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Reasons for Marijuana Use and Its Perceived Effectiveness in Therapeutic and Recreational Marijuana Users Among People Living with HIV in Florida

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ABSTRACT

Therapeutic and recreational marijuana use are common among people living with HIV (PLWH). However, the distinction between perceived "therapeutic" and "recreational" use is blurred, with little information about the specific reasons for use and perceived marijuana effectiveness in adults with chronic conditions. We aimed to compare reasons for use and reason-specific perceived marijuana effectiveness between therapeutic and recreational users among PLWH. In 2018-2019, 213 PLWH currently using marijuana (mean age 48 years, 59% male, 69% African American) completed a questionnaire assessing their specific reasons for using marijuana, including the "main reason." Participants were categorized into one of three motivation groups: therapeutic, recreational, or both equally. For each specific reason, participants rated marijuana effectiveness as 0-10, with 10 being the most effective. The mean effectiveness scores were compared across the three motivation groups via ANOVA, with p <0.05 considered statistically significant. The most frequent main reasons for marijuana use in the therapeutic (n=63, 37%), recreational (n=48, 28%), and both equally (n=59, 35%) categories were "Pain" (21%), "To get high" (32%), and "To relax" (20%), respectively. Compared to recreational users, therapeutic and both equally users provided significantly higher mean effectiveness scores for "Pain," and "To reduce anger." The "Both equally" group also provided significantly higher mean effectiveness scores for "To feel better in general," "To get high," and "To relax" compared to the other two categories. There is a significant overlap in self-reported reasons for marijuana use in primarily therapeutic or recreational users. Perceived marijuana effectiveness was lowest among recreational users.

Key words: = HIV; marijuana, cannabis, effectiveness, reasons for use, therapeutic versus recreational

As of 2020, a total of 35 states, including Florida, have approved marijuana use for medical reasons (*National Conference of State Legislatures, 2020*) . HIV/AIDS is among the approved conditions for Florida's medical marijuana program (*Legal Medical Marijuana States and DC - Medical Marijuana - ProCon.Org*, n.d., 2020). Past research has shown some evidence that marijuana use may be effective in reducing several HIV-associated symptoms,

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including inflammation (Costiniuk & Jenabian, 2019), sensory neuropathic pain (Abrams et al., 2007), loss of appetite and weight loss, and depressive symptoms (Haney et al., 2007). However, both medical and recreational marijuana use are common among people living with HIV (PLWH) (Mannes et al., 2018), with rates ranging from 40% to 74% (Costiniuk et al., 2019). These numbers continue to increase as medical marijuana use in HIV/AIDS management increases (Mercurio et al., 2019; Dai & Richter, 2019). Nonetheless, the evidence remains limited, with conflicting findings on the actual benefits and risks associated with marijuana use for HIV-related symptom mitigation (National Academies of Sciences, 2017; Merlin et al., 2019).

The motivation to start and maintain marijuana use is important for understanding health behaviors and outcomes related to marijuana. In PLWH or other chronic conditions, motivation for use is often defined broadly as either therapeutic (medicinal), recreational, or both, as motives for using marijuana are frequently not mutually exclusive (Pacula et al., 2016; Schauer et al., 2016). These broad categories of use are important, not only for legal or policy reasons, but because different motivations for use could be associated with mental and physical health functioning (Towe et al., 2018), adherence with HIV medications (Mannes et al., 2018), or problematic use of marijuana (Lee et al., 2009). The distinction between therapeutic versus recreational use can be challenging, because individuals who use marijuana therapeutically may state many different specific reasons for use, many of which could extend beyond the management of medical diseases or symptoms (D'souza et al., 2012; Mannes et al., 2018). Therefore, it can be difficult to map specific reasons for use into the broader categories of medical versus recreational, as specific reasons for use such as "to relax" could be considered either recreational or therapeutic (or both) depending on the user's perception. Previously-developed instruments to measure motives for marijuana use were primarily developed in adolescents and young adults (e.g., Lee et al., 2009; Simons et al., 1998) in whom medical reasons for use were not a primary focus.

Previous studies of PLWH indicate that many, but not all, marijuana users perceive that marijuana is effective for their main reason for use (Fairfield et al., 1998, Costiniuk et al., 2019). An improved understanding of factors that influence the perceptions of effectiveness could improve clinical recommendations. It is possible that the perceived effectiveness of marijuana could be associated with a user's overall reason for use, in that persons who consider themselves to be primarily recreational users might perceive marijuana to be more effective for a specific type of symptom or condition compared to therapeutic users. Examining factors associated with perceived effectiveness for specific reasons for use may also help guide therapeutic marijuana recommendations for HIV symptom management and influence marijuana-related policies. Many persons using marijuana for specific health indications may have identified specific strategies to use marijuana that they find to be most effective, and we can learn from their experience.

