019), respiratory issues such as chronic bronchitis (Volkow et al., 2014), and negative impact on cognition and memory (Crean et al., 2011; Cristiani et al., 2004; Skalski et al., 2016; Thames et al., 2016). Among PWH, marijuana has also been found to have an adverse impact on health behaviors essential to survival, notably HIV-care appointments and antiretroviral adherence (Dietz et al., 2010; Kipp et al., 2017; Kuhns et al., 2016; Montgomery et al., 2019; Newville et al., 2015) with some studies finding greater negative impact with more frequent use (Bonn-Miller et al., 2014; Kuhns et al., 2016; Newville et al., 2015). Marijuana use has also been associated with higher odds of drug and alcohol use disorders among PWH (Han and Palamar, 2018).The current epidemiological literature, coupled with reports that marijuana use in the U.S. has increased in recent years (Kerr et al., 2018), possibly in concert with the relaxation and/or eradication of laws prohibiting its use in some states (Zvonarev et al., 2019), raises concern for increased morbidity among PWH. Studies have found a higher prevalence of marijuana use among PWH compared to the general population (Center for Behavioral Health Statistics and Quality, 2016; Prentiss et al., 2004; Shiau et al., 2017), with a threefold higher past-year use (34.2% versus 11.1%) and fourfold higher past-month use (24.9% versus 6.7%) (Shiau et al., 2017).

While there is a potential cause for concern regarding the impact of marijuana's broadening availability on patterns of behavior and health outcomes among PWH, marijuana may help some PWH, who report relief from a broad array of symptoms with use, including pain and anxiety (Chayama et al., 2021; Sajdeya, 2021), or those who use it as an appetite stimulant (Sajdeya, 2021). Indeed, PWH were integral to catalyzing the medicinal marijuana movement in the 1990s (Mann, 2019), and the use of marijuana for medical purposes has long been supported by some care providers (Bridgeman and Abazia, 2017).

The risks of marijuana use for PWH relative to its benefits warrant further exploration, especially in the emerging context of legalization with increased availability of regulated marijuana products, particularly for different methods of delivery (e.g., edibles vs. smoking or vaping), increased package labeling (e.g., type, THC percentage, THC/CBD ratio), and increased product potency, as one study found THC levels in marijuana increased threefold 1995-2014 (ElSohly et al., 2016). Patterns of use among PWH since legalization, as well as their perceptions of health effects compared to benefits, are poorly understood.

Through patient interviews, we sought to gain an in-depth understanding of the impact that state-level marijuana policy changes had on marijuana use behaviors, including patterns of use (e.g., frequency, modality), access, goals for use, use of other substances, and perceived health effects among PWH.

METHODS

Study population and recruitment

We recruited PWH ≥ age 18 for 1:1 interviews at 3 clinics within the Centers for AIDS Research Network of Integrated Clinical Systems (CNICS) in 2019-2020: Fenway Health-Boston, MA; 1917 Clinic at the University of Alabama-Birmingham; and Madison Clinic at Harborview Medical Center/University of Washington-Seattle. Recruitment was based on the indication of eligibility through routinely administered pre-visit electronic assessment of patient-reported outcomes and measures (PROs) (Crane et al., 2007; Lawrence et al., 2010). The PRO measures include a range of health assessments including a substance use screening tool (ASSIST) which queries the frequency and modality of the past 3-month marijuana use. Based on eligibility alerts from PROs, we recruited PWH at the time of their appointment or by phone afterward. We recruited a mix of daily and weekly marijuana users at all sites; in states where marijuana legalization occurred, we recruited PWH who increased their use post-legalization, those who decreased use, and those whose use remained the same. Site Institutional Review Boards approved study activity.

Patient interviews

A multidisciplinary team of HIV care providers and researchers designed an interview guide querying key areas of interest regarding marijuana use, with a focus on changes in perceptions of marijuana products, and patterns of use pre-and post-legalization. Topic areas included: 1) goals for use; 2) product access; 3) patterns of use, including frequency, method of delivery, and factors affecting use; 4) user experience; 5) relationship to use of other substances; 6) control of use including cessation; 7) perceptions of health impact, and 8) social dimensions of use. Interviews were ~60 min and were conducted by trained qualitative researchers either by phone or in person. We offered $50 compensation.

