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Use and perceptions of opioids versus marijuana among medical populations: Perspectives from people living with HIV and cancer survivors

By: Jessica Potts

Behavioral Sciences and Health Education

Dr. Eric Nehl

Committee Chair

Dr. Carla Berg

Committee Member

Dr. Corinne Leach

Committee Member

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An abstract of

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A thesis submitted to the faculty of the Rollins School of Public Health of Emory University in partial fulfillment of the degree of Master of Public Health in Behavioral Sciences and Health Education 2020

Abstract

Public health concerns regarding opioids and marijuana have implications for their medical use. This study examined motives for use and perceived barriers in relation to opioid and marijuana use and interest in use among US adult survey participants living with HIV (PLWH, n=304) or who are cancer survivors (n=194) recruited via social media in Summer 2018. Participants were an average 34.29 years old, 51.6% male, and 58.4% White. Overall, 25.7% (16.1% of PLWH, 40.9% of cancer survivors) reported current (past 30-day) use of opioids, 27.5% (PLWH: 18.1%; cancer survivors: 42.5%) reported current (past 30-day) use of marijuana, and 25.1% (PLWH: 16.1%; cancer survivors: 39.7%) reported current (past 30-day) use of both analgesics. The most common motives for use for either/both drugs were to cope with pain and stress/anxiety (>50%). Highest-rated barriers to using either or both drugs were missing symptoms of worsening illness and concerns about addiction. Per multivariable regression, current opioid use was correlated with greater motives for use (OR=2.32) and being older, female, Black, and higher income (Nagelkerke R-square=.627). Among opioid nonusers, greater interest in use was correlated with greater motives for use (B=0.42), greater barriers (B=0.02), history of cancer, and being female, married/cohabitating, and lower income (Adjusted R-square=.698). Current marijuana use was correlated with greater motives for use (OR=1.62), greater barriers (OR=1.18), history of cancer, and being older and White (Nagelkerke R-square=.702). Among marijuana nonusers, greater interest in use was correlated with greater motives for use (B=0.64), fewer barriers (B=-0.03), history of cancer, and being female, unmarried, and lower income (Adjusted R-square=.802). While motives for use and barriers for both drugs were similar, these constructs were differentially associated with use and interest in use across drugs.

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Chapter 1: Introduction

Problem Definition

Opioids and Medical Marijuana

Opioids are the most widely prescribed treatment for chronic pain in the United States (US).(Dowell, Haegerich, & Chou, 2016; Krashin, Merrill, & Trescot, 2012; P. Lucas, 2012) Extensive clinical studies indicate that long-term opioid therapy used to manage pain is associated with improvements in quality of life, lower health care utilization, and higher productivity.(Rosenblum, Marsch, Joseph, & Portenoy, 2008) While opioid analgesics have been endorsed by healthcare professionals(Dowell et al., 2016; Judith A Paice et al., 2016), the use of opioids is controversial, not only because of concerns about side effects, long-term efficacy, and functional outcomes, but increasingly because of the potential for abuse and addiction.(M. Bennett, Paice, & Wallace, 2017; Rosenblum et al., 2008)

The Centers for Disease Control (CDC) and Prevention state that overdose deaths from opioids, including prescription opioids, heroin, and synthetic opioids have increased almost six-fold since 1999.((WONDER), 2018; Marcus A. Bachhuber, Brendan Saloner, Chinazo O. Cunningham, & Colleen L. Barry, 2014; Volkow, 2014) Opioid overdoses killed more than 47,000 people in 2017, with 36% of those deaths involving prescription opioids.(Scholl, Seth, Kariisa, Wilson, & Baldwin, 2018) According to the US Substance Abuse and Mental Health Services Administration, the dependence on and abuse of pharmaceutical medications such as opioids is the fastest growing form of problematic substance use in the US.(P. Lucas, 2012)

As opioid-related deaths have increased in the United States, many patients and providers have turned to medical marijuana for treatment of symptoms, such as chronic pain, instead of prescription opioids.(Boehnke, Litinas, & Clauw, 2016b) There is a growing body of evidence that supports the use of medical marijuana rather than prescription opioids for the treatment of

chronic pain.(Degenhardt et al., 2015; P. Lucas, 2012; Philippe Lucas et al., 2013) Patients with chronic pain using medical marijuana to manage symptoms found a 64% decrease in opioid use, decreased side effects of medication, and an improved quality of life.(M. Bennett et al., 2017) Medical marijuana has the potential to relieve suffering from chronic pain and to reduce morbidity and mortality associated with the use and abuse of pharmaceutical opioids.(Bruce et al., 2017; P. Lucas, 2012; Taddei, Lo Re, & Justice, 2016) This could lead to reductions in hospitalizations due to opioid dependence or abuse, overdoses and opioid related mortality.(Goldberg & Cataldo, 2018; P. Lucas, 2012; Philippe Lucas et al., 2013) In addition, research suggests that when used in conjunction with opiates, marijuana can lead to a greater cumulative relief of pain, which could reduce patients' use of opioids and the associated adverse side effects.(Abrams, Couey, Shade, Kelly, & Benowitz, 2011; Boehnke, Litinas, & Clauw, 2016a; Haroutounian et al., 2016; P. Lucas, 2012)