The Present Study

The specific objectives of this study were to 1) identify and compare the main reasons for marijuana use according to overall motivation for use (therapeutic, recreational, or both), 2) describe the perceived effectiveness of marijuana for different specific reasons for use, and 3) compare perceived marijuana reason-specific effectiveness among PLWH whose use motives are therapeutic, recreational, or both equally.

METHODS

Study Design

Data for this study were obtained from an ongoing prospective cohort, the Marijuana and Potential Long-term Effects (MAPLE) study. The study was designed to investigate the longitudinal impact of marijuana use on cognitive functioning and HIV-related health outcomes among PLWH in the State of Florida. Data collection started in 2018 and is currently ongoing. In this paper, we analyzed the baseline data from 213 participants who were current (past 30 days) marijuana users enrolled in the MAPLE study. However, 43 participants did not provide data on their marijuana use motives by skipping the question. Therefore, the primary analyses were restricted to 170 marijuana users who provided such data.

Study Participants and Recruitment

Study participants were recruited in three Florida counties (Alachua, Hillsborough, and Dade) between 2018-2019. The participants were recruited by direct referral from the Florida Department of Health (DOH), Same Day Access (SDA) clinics in Tampa, and Care Resource Clinics and Borinquen Health Clinics in Miami, or were identified from the Florida Cohort, Health Street, and Consent2Share databases. Other participants were recruited by word of mouth and distributed study fliers.

Inclusion and Exclusion Criteria

Both current marijuana users and current non-users were recruited in the MAPLE study. Marijuana users were defined as those who used at least four times in the past month. Non-users were defined as those who last used more than five years ago and never used more often than once monthly in their lifetime. Those who used marijuana one to three times in the past month were not eligible for the study. Participants were eligible for the study if they met the following inclusion criteria: 18 years of age or older, HIV positive, willing to give blood and urine samples, had a self-reported marijuana use status that matched the result of a urine drug screening test at enrollment, not planning to move out of Florida in the next 12 months, willing to participate in thinking and memory tests, and be able to understand the study steps, procedure, and purpose. Only current marijuana users at baseline were included in this analysis. All study participants signed a consent form after the research assistants explained the study steps and procedures, and all the study protocols were approved by the institutional review boards at the University of Florida and the Florida Department of Health.

Data Collection

Participants completed self and interviewer-administered questionnaires during baseline study visits. Collected data included sociodemographic data, reasons for marijuana use, the effectiveness score of marijuana for each reason, preferred methods of marijuana administration, and use motivation. An in-person Timeline Follow Back (TLFB) questionnaire was administered with guided instructions from trained interviewers to collect data on marijuana use frequency and methods of administration within the past thirty days (Robinson et al., 2012). A day of use is considered from the time participants wake up until the time they go to bed. Hence, if a participant smoked at 12:30 AM on Wednesday morning we considered it as Tuesday night. To assess the most frequent method of administration, we asked the participants if they had a typical way the used marijuana (e.g., blunts, joints, or bowls). When participants reported using multiple methods of administration, we further asked them to specify which method they used the most.

We could not find any validated tools specifically designed to assess the reasons or effectiveness of marijuana use among PLWH. We conducted a literature review to identify elements that represent reasons for using marijuana; however, most of these elements were not specific for PLWH. Our research team developed and revised a questionnaire consisting of 25 items representing possible marijuana use reasons that demonstrate a range of social factors and physical and mental health symptoms and effects that are common among PLWH. The questionnaire was pilot tested among different small samples of MAPLE participants to improve the understandability of the questions and to identify or exclude elements based on the participants' feedback. However, an internal or external validity analysis was not conducted to test the questionnaire's validity and reliability. The key questionnaire items, including the 25 marijuana use reasons, are available in the Supplement. The full questionnaire is available upon request from the authors.

Measures

Reasons for using marijuana. At the time of survey development, there were few existing tools to measure marijuana use motivations, and they had been developed with a younger, non-medical population (Lee et al., 2009; Simons et al., 1998). Therefore, we included possible reasons for use based on a previous measure we used in a separate HIV cohort study (Mannes et al., 2018), but also included additional items from the literature (D'souza et al., 2012), the approved

indications for medical marijuana in Florida (Patients and Caregivers, 2020, Office Of Medical Marijuana Use), and additional suggestions from PWLH who piloted the measure for this study. For the final measure, participants indicated yes or no as to whether they currently used marijuana for each of 25 possible reasons for marijuana use, and each was asked to choose one item from the list that they identify as the main reason for using marijuana in the past 30 days.