Interview coding

Two trained qualitative researchers coded transcripts using Dedoose software (Sociocultural Research Consultants LLC, 2014). We coded interview content upon receipt of each transcript based on the aforementioned topic areas.

Within each topic area, two coders independently used an open-coding process to identify the theme within the interview excerpt. We then sought consensus on existing themes, facilitated by the qualitative project leader, and evaluated theme frequency.

We evaluated for thematic saturation, the point at which no new themes emerge from additional interviews, after coding the 15th and 25th interviews. The qualitative project leader summarized emergent themes found within the coded categories. We conducted

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four additional interviews upon finding saturation after the 25th; we then determined that no new themes had emerged and ceased recruitment.

RESULTS

We conducted interviews with 29 participants (80% cisgender male, 17% cisgender female, 3% transgender female; mean age 50; 48% Black or African-American, 34% White, 17% Hispanic, 10% multiracial, 7% Asian) (Table 1).

Goals for use

Relaxation and sleep were the most-cited goal for use (66%), followed by a desire to increase appetite (41%), relief of stress/anxiety (31%), pain relief (28%), fun/ recreation (28%), reduce cravings for another substance (17%), and treat physical symptoms other than pain (10%); 69% of participants cited use for more than one purpose. Legalization did not modify goals for use. For nearly a quarter of participants, however, general goals for use changed over time and life course, independent of legalization, from recreational use to treatment of symptoms:

From age 18 or 19; it was just purely recreational, very sporadic…then I started taking [the HIV cocktail]; it was the first time I started using cannabis for an entirely different reason. I would get so nauseated and weak and tired. It was a different cocktail then… that's when my usage became way more regular. (Male, 54, MA)

I don't smoke as much as before, 'cause I don't smoke enough to get f--ked up. It's more of a medical and an emotional thing…the use became…a way of help[ing] me take care of my mental health. And of helping me eat (Male, 33, MA).

I smoke [just] so much until the pain goes away and that's it. But, I mean, getting loaded or high-- no, no more (Transgender female, 51, WA).

Five participants indicated that a primary goal of their marijuana use was to help manage cravings for another substance, namely methamphetamine and/or alcohol:

Weed helps with my [meth] cravings a lot. It throws my mind off. It doesn't make me think about it. I could wanna do some meth, and then I could smoke some weed and just completely get lost in the [TV] show or find something interesting – my mind can be deterred from it way easier than if I'm just sober (Male, 39, WA).

……smoking weed [takes] the craving off of smoking crystal (Male, 39, MA).

Pot helps me keep my alcohol in check. If I just drink and then don't smoke pot, I drink way too much. But if I smoke some pot, I'll drink a lot less (Male, 49, WA).

When I stopped drinking completely, it would be cannabis that probably saved me because that was when I switched …all I did was smoke. And that was plenty. I preferred it. I remembered my life, and I didn't destroy anyone else's…so that's when everything switched (Male, 54, MA).

Product access, including price

For states in which marijuana products were legal, participants overwhelmingly reported easy access to dispensaries. Most already had well-established contacts from whom to purchase marijuana before legalization. Several participants reported that they were glad to stop using street-based dealers:

I used to get it from the street people, you know? Now I just go to the dispensary – it's a lot better. 'Cause when you used to go to just on the street, sometimes I used to get burned….when I get home in my apartment, it's, like, 'What the hell?'[The 'weed'] was a wet newspaper. I don't buy weed from anybody in the street no more (Transgender female, 51, WA).

However, some participants reported price barriers and continued purchasing through their dealers:

The dispensary….don't give you your money's worth...you can always get more from your friend (Male, 52, WA).

In AL, where recreational marijuana sale/use is not legalized, most claimed marijuana was still "easy" to get, occurring through dealers. However, one participant echoed others in disliking the feeling of obligation to be social with a dealer.

Back when I was younger, I was more social. Now I'm older…I have to find somebody that's not trying to talk to me [like a friend] because…it ruins the business aspect of it (Male, 49, AL).