Although marijuana has proved to relieve symptoms for PLWH and cancer survivors, there are implications when it comes to using medical marijuana due to adverse side effects, legal restrictions, and risk of abuse.(M. Bennett et al., 2017; Elikkottil, Gupta, & Gupta, 2009) A meta-analysis assessing the efficacy of medical marijuana in clinical trials found that participants experienced increased adverse neurologic or psychiatric events including headaches, sedation, confusion, and disorientation in comparison to the placebo groups.(Deshpande, Mailis-Gagnon, Zoheiry, & Lakha, 2015) Medical marijuana is also associated with users feeling "high" therefore leading to impaired attention, learning and memory.(Deshpande et al., 2015) The Schedule I status of marijuana makes it difficult to conduct large-scale clinical trials on its efficacy. The increased availability of legal medical marijuana has the potential to be a solution to the associated personal, social and public health consequences of the increasing number of

opioid prescriptions.(Philippe Lucas et al., 2013) The recent shift in policy and social norms related to opioids and marijuana use provide a critical time for understanding perceptions and use of these drugs among patient populations.

Patient Populations: Cancer Survivors and People Living with HIV

Due to improvements in treatment and earlier diagnoses, both cancer and HIV are thought to be considered chronic diseases that can be managed with appropriate treatment.(Krashin et al., 2012; Pain, 2016)With new HIV infections at rates of 48,000-53,000 per year, and substantially lower death rates due to antiviral therapy, the overall prevalence of HIV is increasing in the United States.(Ball, 2014; Taddei et al., 2016) Newly infected patients who adhere to treatment and care have a virtually normal life expectancy.(Ball, 2014)

Within the next decade, the number of cancer survivors living in the United States will increase from 15.5 million cancer survivors to over 20 million.(Leach et al., 2017; Lewis-Patterson, Palos, Dains, & Jackson, 2016; Miller et al., 2016) The improvement in cancer survival rates can be attributed to advances in early detection of cancer, patient adherence to screening recommendations, and improved treatment options.(Lewis-Patterson et al., 2016)

While HIV and cancer are no longer considered fatal diseases, people living with HIV (PLWH) and cancer survivors experience various late and long-term health effects associated with their diseases(Ball, 2014; Lewis-Patterson et al., 2016) including physical pain, fatigue, mental health (e.g., worry), and other related symptoms (e.g., difficulty sleeping)(Glare et al., 2014; Krashin et al., 2012; Leach et al., 2017; Wu & Harden, 2015) therefore, identifying appropriate methods to promote the health and well-being of these patient populations is essential.

Managing Symptoms

Treating these common symptoms among PLWH and cancer survivors is a major public health issue. Since these symptoms vary from patient to patient, managing them among PLWH and cancer survivors remains complex and challenging,(Krashin et al., 2012) often requiring personalized, patient-based approaches including combinations of cognitive behavioral therapy, physical and occupational therapy, and pharmacological interventions.(Bruce et al., 2017)

Interest and Information Sources Regarding Pharmacotherapy for Symptom Management

Due to the increase in the availability of information about health, medical symptoms, and potential treatments or remedies, patient populations are faced with the challenge of deciding where to get information about their respective medical conditions. Online health information is often utilized among those living with chronic illnesses in order to maintain good physical, psychological and individual wellbeing, as well as to inform treatment decisions and discussions with healthcare professionals.(Schnall, Liu, & Iribarren, 2018) Healthcare providers, personal networks and community are other channels of health information noted as common sources of information.(Schnall et al., 2018) Information gathering from multiple sources is becoming more common among patient populations and has led to a more shared decision-making model among patients and their healthcare providers.(Anker, Reinhart, & Feeley, 2011) Health information seeking is associated with increased discussions with healthcare providers, patient satisfaction, and knowledge of potential treatment options.(Anker et al., 2011)

In 2016, the CDC released guidelines that provide recommendations for physicians who are prescribing opioids. This guideline is intended to improve communication and knowledge about opioid use, improve the safety and effectiveness of pain treatment and reduce the risks associated with long-term opioid therapy.(Pergolizzi, Raffa, Taylor, & Vacalis, 2018) While

guidelines exist, patients often explore multiple information sources when making decisions regarding the use of opioids to manage their respective disease.

Due to the rapid rise of marijuana use for medicinal purposes, there is a lack of information on the health benefits, implications and recommendations for use. Continued research and well controlled trials are necessary to further understand the effects of marijuana on health endpoints such as epilepsy, posttraumatic stress disorder, and cancers.(National Academies of Sciences & Medicine, 2017) As more evidence is collected about the efficacy of marijuana for managing symptoms of various health endpoints, the CDC will release recommendations for patients using marijuana for medicinal purposes.

As the opioid addiction epidemic has emerged and medical marijuana legislation has expanded, it is important to understand where patient populations are retrieving information about these potential analgesics. This study aims to examine the information sources patient populations are accessing when it comes to make decisions about treating adverse side effects related to their diseases.

Justification and Goals of Research

As the number of PLWH and cancer survivors continues to increase, it is essential to assess patient preferences when it comes to obtaining information about potential treatments for managing their diseases, as well as their reasons for use and potential barriers towards using opioids and medical marijuana.