Perceived marijuana effectiveness. Previous research on the perceived effectiveness of marijuana for specific conditions included categorical ratings (e.g., "extremely," "quite a bit") (Costiniuk et al., 2019; Fairfield et al., 1998). However, for our study, participants were asked to give a numerical score that ranged from zero to ten to how effective marijuana is for each chosen reason, with ten being the most effective. The participants only provided effectiveness scores for the specific reasons for which they indicated using marijuana in the past 30 days.

Marijuana use motivation. The participants were asked to estimate the percentage of their marijuana use in the past 30 days that they attribute to recreational and therapeutic use, with the total percentage adding to 100%. The participants were considered as therapeutic or recreational users if the percentage for one category exceeded the other. Participants who estimated their use to be exactly 50% for both therapeutic and recreational use were categorized in a third category named "Both equally."

Sociodemographic variables. Male or female sex was determined by self-reported sex at birth. Race/ethnicity was grouped as Hispanic, not Hispanic White, not Hispanic Black/ African American, not Hispanic American Indian or Alaska Native, and not Hispanic Other. The age groups were (18-39), (40-39), (50-59), and (60-70) years old.

Marijuana frequency. The frequency of using marijuana was measured using the TLFB questionnaire. Participants were categorized as using 5-7 days/week, or less than five days a week. Method of administration (e.g., smoke, vape, edibles) was identified as the type used most often in the past 30 days.

Data Analysis

Descriptive statistical analyses were used to describe the characteristics of the full sample of 213 PLWH (age group, sex at birth, and race/ethnicity), main reasons for using marijuana, use motivation (therapeutic, recreational, and both equally), use frequency, and methods of administration. Data to determine marijuana use motivation were missing in 43 participants who were excluded from further analysis and comparisons, yielding a final sample of N = 170.

For each of the 25 different reasons for use, we calculated the mean and standard deviations of the effectiveness scores (0-10). We then compared the mean scores for the ten most frequent reasons for use across the three use motivation categories (therapeutic, recreational, and both equally), using Analysis of Variance (ANOVA) to assess the statistical significance of any differences. All statistical analyses were performed using SAS 9.4 statistical software, and *a p-value* of less than 0.05 was considered statistically significant.

RESULTS

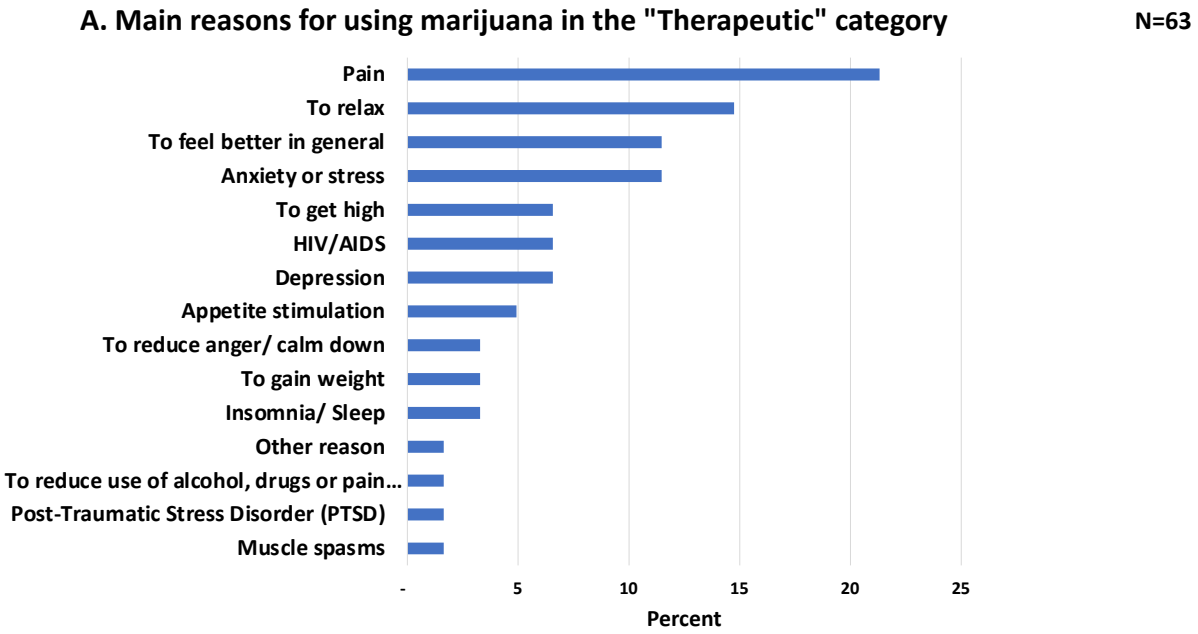
The study sample consisted of 213 PLWH who were using marijuana. The mean age was 48±12 years, 59% were male, and 69% were African American. Mean marijuana use frequency per week was 5±2 days per week, and 69% used marijuana for 5-7 days per week. Nearly all (99.5%) of the study sample used inhalation methods for marijuana intake. Smoking blunts was the most frequent method of administration (53%). Among those who provided a percent estimation of their use motivation (n=170), 37% were categorized as therapeutic, 28% as recreational, and 35% as both equally (Table 1).