Patterns of use, including frequency, method delivery, and factors affecting the use

One-third of participants living in states where marijuana is legal (MA, WA) reported a change in their patterns of use since legalization. Among this subset, all but one noted an increase in the frequency of use, and one noted only a brief increase in use. For these participants, ease of accessibility was a key factor in this increase:

The availability and the legalization [of marijuana]…was a

Table 1. Interview participant characteristics: patients with HIV who use marijuana.

Characteristics	N (%)
Gender	
Male	23
Female	5
Transgender female (male sex at birth)	1
Age	
<30	1
30-39	7
40-49	3
50-59	13
≥60	5
Race	
White	10
Black/African American	14
Asian/Pacific Islander	2
Other/unknown	3
Hispanic ethnicity	
Hispanic	5
Not Hispanic	21
Other/unknown	3
Site	
Fenway	12
UW	9
UAB	8
HIV transmission risk factor(s)	
Men who have sex with men	22
Heterosexual contact	10
Person who injects drugs	4
Unknown	0
Most recent CD4 count	
< 200	2
200 - 349	1
≥350	20
Unknown	6
Recent viral load	
0-400	29
Over 400	0
Unknown	0
Nicotine use	
Current nicotine use	9
Ever nicotine use	16
Alcohol use	
At risk drinker	7
Not at risk drinker	12
Non-drinker	6
Unknown	4
Current drug use (in addition to marijuana)	
Methamphetamines	2
Cocaine/crack	3
Illicit opioids	2

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huge difference. Before, I wasn't using it much. There was nowhere to get it, right? (Male, 54, WA) Several noted the novelty of experimenting with new products. Participants appreciated the transparency of ingredient labeling (e.g., indica/sativa, THC percentage, THC/CBD ratio) which encouraged experimentation with different types.

There are lot more choices. The information they provide is you know the THC, the CBD, what type of strain it is if it's Indica, Sativa or hybrid. The information that they provide is so much more than when it was medical. 've had some strains that affect me really bad…so having that information is helpful. I can get me something where the THC is below 20 percent…I can have some more control over what I'm buying, what's actually in it, how much THC or CBD is in it (Male, 49, WA).

Before, [you didn't] know if it's gonna be strong, I don't know if it's gonna be good weed, or, you know, I don't know if it's gonna be Indica or could be something else… (Transgender female, 51, WA).

Since it was legalized I like to explore different types of strains and flavors, especially when it comes to edibles (Male, 33, MA).

They've went crazy with really diversifying their products and what they offer. I think that in itself is amazing. You don't have to smoke it if you don't want to smoke it. You can try this [edible] and it might have the same effect. It's just better for people or patients that need it, or that can't smoke it (Male, 29, MA).

I'm not one that's very keen with…any kind of thing I have to inhale…a friend of mine shared some [edibles] with me and I liked the feeling. And so that's where it kind of took off for me, when more dispensaries became available, I decided to explore it on my own and really understand 'what do I like' and figure it out from there (Male, 39, MA).

Some participants, by way of regulation/legalization, learned more about cannabinoids, and were able to tailor usage to their health goals:

I didn't know nothing about...a difference between THC and the CBD...so they educated me a little bit…in fact...[now] even I'm not looking to get the THC (Female, 60, WA).

[The joints'] CBD content was a little bit higher…and so I wanted to see how I do with them, and I wanted them to…help me sleep (Male, 49, WA).

I think I had access to whatever they want to call all the different strains now. The difference between then and now is now I know which one is which…I never realized that some of it was different feeling because…my prime

goal back at that point was to get rid of nausea, and all of them work for that. Does not matter which strain. But some of them would make you more nervous or more paranoid, and others would relax and calm you, and you didn't know why (Male, 54, MA).

Relationship to use of other substances

When asked about the use of other substances along with marijuana, a few patients reported using it to magnify the effects of alcohol. However, multiple participants also reported using marijuana to reduce alcohol intake:

I feel like I can maintain a plateau easier and with less substances when I drink, both drink beer and do pot (Male, 58, WA).