This study presents an important contribution to the existing literature as very few studies examine the information sources that are currently being utilized by patient populations, as well as their preference of information sources. While various studies have noted the increasing availability of information sources and the benefits of information seeking behaviors in patient

populations, there is a gap in literature that needs to be addressed. As perceptions and policies surrounding the use of opioids and medical marijuana continue to shift, it is important to explore patients' behaviors that assist in making decisions regarding their medical condition.

This study also aims to assess the reasons PLWH and cancer survivors are either using opioids and/or medical marijuana or avoiding these analgesics to manage their conditions.

To date, few studies exist regarding reasons for use of opioids or marijuana among patient populations. Although the number of patients seeking opioids to treat medical conditions continues to increase, there are a limited number of studies examining reason for use. A previous study of patients with and without chronic pain reported that pain relief was their primary reason for use followed by other reasons including anxiety, depression, to improve sleep and to get high.(Weiss et al., 2014) A previous study of 442 PLWH stated that reasons for using medical marijuana was for improving relaxation/stress, appetite/weight loss, or nausea.(Sidney, 2001) However, previous studies did not address the perceived effects of medical marijuana on symptoms related to managing their disease. Five cross-sectional studies found that chronic pain was the most common use motive among diverse patient populations, yet these studies did not include information related to the participant's medical conditions.(Park & Wu, 2017) This study aims to contribute to the existing literature on reasons for using opioids or marijuana in two relevant patient populations.

Very little research has been conducted assessing patient perceptions about the barriers to using marijuana or opioids to manage their respective diseases. In 2016, a systematic review assessed the efficacy and adverse effects of marijuana among patient populations. While this study didn't specifically assess barriers to use, patients reported various adverse side effects related to marijuana use when managing their symptoms.(Deshpande et al., 2015) These adverse

effects included visual symptoms, musculoskeletal symptoms, neurologic and psychiatric events.(Deshpande et al., 2015) A meta-analysis conducted in 2007, examined physician related barriers to managing cancer related pain with opioids. This study found most physicians noted common barriers included attitudinal barriers, lack of knowledge, communication barriers with patients and reluctance to prescribe opioids.(Jacobsen, Sjogren, Moldrup, & Christrup, 2007) Despite intensive research on the barriers to pain management, it is not widely understood, and patient perceptions have not been thoroughly assessed.

Thus, the purpose of this research is to explore patient populations' current information sources, preferred information sources, reasons for use and barriers to use when it comes to opioids and medical marijuana.

Conceptual Framework

This study is informed by the Health Belief Model (HBM) (I. M. Rosenstock, 1974) and the Health Information Seeking Model (HISM)(Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) (Figure 1). HBM suggests that a person's belief in the personal threat and/or seriousness of an illness or disease (i.e., perceived susceptibility and severity), in the effectiveness of the health behavior or treatment (i.e., perceived benefits), and in the challenges to accessing or using a treatment option (i.e., perceived barriers) predict health behaviors (I. M. Rosenstock, 1974).

HISM (Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) focuses on how individuals access and use information related to health, illness, and related risk factors in order to make medical decisions or health behavior changes.(Cutilli, 2010; Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) Based on this conceptual framework, an individual's prior experiences, including their illness, symptoms, medical treatments, use of medications, and exposure to information about medical options, can shape the perceived utility or benefits (e.g., symptom

relief) of using different treatment options and the barriers to using them (e.g., concerns about addiction, stigma related to use, adverse side effects).(M. Bennett et al., 2017; Elikkottil et al., 2009) These experiences likely influence their interest in and attitudes about using opioids and marijuana and their actual use of them.(I. M. Rosenstock, 1974)

Study Aims

Leveraging this overall conceptual framework, this study aimed to address a critical gap in the literature, specifically with regard to how two patient populations navigate the management of their symptoms as the opioid addiction epidemic has emerged and medical marijuana legislation has expanded. This study examined use history, interest in use, common and preferred information sources regarding these drugs, motives for use/potential motives for use, and perceived barriers to use regarding opioids and marijuana among two highly relevant patient populations – PLWH and cancer survivors. Motives for use and barriers to use in relation to current (past 30-day use) of the respective drugs and to interest in using these drugs among nonusers were also examined within these two patient populations.

Research Questions

1. What are the information sources and preferred information sources as it pertains to opioids and marijuana among PLWH and cancer survivors?
2. Describe and explore the motives for use and perceived barriers to use of opioids and marijuana among PLWH and cancer survivors.

Chapter 2: Literature Review

Brief Introduction of the Literature

Opioid and medical marijuana use are becoming more common among people in the United States. In the 2015 National Survey on Drug Use and Health, 37.8% of US citizens reported using prescription opioids.(Han et al., 2017) Among those who used prescription opioids many reported misusing their prescription in order to relieve physical pain (63.4%).(Han et al., 2017) The 2014 National Survey on Drug Use and Health found that medical marijuana use is not only found in states that have passed medical marijuana laws.(Compton, Han, Hughes, Jones, & Blanco, 2017) This study found that use of medical marijuana was associated with older age, disability, stroke diagnosis, poor health, and anxiety disorder.(Compton et al., 2017) As laws and stigma surrounding opioids and medical marijuana continue to change, exploring the benefits and risks of these analgesics to manage symptoms of various health conditions is an emerging issue.