The ten most frequent main reasons for marijuana use in the total sample were: "To relax" (18%), "Pain" (13%), "To get high" (13%), "To feel better in general" (10%), "Anxiety or stress" (10%), "Appetite stimulation" (8%), "Depression" (5%), "To reduce anger/ calm down" (5%), "Insomnia/ sleep" (5%), and "HIV/AIDS" (3%).

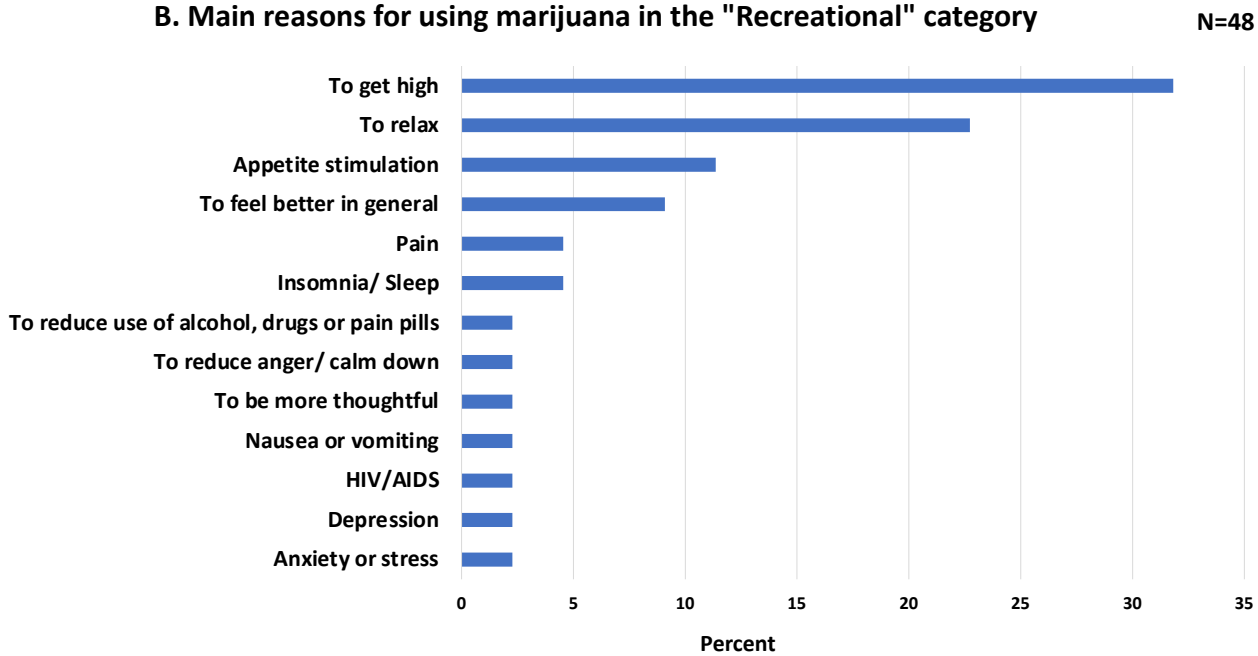
Table 1. *Sample descriptives for 213 people living with HIV reporting past twelve-month marijuana use*