I have found that, you know, when I have taken like a tincture or had an edible or so before I go to like a bar event, or go out for drinks or dinner or something, that I don't have to have as much alcohol to feel a buzz...I like that sort of balance. I also like the fact that just having, even if it's a glass of wine or, one cocktail or two, kind of helps me get into that space. You feel the high. It sort of speeds it along a little bit. It also puts me in a mindset to say, okay, I'm in a good place, so I'm going to just coast on this for a bit. I may sip on my drink versus ordering another one. So, I've learned to kind of create a balance where I keep myself in check, especially in a social setting (Male, 39, MA).

One participant reported using marijuana for sleep and to increase their appetite after a long session of methamphetamine use:

When I was doing meth, if I was coming down and I was done I know I needed to sleep then I would smoke some weed. And I need to eat and I need to calm myself down. I would smoke some weed. And get myself back together (Male, 39, WA).

One participant also reported marijuana use to augment prescription opioids for pain relief:

It's really a combined usage of my medicines that I get from a doctor and the cannabis that create livable pain levels (Female, 60, WA).

Control of use including cessation

Over half of the participants had not tried to 'control' their use (n=16). Few reported any interest in stopping marijuana use. PWH generally reported their use as easy to control:

I would say it's easy for me to regulate [my use of] it. I don't get high every day or I don't feel the need to get high every day. I guess it's become more of a habit, but it's not something hard to break and go for a period of not using (Male, 52, MA).

Control of use appeared to be especially easy for edibles:

It's one edible… I've never taken one and then had another and another one (Male, 58, WA).

For one participant this was aided by the product labeling:

I try to do a 'dosage' - which is why I like these dispensaries…everything is kind of portioned out.I try to do a dosage of around 10 milligrams, usually. Sometimes if I really want an extra boost, I'll do 15. Maybe even 20.… I feel like that gives me just the right balance of everything (Male, 39, MA).

Others measured use by units (e.g., blunts) or by rationing a set amount:

My main thing is smoking blunts …I have one when I get home from work. Definitely before I go to bed I'll smoke another one and that's it (Male, 29, MA).

I try to ration it, you know? And not really smoke it all up in one day, I try, so I probably smoke one blunt today then one blunt tomorrow (Female, 41, AL).

I just made sure that whatever I get last week for that month, so I roll it small, then skinny, and then when I'm out, I'm out (Male, 60, AL).

One participant described waiting between hits to control their intake:

The weed, you know, it varies- the quality. So, I wait between hits to see what's happening instead of rushing and smoking a lot in 20 minutes (Male, 49, MA).

Another continued to smoke until they had met a specific goal:

There isn't something that marks the end of smoking, that you're, like, 'Okay, I smoked this much. I'm gonna stop now,'…you'll just smoke until the pain goes away (Transgender female, 51, WA).

Attempts to stop using marijuana varied in style and motivation. Seventy-six percent had made prior attempts to stop or cut down. Two participants successfully stopped smoking marijuana but continued to use it in other forms. Several others had stopped and started again for a disparate variety of reasons which included pregnancy/child-rearing, employment search or maintenance, respiratory health problems, and attempting

to get sober in general from multiple substances.

Perceptions of health impact

Participants sought information about marijuana use and its health effects from a variety of sources. Approximately half of the participants (n=14) reported getting information from the internet, 12 from their health care provider, 10 from friends, and 7 from their marijuana dispensary; 10 participants reported using more than one source of information.

The majority of participants (62%) believed marijuana use was beneficial to their health. Of these, 9 believed it was helpful for appetite and 7 for pain. Eight participants described a psychological benefit of reducing anxiety, “calming down”, and/or “helping control thoughts”. Five believed the effects could be primarily negative, but these statements were typically couched in uncertainty:

…you're putting a foreign substance in your body. Even though it's natural, there's gotta be some type of downfall I'm sure. Never really thought about it. I have thought about my lungs and stuff, and maybe trying to switch to edibles or something, but I haven't had a problem with my lungs and weed (Male, 59, MA).

I don't really feel the effects yet. But you know, who knows. Ten years now I could be coughing up a lung… (Male, 29, MA).