Due to improvements in treatment and earlier diagnoses, the prevalence of PLWH and cancer survivors is increasing and these diseases can be considered chronic diseases that can be managed with appropriate treatment.(Krashin et al., 2012; Leach et al., 2017; Lewis-Patterson et al., 2016; Miller et al., 2016; Pain, 2016) Although HIV and cancer are no longer considered fatal diseases, people living with HIV (PLWH) and cancer survivors have various late and long-term health effects associated with their diseases.(Ball, 2014; Lewis-Patterson et al., 2016) As the number of people living with HIV or a cancer diagnosis continues to increase, identifying appropriate methods to promote the health and well-being of these patient populations is essential.

Treating common symptoms faced by PLWH and cancer survivors is a major public health concern. Since these symptoms vary from patient to patient, managing them among PLWH and cancer survivors remains complex and challenging,(Krashin et al., 2012) often requiring personalized, patient-based approaches including combinations of cognitive behavioral therapy, physical and occupational therapy, and pharmacological interventions.(Bruce et al., 2017)

While health information is rapidly changing due to emerging information and technology, it is essential to explore patients' information seeking behaviors in order to better understand their experiences and address their needs.(Moldovan-Johnson, Tan, & Hornik, 2014) Seeking information about one's health is documented as a key coping strategy in health promoting activities and psychosocial adjustment to illness.(Lambert & Loiselle, 2007)

The purpose of this review is to improve the understanding of existing literature on opioid and medical marijuana use, controversy regarding use of these analgesics, two relevant patient populations, symptoms experienced among these populations, and interest in use of opioids and medical marijuana among patient populations. Lastly, we will discuss the conceptual framework for this study which utilizes the Health Belief Model and the Health Information Seeking Model.

Opioids and Medical Marijuana

Opioids are the most widely prescribed treatment for chronic pain in the United States (US).(Dowell et al., 2016; Krashin et al., 2012; P. Lucas, 2012) Recent clinical studies indicate that long-term opioid therapy used to manage pain is associated with improvements in quality of life, lower health care utilization, and higher productivity.(Rosenblum et al., 2008) While opioid analgesics have been endorsed by healthcare professionals(Dowell et al., 2016; Judith A Paice et

al., 2016), the use of opioids is controversial, not only because of concerns about side effects, long-term efficacy, and functional outcomes, but increasingly because of the potential for abuse and addiction.(M. Bennett et al., 2017; Rosenblum et al., 2008) A study suggested that prescription opioids could control pain in 73% of patients with cancer (M. Bennett et al., 2017), yet cancer survivors are considered to be at high risk for opioid-related morbidity and mortality.(Voon, Karamouzian, & Kerr, 2017) Due to the high prevalence of prescription opioids used to treat chronic pain in PLWH and cancer survivors, there are many reluctancies when it comes to treating symptoms among these patient populations.(Voon et al., 2017)

As opioid-related deaths have increased in the United States, many patients and providers have turned to medical marijuana for treatment of symptoms, such as chronic pain, instead of prescription opioids.(Boehnke et al., 2016b) There is a growing body of evidence that supports the use of medical marijuana in replacement of prescription opioids for the treatment of chronic pain.(Degenhardt et al., 2015; P. Lucas, 2012; Philippe Lucas et al., 2013) Patients with chronic pain using medical marijuana to manage symptoms found a 64% decrease in opioid use, decreased side effects of medication, and an improved quality of life.(M. Bennett et al., 2017) Medical marijuana has the potential to relieve symptoms, as well as reduce morbidity and mortality associated with the use and abuse of pharmaceutical opioids.(Bruce et al., 2017; P. Lucas, 2012; Taddei et al., 2016) This could lead to reductions in hospitalizations for opioid dependence or abuse, overdoses and opioid related mortality.(Goldberg & Cataldo, 2018; P. Lucas, 2012; Philippe Lucas et al., 2013) In addition, research suggests that when used in conjunction with opiates, marijuana can lead to a greater cumulative relief of pain, which could reduce patients' use of opioids and their adverse side effects.(Abrams et al., 2011; Boehnke et al., 2016a; Haroutounian et al., 2016; P. Lucas, 2012)

Controversy Regarding Opioids and Medical Marijuana

Opioid analgesics are powerful medications that need to be used with precaution due to their addictive properties.(D. S. Bennett & Carr, 2002) Regulatory concerns, beliefs about tolerance to opioids and safety concerns are all responsible for clinicians and patient reluctance to use opioids for symptom management.(Glajchen, 2001) Various clinicians are hesitant to prescribe opioids for pain management due to gaps in knowledge, negative attitudes, inadequate assessment skills and timidity in prescribing these analgesics.(D. S. Bennett & Carr, 2002; Glajchen, 2001; Morley-Forster, Clark, Speechley, & Moulin, 2003) A survey in California found that 35% of primary care physicians were not willing to prescribe opioids for chronic pain under any circumstances.(Morley-Forster et al., 2003) There is continued controversy surrounding the use of opioids for symptom management due to fears of abuse from both patients and providers, intolerable side effects, and disciplinary action by regulatory agencies.(Passik & Weinreb, 2000) Patients with chronic pain are mainly concerned with the fear of addiction and adverse side effects when using opioids to manage symptoms.(Glajchen, 2001) The World Health Organization has stated that opioids are essential for the relief of pain and suffering, yet there are various state by state restrictions on the amount or length of opioid prescriptions due to the increasing rates of opioid related deaths in the United States.(D. S. Bennett & Carr, 2002)