Characteristic	N (%)
Age group	
18-39 years old	50 (23.5)
40-49 years old	42 (19.7)
50-59 years old	84 (39.4)
60-70 years old	37 (17.4)
Sex at birth	
Female	87 (41.2)
Male	124 (58.8)
Race/ ethnicity	
Hispanic	31 (14.8)
Not Hispanic, White	28 (13.3)
Not Hispanic, Black/African American	144 (68.6)
Not Hispanic, American Indian or Alaska Native	4 (1.9)
Not Hispanic, Native Hawaiian or Pacific Islander	1 (0.5)
Not Hispanic, Asian	2 (1.0)
Not Hispanic, Other	3 (1.4)
Taking HIV medication	
Yes	198 (93.0)
No	15 (7.0)
Marijuana use frequency in the last 30 days	
less than 5 days/week	55 (31.4)
[5-7] days/week	120 (68.6)
Method used most often in the last 30 days	
Joints [rolled paper marijuana cigarettes]	61 (36.3)
Blunts [cigar wrappers filled with marijuana]	89 (53.0)
Pipes [water pipes, bongs, one-hitter]	12 (7.1)
Vaporizing device [vape pen, volcano]	5 (3.0)
Food or drink item [cookie, brownie, candy, tea]	1 (0.6)
Marijuana use motivation	
Therapeutic	63 (37.1)
Recreational	48 (28.2)
Both equally	59 (34.7)

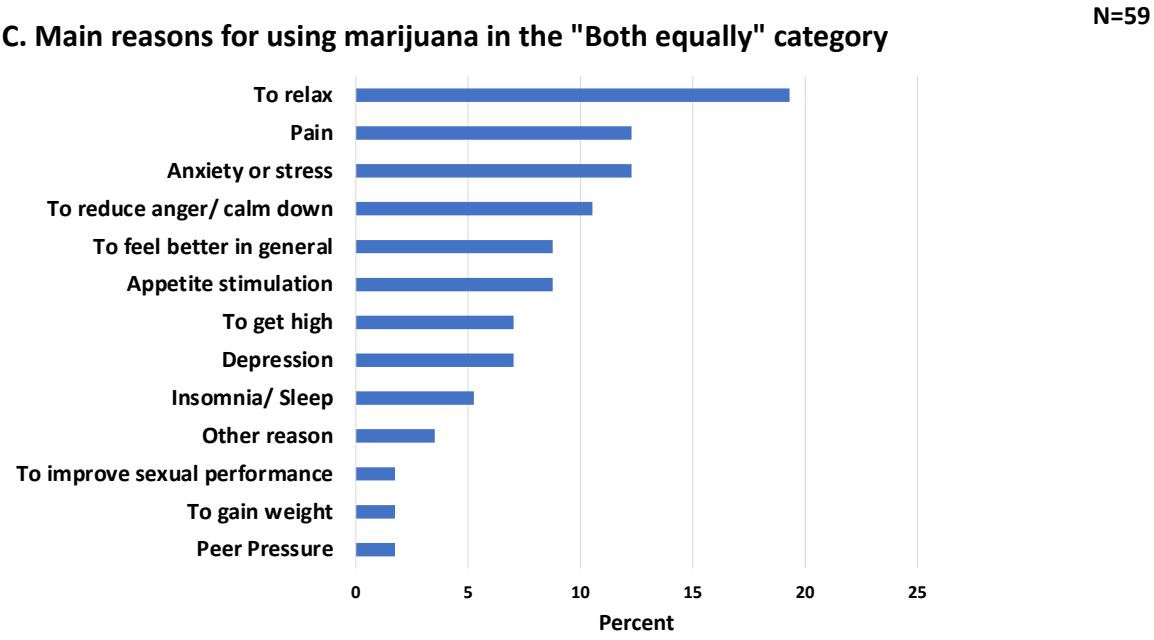
Figure 1. *Comparison of the main reasons for using marijuana in the three motivation categories (therapeutic (*n*=63), recreational (*n*=48), and both equally (*n*=59)) among 170 people living with HIV who used marijuana in the past twelve months.*



A. Percent frequencies of the main reasons for marijuana use in the therapeutic category.



B. Percent frequencies of the main reasons for marijuana use in the recreational category.



C. Percent frequencies of the main reasons for marijuana use in the both equally category.

The main reasons for using marijuana among the 170 participants in the three motivation categories were as follows. Among therapeutic users, the most frequent main reason for marijuana use was" Pain" (21%), followed by "To relax" (15%), "Anxiety or stress" (11%), and "To feel better in general" (11%). Among recreational users, the most frequent main reason for marijuana use was "To get high" (32%), followed by "To relax" (23%), "Appetite stimulation" (11%), and "To feel better in general" (9%). Among users categorized as both equally, the most frequent main reason for marijuana use was "To relax" (20%), followed by "Anxiety or stress" (12%) and "Pain" (12%) and "To reduce anger/ calm down" (11%) (Figure 1). It is noteworthy that "To relax" was a common reason for using marijuana across the three categories.