Eight participants believed that the health effects depend on the modality of use, favoring edibles as healthier:

I don't smoke it…I feel it's not as much of a threat to certain parts of my well-being by just ingesting it (Male, 39, MA).

There is one negative to the smoking over the years…the coughing, which is why I tend to be more attracted to the edibles now (Male, 54, MA).

The edibles would be better. You don’t have to eat but one cookie and you're good for half a day. Weed you're smoking throughout the day pretty much, at least I am (Female, 60, WA).

One participant echoed others in the belief that marijuana was more neutral or inert as a substance relative to other substances:

[Marijuana] is a positive…as it enters and leaves you. I can't say that about the hydrocodone or the Tylenol or the HIV cocktail, and all the poisons literally that I have to take to stay alive. Cannabis is the only one that doesn't do anything bad (Male, 54, MA).

Six participants did not perceive a relationship between marijuana use and their health.

Social dimensions of use

In states where marijuana use was legalized, participants noted feeling liberated from the stigma of possessing or using marijuana:

The stigma is gone. There is zero fear…it's just so much nicer to know that you can just casually walk into any place that sells these things and everything is legal, so it's comfortable (Male, 54, MA).

I feel like suddenly it’s become super commercial and super well-branded and I go to the dispensary and there’s so much excitement around there. I feel like I’m at a lounge in a night club. Walking in and out [of a dispensary] for me a different experience than feeling like I’m…going to get caught for having it, I’m in possession (Male, 52, MA).

My friends started using [marijiuana]…they didn’t want anything to do with it when it was illegal. The legality also has made me feel more relaxed around using it. Not that I'm super paranoid, but…I don't have to hide it as much…before it was more of a secretive type of thing (Male, 58, WA).

DISCUSSION

Among PWH who use marijuana in 3 states, legalization in 2 of the states (MA, WA) facilitated an increase in use for one-third of participants. Increased ease of access and exploration of product diversity were the primary reasons for the change. No such change was reported among PWH in the non-legalized state (AL). Participants in the legalized states reported increased experimentation with varying types of products, modalities of use, cultivars (aka strains), and THC/CBD ratios, most often in service of addressing specific symptom alleviation goals. Legalization did not itself modify goals for use, but a quarter of PWH in legalized states described an evolution of goals for use, independent of legalization, from recreational use to treatment of symptoms. Alcohol was the most common substance used in conjunction with marijuana. While few PWH used marijuana to bolster the effects of alcohol or vice versa, several reported using marijuana to temper their alcohol use. Some PWH regarded marijuana use as critical to maintaining their abstinence from methamphetamines.

As found in other studies (Azcarate et al., 2020; Chayama et al., 2021; Sajdeya, 2021), alleviating symptoms was a key goal, with nearly all participants using marijuana to address one or more symptoms such as pain relief, to aid sleep, to reduce anxiety, or to stimulate appetite. Most participants framed marijuana use as a tool for improving their health.

While some participants believed that smoking marijuana could harm their lungs, they were uncertain of

the extent of the damage. Participants who feared lung damage as a possible health impact reported that they used edible marijuana products instead. Notably, no participants expressed concern over marijuana's potential cognitive impact, nor did any express health concerns regarding the use of marijuana edibles. Cessation attempts were typically temporary and situation-specific (e.g., pregnancy, drug test); no one among these participants reported having struggled to stop. Self-regulation of marijuana use typically involved limiting themselves to a particular unit (e.g., 1 edible), using a set amount, or restricting the number of times used per day.