The Centers for Disease Control (CDC) and Prevention states that overdose deaths from opioids, including prescription opioids, heroin, and synthetic opioids have increased almost six-fold since 1999.((WONDER), 2018; Marcus A. Bachhuber et al., 2014; Volkow, 2014) Opioid overdoses killed more than 47,000 people in 2017, with 36% of those deaths involving prescription opioids.(Scholl et al., 2018) According to the US Substance Abuse and Mental Health Services Administration, the dependence on and abuse of pharmaceutical medications

such as opioids is the fastest growing form of problematic substance use in the US.(P. Lucas, 2012)

Although marijuana has proved to relieve symptoms for PLWH and cancer survivors, there are implications when it comes to adverse side effects, legal restrictions, and risk of abuse.(M. Bennett et al., 2017; Elikkottil et al., 2009) A meta-analysis assessing the efficacy of medical marijuana in clinical trials found that participants experienced increased adverse neurologic or psychiatric events including headaches, sedation, confusion, and disorientation in comparison to the placebo groups.(Deshpande et al., 2015) Medical marijuana is also associated with users feeling "high" therefore leading to impaired attention, learning and memory.(Deshpande et al., 2015) The Schedule I status of marijuana makes it difficult to conduct large-scale clinical trials on its efficacy. The increased availability of legal medical marijuana could be a solution to the associated personal, social and public health consequences of the rising number of opioid prescriptions.(Philippe Lucas et al., 2013)

The recent shift in policy and social norms related to opioids and marijuana use provide a critical time for understanding perceptions and use of these drugs among patient populations. Thus, this study examined perceptions and use of opioids and marijuana for symptom management among two highly relevant patient populations – people living with HIV (PLWH) and cancer survivors.

Patient Populations: People Living with HIV and Cancer Survivors

With new HIV infections at rates of 48,000-53,000 per year, and substantially lower death rates due to antiviral therapy, the overall prevalence of HIV is increasing.(Ball, 2014; Taddei et al., 2016) Newly infected patients who adhere to treatment and care have a virtually normal life expectancy.(Ball, 2014) Within the next decade, the number of cancer survivors

living in the United States will increase from 15.5 million cancer survivors to over 20 million.(Leach et al., 2017; Lewis-Patterson et al., 2016; Miller et al., 2016) The improvement in cancer survival rates can be attributed to advances in early detection of cancer, patient adherence to screening recommendations, and improved treatment options.(Lewis-Patterson et al., 2016) As of 2016, the cancer death rate for men and women combined has dropped by 27%.(Society, 2019) As survival rates for HIV and cancer continue to increase, physicians, researchers, and patients must learn to adequately manage the various late and long-term health effects associated with these diseases.(Ball, 2014; Lewis-Patterson et al., 2016)

Managing Symptoms Related to HIV and Cancer

Despite advances in treatment, PLWH and cancer survivors commonly face declines in their physical health(Althoff, Smit, Reiss, & Justice, 2016) and suffer from adverse symptoms including physical pain, fatigue, mental health (e.g., worry), and other related symptoms (e.g., difficulty sleeping).(Glare et al., 2014; Krashin et al., 2012; Leach et al., 2017; Wu & Harden, 2015) Palliative care focuses on the relief of physical and emotional symptoms related to illness with the goal to make the patients' life as comfortable as possible.(Society, 2016) Palliative care is essential for PLWH and cancer survivors to manage the long-term physical effects, as well as psychological and socioeconomic sequalae associated with their illness.(Miller et al., 2016)

Pain. Pain is a common physical symptom indicated by these patient populations, with pain levels experienced depending on the stage of the illness or current treatment.(Glare et al., 2014; Krashin et al., 2012) Chronic pain affects 30-90% of PLWH and 40% of cancer survivors,(Bruce et al., 2017; Glare et al., 2014; Krashin et al., 2012; P. Lucas, 2012) due to both their condition(Leach et al., 2017) and treatment.(Miller et al., 2016) Moreover, higher levels of

chronic pain is associated with more severe illness, poorer health, and decreased quality of life.(Krashin et al., 2012; Pain, 2016; Wu & Harden, 2015)

Fatigue. Fatigue is another commonly indicated symptom among PLWH and cancer survivors. For example, a study of 350 PLWH indicated that 88% experienced fatigue, which contributed to poor cognitive functioning and lower quality of life.(Byun, Gay, & Lee, 2016) Data from the American Cancer Society's Cancer Survivor Transition Study found that 84.6% of cancer survivors experience fatigue or loss of strength, making it the most common, severe, and distressing symptom.(Deshields, Potter, Olsen, & Liu, 2014; Leach et al., 2017; Wu & Harden, 2015) High levels of fatigue are associated with more deficits in attention/cognitive functioning, greater levels of depression and anxiety, more pain, lower quality of life, and other comorbidities.(Byun et al., 2016; Wu & Harden, 2015)