The numerical summaries of marijuana effectiveness scores in the total sample are summarized in Table 2. The results showed high scores in general; although the mean scores did vary for the different reasons, the numbers of participants who contributed to the scoring of each reason varied because only those who used for that reason in the past month were asked to rate the effectiveness. The mean effectiveness score was greater than 8 out of 10 for all reasons except "HIV/AIDS," "Peer pressure," and "To lose weight." The maximum score was ten for all reasons, while the minimum scores varied (zero-ten). For some reasons for use, such as cancer, glaucoma, and seizures, the sample size was too small to compare the scores across the three motivation categories.

Figure 2 illustrates the differences in the effectiveness scores for the 170 participants classified in each of the three motivation categories as assessed by the ANOVA. Differences were statistically significant in six out of the ten reasons. The degree of freedom was 2 in all of the analyses. Among those whose motivation was primarily therapeutic, the mean effectiveness score for "Pain" was significantly higher than for those whose motivation was recreational (p= 0.02, t=2.46), and in the full model (p=0.03, F=3.46). In contrast, the mean effectiveness score for "To get high" was significantly lower in therapeutic users than for recreational or both equally motivation categories (p=0.002, F=6.46) in the full model. Persons whose motivation was both equally had significantly higher mean effectiveness scores for "To feel better in general" (p= 0.02, F=3.99), "To get high" (p= 0.002, F=6.46), "To reduce anger/ calm down" (p= 0.04, F=3.57), and "To relax" (p= 0.04, F=3.71) compared to persons whose motivation was primarily recreational or primarily therapeutic, in the full model. In

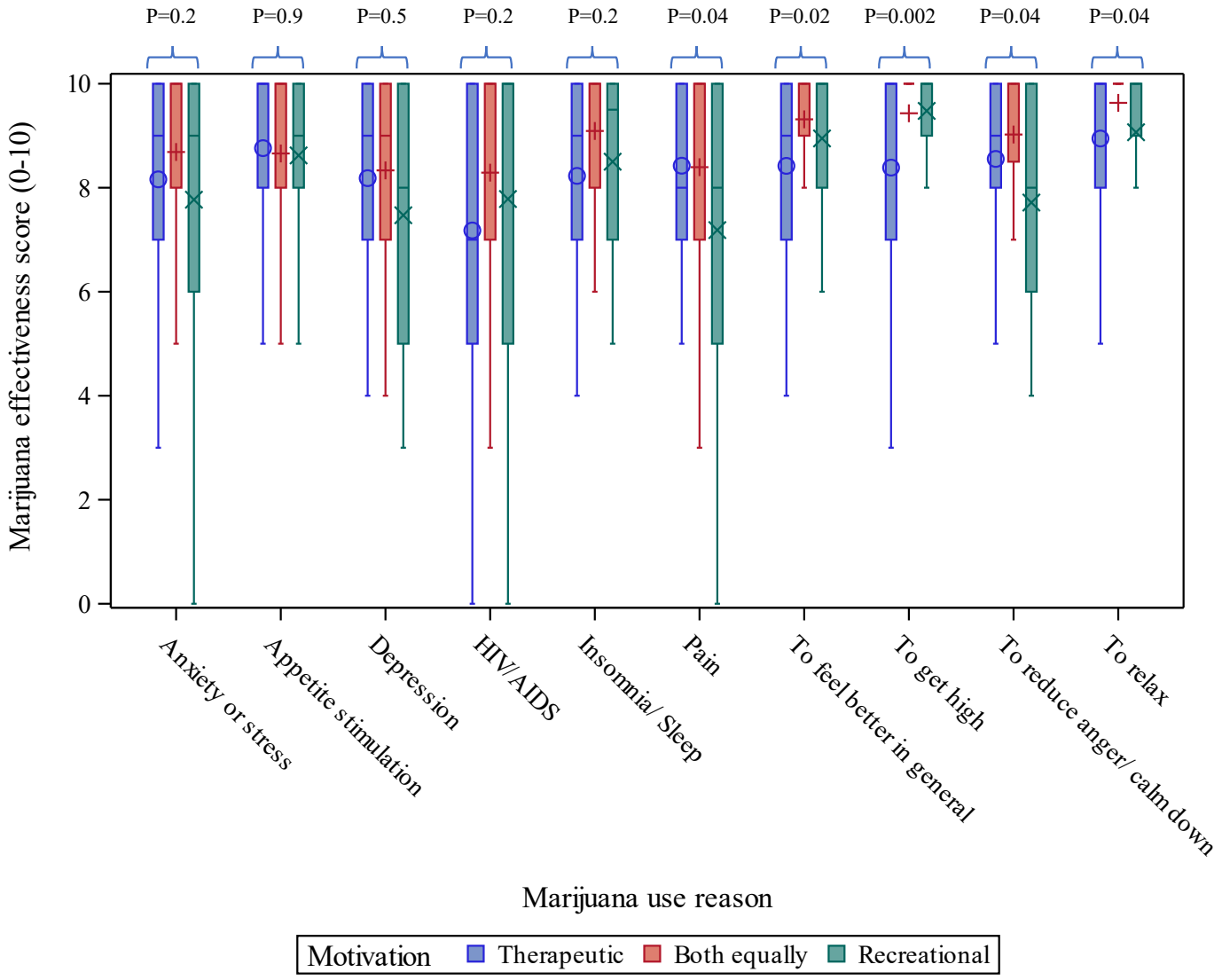
general, people who rated their motivation for use as both equally tended to provide higher effectiveness scores for each of the top 10 most frequent reasons for use than those who were motivated primarily for either therapeutic or recreational reasons.