Participants described several benefits of legalization. First, the diversity and accessibility of products offer more options for means of ingestion, allowing those concerned about adverse respiratory effects to choose from a wide range of edible and other non-inhaled products. Second, participants appreciated transparency in product labeling which afforded PWH the opportunity to screen for and select product attributes and ingredients before purchase, a finding echoed elsewhere (Alon et al., 2021). These attributes included a selection of THC/CBD dosage and potency, cultivars (e.g., indica, sativa, hybrid), and product types with particular physiological or psychoactive effects (e.g., pain relief, reducing anxiety), and allowed participants to tailor use to their unique goal. Third, participants reported a reduction in psychological stress due to the de-stigmatization of marijuana use in legalized states, including no longer worrying about the potential repercussions of breaking state law. This may have positive implications for healthcare delivery: a large national U.S. survey of marijuana users in the general population found those in non-legalized states were less likely to discuss use with their providers (Azcarate et al., 2020). Finally, PWH in legalized states appreciated no longer needing to access marijuana by way of private dealers, which often required an unwanted social obligation; PWH expressed relief at, or interest in, the act of acquiring marijuana as a simple, de-personalized economic transaction.

Our findings suggest a prioritization of short-term benefits of using marijuana over long-term health concerns. Evidence supports both. A 2017 evidence review across several clinical populations found evidence for marijuana is effective in treating chronic pain among adults; moderate evidence for improving sleep among patients with certain pain-related chronic conditions; and limited evidence for improving appetite, anxiety, and symptoms of PTSD (National Academy of Sciences, Engineering, and Medicine, 2017). A 2018 systemic review found marijuana to be superior to a placebo for improving appetite and weight gain among PWH (Mucke et al., 2018). Despite these benefits, compared to those without HIV, long-term marijuana use among PWH is associated with worse respiratory, cardiovascular, and brain function (Keihani et al., 2019; Lorenz et al., 2017; Lorenz et al., 2019; Okafor et al., 2019; Thames et al., 2016). Independent of smoking tobacco, large longitudinal cohort studies have found that compared to those without HIV, long-term marijuana smoking was linked to lung disease; in a study of middle-aged men, heavy marijuana use was a risk factor for cardiovascular disease (Lorenz et al., 2017; Lorenz et al., 2019).Several studies demonstrated the impact of marijuana use on cognitive functioning. One found that moderate-to-heavy marijuana users with HIV performed worse in learning/memory function compared to those without HIV (Thames et al., 2016); another found worse cognitive function among symptomatic PWH compared to asymptomatic PWH and those without HIV (Keihani et al., 2019). A 17-year longitudinal study comparing people with and without HIV who used marijuana showed cognitive processing differences to be poorer among PWH, though authors questioned the clinical relevance of the differences found (Okafor et al., 2019). These studies suggest substantial risks associated with long-term marijuana use among PWH with of which our interview participants were largely unfamiliar. PWH may wish to weigh these against the shorter-term, symptom-relief benefits they describe.

While findings point generally to adverse cumulative health effects of marijuana use among PWH, opportunities for more granular inquiries exist, particularly surrounding long-term effects of specific routes of administration, such as 'vaping', edibles, and tinctures, and evaluation of the health impacts of prolonged, frequent use of higher potency products. Additional exploration is also warranted for the efficacy of marijuana use as a potential harm reduction tool for reducing the use of alcohol and/or other 'harder' substances, such as methamphetamine; the results of such studies to date have been inconclusive (National Academies of Sciences, 2017) or positive but limited in sample size (Socias et al., 2017). A better understanding of long-term impacts, particularly weighted against the benefits of short-term symptom alleviation and harm reduction, will help empower PWH and their health providers to consider more tailored, informed decisions regarding marijuana use.

STRENGTHS AND LIMITATIONS

This study is one of the few that evaluate beliefs surrounding marijuana use among PWH. We note that this study is limited to PWH who use marijuana at least weekly. Beliefs, behaviors, and perceptions of the impact of marijuana use may differ substantially among PWH who use marijuana less frequently. However, we believe the focus on frequent marijuana users placed a greater focus on those at higher risk of experiencing adverse health effects from marijuana use.

Conclusion

Among a sample of PWH who use marijuana, the broad

variety and availability of products following legalization increased use for a third of participants from affected states and was consistently described as offering a means for facilitating decision-making for targeted therapeutic use, including as an aid for sleep, anxiety, appetite, and pain, as well as minimization of craving alcohol and 'harder' substances. While many participants described attempts to decrease or stop use driven by a variety of motivations, concern over the long-term impact of use was limited to respiratory effects, with no concerns regarding potential cognitive impacts or effects from the use of edible marijuana.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

REFERENCES

Alon L, Bruce D, Blocker O, Bouris AM, Reirden DH, Schneider JA (2021). Perceptions of quality and safety in cannabis acquisition amongst young gay and bisexual men living with HIV/AIDS who use cannabis: Impact of legalization and dispensaries. International Journal of Drug Policy 88:103035.