Mental Health. PLWH and cancer survivors deal with significant emotional burden related to their respective diseases,(Bhatia, Hartman, Kallen, Graham, & Giordano, 2011; Society, 2016; Stanton, 2006) often variable depending on the presence of physical symptoms and elapsed time since diagnosis.(Wu & Harden, 2015) For example, one study indicated that 67% of PLWH indicate significant depressive symptoms.(Bhatia et al., 2011) PLWH and cancer survivors must deal with accepting their illness, finding "a new normal", and coping with the associated fears related to their illness.(Miller et al., 2016) Additionally, PLWH often struggle with disclosing their disease status, being afraid of the reaction of family or friends leading to social isolation.(Ball, 2014) Moreover, cancer survivors are more likely to experience worry about recurrence.(Society, 2016; Stanton, 2006) Such mental health concerns are critical, as they impact quality of life in general and physical health specifically. For example, depression is linked with reduced adherence to medication and treatment.(Althoff et al., 2016; Bhatia et al.,

2011) Moreover, mental health issues also impact attentional/cognitive functioning and other aspects of quality of life.(Althoff et al., 2016; Bhatia et al., 2011) Understanding the complex experiences of PLWH and cancer survivors is essential for implementing successful palliative and supportive care, decreasing symptom burden, and improving patient's quality of life.(Deshields et al., 2014)

Interest and Information Sources Regarding Pharmacology for Symptom Management

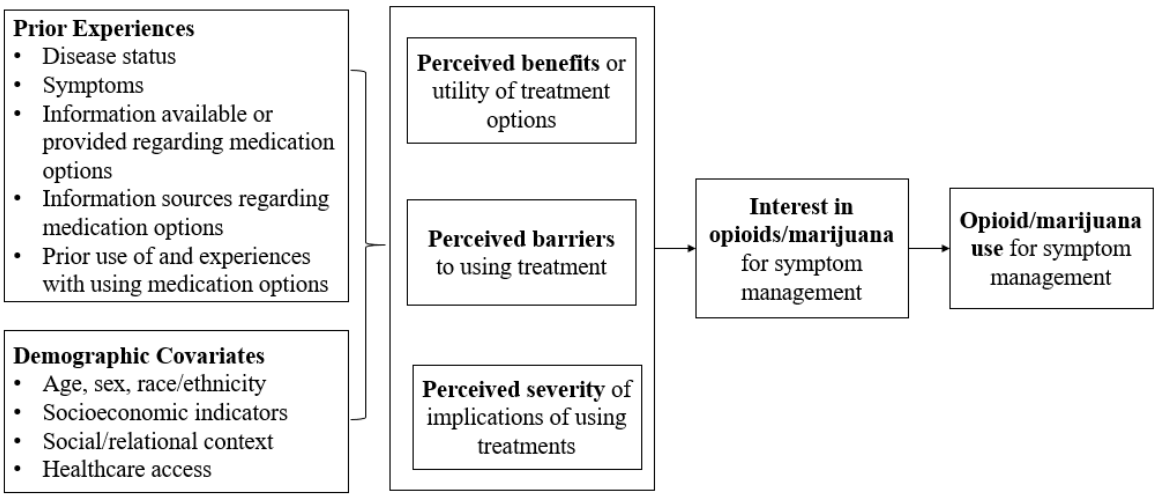
Increased knowledge about treatment options is essential to improve both patient and provider willingness to use opioids or marijuana to manage symptoms.(Glajchen, 2001) Providing PLWH and cancer survivors with adequate information about pharmacotherapy is essential to improve communication and knowledge about opioid and marijuana use, improve the safety and effectiveness of pain treatment and reduce the risks associated with these treatments.(Pergolizzi et al., 2018) In 2016, the CDC released guidelines that provide recommendations for physicians who are prescribing opioids. This guideline is intended to improve communication and knowledge about opioid use, improve the safety and effectiveness of pain treatment and reduce the risks associated with long-term opioid therapy.(Pergolizzi et al., 2018) Currently, recommendations for prescribing medical marijuana do not exist due to limited knowledge about its effectiveness in managing symptoms related to HIV or cancer. Due to the controversial public opinions surrounding the use of opioids and medical marijuana, patients are left to seek information related to these analgesics from various sources in order to make decisions related to managing their symptoms.