Table 2. *Numerical summaries of "Marijuana Effectiveness Scores (0-10)" for reasons for marijuana use among 213 persons living with HIV who used marijuana in the past twelve months*

Reason for marijuana use	Mean Effectiveness Score (0-10)	SD*	Min†	Median	Max‡	N§
Anxiety or stress	8.3	2.12	0	9	10	133
Appetite stimulation	8.7	1.91	0	10	10	116
Cancer	8.9	1.88	5	10	10	14
Depression	8.1	2.21	0	9	10	105
Glaucoma	9.3	1.30	6	10	10	12
HIV/AIDS	7.7	2.76	0	8	10	106
Insomnia/ sleep	8.6	1.80	4	10	10	89
Muscle spasms	8.2	1.82	4	9	10	53
Nausea or vomiting	8.4	1.84	4	9.5	10	36
Pain	8.1	2.17	0	8	10	117
Peer pressure	6.6	2.46	2	6	10	19
Post-Traumatic Stress Disorder (PTSD)	8.1	2.07	2	8	10	45
Reduce medicine side effects	8.0	2.34	0	8	10	33
Seizures	8.4	1.92	5	9	10	8
To be creative	8.8	1.72	4	10	10	51
To be more thoughtful	8.6	2.08	1	10	10	64
To feel better in general	8.9	1.59	4	10	10	142
To feel comfortable around others	8.2	2.30	2	9	10	82
To gain weight	8.3	2.23	1	10	10	52
To get high	9.1	1.75	0	10	10	139
To lose weight	6.1	4.02	0	6	10	7
To improve sexual performance/ sensation	8.6	2.02	2	10	10	44
To reduce anger/ calm down	8.6	1.89	2	10	10	112
To reduce use of alcohol, drugs or pain pills	8.8	1.50	5	10	10	46
To relax	9.2	1.45	5	10	10	158
Other reasons	9.7	0.78	8	10	10	12

Note. *SD=standard deviation. †Min= minimum score. ‡Max= maximum score. §N= number of participants. Only persons who used marijuana for a specific reason in the past month gave an effectiveness rating; hence, number of participants does not add up to 213 for each reason.

Figure 2. *Comparison of "Marijuana Effectiveness Score" for the ten most frequent reasons for marijuana use clustered by the motivation categories (therapeutic* (n*=63), recreational* (n*=48), and both equally* (n*=59)) among 170 people living with HIV who used marijuana in the past twelve months.*



Note. The X-axis represent the specific reasons for marijuana use. The Y-axis represent the effectiveness scores ranging from zero to 10, with 10 being the most effective. Each motivation use category is represented by a different color. Scores are illustrated by vertical boxplots to show the minimum, first quartile, median, third quartile, and maximum score. Circles, plus signs, and Xs represent the mean score for each category. Analysis of variance (ANOVA) was done to compare the effectiveness scores among the three motivation categories. Differences are statistically significant at p-value <0.05.

DISCUSSION

We categorized 170 PLWH based on their marijuana use motivation into three categories, therapeutic, recreational, and equally both, and compared their main reasons for using marijuana as well as their self-reported perceived marijuana effectiveness for a range of medical conditions, general feelings, and recreational purposes.