Azcarate PM, Zhang AJ, Keyhani S, Steigerwald S, Ishida JH, Cohen BE (2020). Medical reasons for marijuana use, forms of use, and patient perception of physician attitudes among the US population. Journal of General Internal Medicine 35(7):1979-1986.

Bonn-Miller MO, Oser ML, Bucossi MM, Trafton JA (2014). Cannabis use and HIV antiretroviral therapy adherence and HIV-related symptoms. Journal of Behavioral Medicine 37(1):1-10.

Bridgeman MB, Abazia DT (2017). Medicinal cannabis: history, pharmacology, and implications for the acute care setting. Pharmacy and Therapeutics 42(3):180.

Center for Behavioral Health Statistics and Quality (2016). Key substance use and mental health indicators in the United States: Results from the 2015 National Survey on Drug Use and Health (HHS Publication No. SMA 16-4984, NSDUH Series H-51).

Chayama KL, Valleriani J, Ng C, Haines-Saah R, Capler R, Milloy MJ, McNeil R. (2021). The role of cannabis in pain management among people living with HIV who use drugs: A qualitative study. Drug and Alcohol Review 40(7):1325-1333.

Crane HM, Lober W, Webster E, Harrington RD, Crane PK, Davis TE, Kitahata MM. (2007). Routine collection of patient-reported outcomes in an HIV clinic setting: the first 100 patients. Current HIV research 5(1):109-118.

Crean RD, Crane NA, Mason BJ (2011). An evidence based review of acute and long-term effects of cannabis use on executive cognitive functions. Journal of Addiction Medicine 5(1):1-8.

Cristiani SA, Pukay-Martin ND, Bornstein RA (2004). Marijuana use and cognitive function in HIV-infected people. The Journal of Neuropsychiatry and Clinical Neurosciences 16(3):330-335.

Dietz E, Clum GA, Chung SE, Leonard L, Murphy DA, Perez LV, Ellen JM (2010). Adherence to scheduled appointments among HIV-infected female youth in five U.S. cities. Journal of Adolescent Health 46(3):278-283.

ElSohly MA, Mehmedic Z, Foster S, Gon C, Chandra S, Church JC. (2016). Changes in cannabis potency over the last 2 decades (1995-\2014): Analysis of current data in the United States. Biological Psychiatry 79(7):613-619.

Han BH, Palamar JJ (2018). Marijuana use by middle-aged and older adults in the United States, 2015-2016. Drug Alcohol Depend 191:374-381.

Keihani S, Putbrese BE, Rogers DM, Zhang C, Nirula R, Luo-Owen X, Urologic Reconstruction Network of Surgeons (2019). The associations between initial radiographic findings and interventions for renal hemorrhage after high-grade renal trauma: Results from the Multi-Institutional Genitourinary Trauma Study. Journal of Trauma and Acute Care Surgery 86(6):974-982.

Kerr WC, Lui C, Ye Y (2018). Trends and age, period and cohort effects for marijuana use prevalence in the 1984-2015 US National Alcohol Surveys. Addiction 113(3):473-481.

Kipp AM, Rebeiro PF, Shepherd BE, Brinkley-Rubinstein L, Turner M, Bebawy S, Hulgan T (2017). Daily marijuana use is associated with missed clinic appointments among HIV-infected persons engaged in HIV care. AIDS and Behavior 21(7):1996-2004.

Kuhns LM, Hotton AL, Garofalo R, Muldoon AL, Jaffe K, Bouris A, Schneider J (2016). An index of multiple psychosocial, syndemic conditions is associated with antiretroviral medication adherence among HIV-positive youth. AIDS Patient Care STDS 30(4):185-192.