While information related to treating illness is rapidly changing due to emerging information and technology, it is essential to explore patients' information seeking behaviors in order to better understand their experiences and address their needs.(Moldovan-Johnson et al., 2014) A recent study of cancer survivors' found that high engagement with clinicians for

information encouraged information seeking from nonmedical sources such as the internet or peers and vice versa, which may indicate a shift towards a more active patient model for decision making.(Moldovan-Johnson et al., 2014) The most common information sources for cancer patients include physicians or health professionals (100%), non-medical interpersonal sources such as family, friends or other cancer patients (100%) and brochures or pamphlets (91%).(Nagler et al., 2010) Sources of health information utilized by patients is impacted by an individual's health literacy, relationships with their providers, mistrust in medical professionals and access to the internet.(Cutilli, 2010) Research shows that health consciousness and intention positively predicts patients' search for health information beyond their healthcare provider.(Cutilli, 2010) As the trend toward shared medical decision making between healthcare professionals and patients continues to increase, patients are becoming more involved in their treatment from wanting to understand their physicians' decisions about care, to wanting their perceptions and precautions heard and considered, and even decision making concerning their own health.(Lambert & Loiselle, 2007) Seeking information about one's health is documented as a key coping strategy in health promoting activities and psychosocial adjustment to illness.(Lambert & Loiselle, 2007)

Conceptual Framework

This study leverages the Health Information Seeking Model (HISM) (Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) and the Health Belief Model (HBM)(I. M. J. H. e. m. Rosenstock, 1974) to better understand perceptions and use of opioids and marijuana for symptom management among PLWH and cancer survivors.



Health Belief Model

HBM suggests that a persons' belief in the personal threat of an illness or disease combined with a person's belief in effectiveness of the health behavior or treatment will predict the likelihood of a health behavior.(I. M. J. H. e. m. Rosenstock, 1974) HBM(I. M. J. H. e. m. Rosenstock, 1974) articulates six core constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action and self-efficacy (I. M. J. H. e. m. Rosenstock, 1974). This study focuses on perceived severity, perceived benefits and perceived barriers of using opioids and marijuana for symptom management. These patient populations must weigh the risks and benefits of using pharmacotherapy such as opioids or marijuana. The use of opioids or marijuana is impacted by a patients' perceived severity of side effects of the analgesics, perceived benefits such as reduction in symptoms and perceived barriers such as the various side effects associated with these treatments related to their respective diseases.

Health Information Seeking Model

The Health Information Seeking Model(Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) focuses on activities such as searching for, finding, and using information related to diseases, health threatening factors, and health related activities.(Cutilli, 2010; Lalazaryan &

Zare-Farashbandi, 2014) This study aims to understand how and why individuals obtain health information about opioids and marijuana, where they go to retrieve such information, what particular types of information they prefer, and how the health information sought is used.(Lambert & Loiselle, 2007) Information seeking behaviors include dealing with health-threatening situations, making medical decisions, and pursing behavior change and preventive behavior which can be impacted by psychological, demographic, interpersonal, or environmental factors.(Cutilli, 2010; Wilson, 2000) This study explores the various sources of medical information PLWH and cancer survivors are utilizing, as well as their preferred sources of information.

The Health Belief Model and the Health Information Seeking Model work together when it comes to patient populations making decisions surrounding treating their illnesses. Before determining the perceived severity, benefits or barriers toward using opioids or marijuana to treat their illness they need to do research about these analgesics. These decisions surrounding their care is impacted by personal experiences, suggestions from friends, families or doctors, and their opinions surrounding various treatments. It is impossible to weigh the risks and benefits of using opioids or marijuana without engaging in information seeking behaviors. Determining how various information sources impact a patient's health behaviors is an essential part of providing adequate care to PLWH and cancer survivors in order to manage various symptoms related to their respective diseases and improve their health-related quality of life.

Chapter 3: Student Contribution

The intended journal for this manuscript is the American Psychological Association Journal. Jessica Potts, Dr. Eric Nehl, Dr. Carla Berg, and Dr. Corinne Leach contributed to the conceptualization of the project. Dr. Carla Berg conceptualized the study question, data source (COPE Study 2018), and epidemiological portion of the study, Dr. Corinne Leach contributed subject matter expertise on cancer survivorship, and Dr. Eric Nehl conceptualized the theory portion of the paper. Before beginning the study, Jessica Potts conducted a detailed literature review on the topic, reviewed by Drs. Nehl, Berg and Leach, and determined how this analysis would fill the gaps in the literature. Dr. Berg planned the analyses along with Betelihem Getachew, MPH and data elements needed. Jessica Potts contributed to the presentation of the results in tables. All analytical results were reviewed by Jessica Potts, Drs. Nehl, Berg and Leach. Sections of the manuscript were drafted by Jessica Potts and reviewed and revised by Drs. Nehl, Berg, and Leach.

Chapter 4 – Manuscript

INTRODUCTION

Controversy Regarding Opioids and Medical Marijuana

Opioids are the most widely prescribed treatment for chronic pain in the United States (US).(Dowell et al., 2016; Krashin et al., 2012; P. Lucas, 2012; J. A. Paice et al., 2016) Extensive clinical studies indicate that long-term opioid therapy to treat pain is associated with improvements in quality of life, lower health care utilization, and higher productivity.(Rosenblum et al., 2008)While opioid analgesics have been endorsed by healthcare professionals(Dowell et al., 2016; J. A. Paice et al., 2016) especially for cancer pain treatment, the use of opioids is controversial, not only because of concerns about side effects, long-term efficacy, and functional outcomes, but increasingly because of the potential for abuse and addiction.(D. S. Bennett & Carr, 2002; Rosenblum et al., 2008) Nearly 2.5 million people in the US are suffering from opioid addiction related to prescription drugs for chronic pain, with 75-83% starting with a prescription drug.(NIDA, June 25, 2015) Indeed, the abuse of prescription and non-prescription opioids is one of the greatest public health threats in the US today, with nearly 91 US adults dying every day from an opioid overdose.(CDC, 2018) Driven by this alarming rate of opioid abuse and misuse, drug overdose is now the leading cause of accidental death in the US.(Straus, Ghitza, & Tai, 2013) Presently, opioid overdoses contribute to 61% of all overdose deaths.(Rudd, Aleshire, Zibbell, & Gladden, 2016)