Consistent with the findings of Costiniuk et al. (2019), we found that seeking pleasure and reducing pain, anxiety, and stress are among the top reasons for marijuana use in PLWH. The main reasons for using marijuana differed across the three motivation categories. In therapeutic users, the most frequent main reason for marijuana use was for pain followed by relaxation and anxiety or stress relief, and to feel better in general, while in recreational users, the most frequent reason was to get high, followed by relaxation, appetite stimulation, and to feel better in general. Without asking the participants to define their own motivation (therapeutic vs. recreational), one might have assumed that "relaxation" and "feeling better in general" are recreational reasons for using marijuana. However, our findings show that effects such as relaxation and feeling better in general are important components for both therapeutic and recreational users of marijuana for PLWH, which should lead researchers and clinicians to consider broadening the potential therapeutic categories for medical marijuana.

The high mean effectiveness scores in our total sample suggest that marijuana is perceived to be effective for a wide range of use reasons. The scores may have overestimated the perceived effectiveness of marijuana as only participants who indicated using marijuana for a specific reason in the past 30 days provided a numerical score to rate the effectiveness of marijuana. It is possible that effectiveness scores may have been lower if they included those who may have tried marijuana for a specific reason in the past but stopped using it for that reason after finding it ineffective. However, a minimum score of 0 or 1 was given for ten out of the 25 listed reasons, suggesting that some people do use marijuana for specific indications, even though they do not find it effective for that reason. Interestingly, the average effectiveness score for "HIV" was the third-lowest score for all reasons; this could be in part explained by HIV being an uncurable condition, until now, and participants might perceive marijuana as less effective for treating the virus or specific condition, compared to other reasons, such as pain, where fast symptom relief may be achieved. However, for some medical reasons, such as pain and depression, we do not know if describing marijuana as effective indicates reducing the symptoms or merely helping the patients cope with them by distraction and getting high. Qualitative studies are needed to better understand patients' perspectives of changes in symptoms they experience when using marijuana.

We found statistically significant differences in perceived marijuana effectiveness scores for five main reasons for use across the three motivation categories. Those reasons were pain, to feel better in general, to get high, to reduce anger, and to relax. Interestingly, participants who categorized themselves as "both recreational and therapeutic equally" tended to give higher effectiveness scores compared to the other two groups for all ten reasons, adding to the complexity of this group, where classifying reasons such as relaxation, reducing anger, and feeling better, as therapeutic or recreational is even more challenging.

Limitations

We acknowledge that our study is not without limitations. First, the cross-sectional design did not allow us to examine the temporal effects of using marijuana on HIV-related symptoms, such as pain. Second, we did not use existing validated and reliable measures to assess reasons for marijuana use, motivations for use, or perceived effectiveness. At the time that the study questionnaire was developed, the most commonly used tool to assess motivations for marijuana use had only been validated in adolescents and young adults, although it has since been validated in adult users of medical cannabis (Bohnert et al., 2018). However, our questionnaire was developed from a measure we had used in a previous study (Mannes et al., 2018) and covered a wide range of psychological, social, and medical reasons for using marijuana that are common among PLWH. As assessing marijuana's effects on HIV-related symptoms continues to mainly rely on self-report,

standardized tools to assess the reasons for using marijuana and its effects on specific HIV-related symptoms are needed. Finally, we only evaluated marijuana effectiveness among those who used it for specific indications in the past 30 days, and we did not yet assess how perceived effectiveness may vary according to different demographic characteristics (e.g., age, gender, race/ethnicity, level of education), marijuana use characteristics (e.g., frequency of use, methods of administration) or other factors. Identifying variations in individuals or marijuana use patterns that are deemed more effective for specific conditions can help to inform future clinical care recommendations, and also identify specific types and patterns of marijuana use to be evaluated and compared in future randomized clinical trials.

However, our study did have several strengths. It was conducted in a relatively large sample of PLWH who use marijuana, a unique population that is hard to find and recruit. To our knowledge, our study is among the first to report self-scored marijuana effectiveness for different reasons for marijuana use among PLWH and the first to compare the reasons for use and the perceived effectiveness of marijuana across different groups of marijuana use motivation.

Conclusion

Even as the evidence regarding the risks and benefits of marijuana use is limited, marijuana is perceived to be effective for a range of use reasons among PLWH. However, there are significant differences in the reasons for use and perceived marijuana effectiveness among those whose use motivation is therapeutic, recreational, or both equally. Our findings emphasize the need to better understand the potential distinctions as well as the overlap of specific reasons for use in persons who consider themselves to be using marijuana for therapeutic vs. recreational reasons, especially when we seek evidence regarding the therapeutic effects of marijuana. There is also a continued need to develop unbiased, standardized tools to assess marijuana effectiveness for HIV-related symptoms and conditions via self-report in clinical studies. Qualitative research is also needed to help further understand the nuances of use motivation and marijuana effectiveness, as more and more PLWH use marijuana on a regular basis.

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