Lawrence ST, Willig JH, Crane HM, Ye J, Aban I, Lober W, Schumacher JE (2010). Routine, self-administered, touch-screen, computer-based suicidal ideation assessment linked to automated response team notification in an HIV primary care setting. Clinical Infectious Diseases 50(8):1165-1173.

Lorenz DR, Dutta A, Mukerji SS, Holman A, Uno H, Gabuzda D (2017). Marijuana use impacts midlife cardiovascular events in HIV-infected men. Clinical Infectious Diseases 65(4):626-635.

Lorenz DR, Uno H, Wolinsky SM, Gabuzda D (2019). Effect of marijuana smoking on pulmonary disease in HIV-infected and uninfected men: a longitudinal cohort study. EClinical Medicine 7:55-64.

Mann J (2019). How San Francisco's HIV/AIDS warriors paved the way for today's cannabis gold rush. San Francisco Chronicle. Retrieved from https://www.sfchronicle.com/style/article/How-San-Francisco-s-HIV-AIDS-warriors-paved-the-13826035.php#photo-17309624

Montgomery L, Bagot K, Brown JL, Haeny AM (2019). The association between marijuana use and HIV continuum of care outcomes: a systematic review. Current HIV/AIDS Reports 16(1):17-28.

Mucke M, Weier M, Carter C, Copeland J, Degenhardt L, Cuhls H, Conrad R (2018). Systematic review and meta-analysis of cannabinoids in palliative medicine. Journal of cachexia, sarcopenia and muscle 9(2):220-234.

National Academies of Sciences, Engineering, and Medicine (2017). The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research. (9780309453042 0309453046). Retrieved from Washington (DC): https://www.ncbi.nlm.nih.gov/pubmed/28182367

Newville H, Berg KM, Gonzalez JS (2015). The interaction of active substance use, depression, and antiretroviral adherence in methadone maintenance. International Journal of Behavioral Medicine 22(2):214-222.

Okafor CN, Plankey MW, Li M, Chen X, Surkan PJ, Shoptaw S, Cook RL (2019). Association of marijuana use with changes in cognitive processing speed and flexibility for 17 years in HIV-seropositive and HIV-seronegative men. Substance Use and Misuse 54(4):525-537.

Prentiss D, Power R, Balmas G, Tzuang G, Israelski DM (2004). Patterns of marijuana use among patients with HIV/AIDS followed in a public health care setting. Journal of Acquired Immune Deficiency Syndromes 35(1):38-45.

Sajdeya R, Joseph V, Stetten NE, Ibanez GE, Wang Y, Powell L, Somboonwit C, Corsi KF, Cook RL (2021). Reasons for marijuana use and its perceived effectiveness in therapeutic and recreational marijuana users among people living with HIV in Florida. Cannabis 4(1):40-52.

Shiau S, Arpadi SM, Yin MT, Martins SS (2017). Patterns of drug use and HIV infection among adults in a nationally representative sample. Addictive Behaviors 68:39-44.

Skalski LM, Towe SL, Sikkema KJ, Meade CS (2016). The impact of marijuana use on memory in HIV-infected patients: A comprehensive review of the HIV and marijuana literatures. Current Drug Abuse Reviews 9(2):126-141.

Socias ME, Kerr T, Wood E, Dong H, Lake S, Hayashi K, Milloy MJ (2017). Intentional cannabis use to reduce crack cocaine use in a canadian setting: A longitudinal analysis. Addictive Behaviors 72:138-143.

Sociocultural Research Consultants LLC (2014). Dedoose version 5.0.11, Web application for managing, analyzing, and presenting

qualitative and mixed method research data. www.dedoose.com
Thames AD, Mahmood Z, Burggren AC, Karimian A, Kuhn TP (2016). Combined effects of HIV and marijuana use on neurocognitive functioning and immune status. AIDS Care 28(5):628-632.
Volkow ND, Compton WM, Weiss SR (2014). Adverse health effects of marijuana use. The New England Journal of Medicine 371(9):878-878.
Zvonarev V, Fatuki TA, Tregubenko P (2019). The public health concerns of marijuana legalization: An overview of current trends. Cureus 11(9):e5806.