Within this time of controversy surrounding opioids, many patients and providers are turning to marijuana for treatment of symptoms.(Boehnke et al., 2016b; Vyas, LeBaron, & Gilson, 2018) Currently, 33 states and the District of Columbia have approved some form of medical marijuana laws that include a list of approved medical conditions that qualify a patient

for access to prescription medical marijuana.(Bradford & Bradford, 2016; Legislatures, 2019) Marijuana may help patients manage certain medical conditions and complications (e.g., chronic pain or nausea, Parkinson's disease symptoms, multiple sclerosis symptoms, seizure disorders).(Bridgeman & Abazia, 2017) There is a growing body of evidence that supports the use of medical marijuana for the treatment of chronic pain.(Aviram & Samuelly-Leichtag, 2017; M. Bennett et al., 2017; Degenhardt et al., 2015; P. Lucas, 2012; Philippe Lucas et al., 2013) Prescribed medical marijuana has the potential to relieve suffering from chronic pain, to reduce morbidity and mortality associated with the use and abuse of pharmaceutical opioids (Bruce et al., 2017; P. Lucas, 2012; Taddei et al., 2016), and to improve quality of life.(Boehnke et al., 2016a) In addition, research suggests that when used in conjunction with opioids, marijuana can lead to a greater cumulative relief of pain, which could reduce patients' opioid use rates or levels and their adverse side effects.(Abrams et al., 2011; M. Bennett et al., 2017; Boehnke et al., 2016a; Haroutounian et al., 2016; P. Lucas, 2012) Moreover, early research (M. A. Bachhuber, B. Saloner, C. O. Cunningham, & C. L. Barry, 2014) reported that, from 1999 to 2010, states with prescription medical marijuana laws experienced slower increases in opioid analgesic overdose mortality. However, more recent research extended that work through 2017 and found that, over the longer period, the association between state prescription medical marijuana laws and opioid overdose mortality reversed direction (from −21% to +23%) and remained positive after accounting for recreational marijuana laws.(Shover, Davis, Gordon, & Humphreys, 2019) Thus, while medical marijuana may provide some promise in terms of addressing concerns related to opioid use, the data is underdeveloped and is controversial with regard to its implications for clinical practice.(M. Bennett et al., 2017)

Managing Symptoms Related to HIV and Cancer

The controversy regarding the medical use of these drugs has important implications for medical populations, such as people living with HIV (PLWH) and cancer patients/survivors. Earlier diagnosis and improvements in treatment have led to increasing numbers of PLWH (Ball, 2014; Taddei et al., 2016) and cancer survivors (Society, 2019). PLWH and cancer survivors have various late and long-term health effects associated with their diseases (Ball, 2014; Lewis-Patterson et al., 2016); thus ongoing management of disease-related health implications to promote the health and well-being of these patient populations is essential (Krashin et al., 2012; Pain, 2016).

Despite advances in treatment, PLWH and cancer survivors commonly face declines in physical health (Althoff et al., 2016) and suffer from adverse symptoms, including physical pain, fatigue, mental health concerns (e.g., worry), and other negative symptoms (e.g., difficulty sleeping) (Glare et al., 2014; Krashin et al., 2012; Leach et al., 2017; Wu & Harden, 2015). Particularly relevant to the current study, pain is a common physical symptom indicated by these patient populations (Glare et al., 2014; Krashin et al., 2012), with chronic pain affecting 30-90% of PLWH and 40% of cancer survivors (Bruce et al., 2017; Glare et al., 2014; Krashin et al., 2012; P. Lucas, 2012; van den Beuken-van Everdingen, Hochstenbach, Joosten, Tjan-Heijnen, & Janssen, 2016). Experiencing pain can be related to both their disease status and related treatments (Jiao et al., 2016; Russo & Sundaramurthi, 2019). Higher levels of chronic pain is associated with more severe illness, poorer health, and decreased quality of life (Krashin et al., 2012; Pain, 2016; Wu & Harden, 2015).

In addition to pain, other significant facets of quality of life are affected by HIV and cancer, including fatigue and mental health. Regarding the former, fatigue is experienced by the majority of PLWH and cancer survivors. For example, one study estimated 88% of PLWH

experience fatigue (Byun et al., 2016), and one study of breast, prostate, and colorectal cancer survivors within the first year of completing treatment indicated that 84.6% reported experiencing fatigue (Leach et al., 2017). Fatigue contributes to poorer cognitive functioning, greater levels of depression and anxiety, greater pain, and lower quality of life (Byun et al., 2016; Wu & Harden, 2015). With regard to mental health, these patient populations face significant emotional burden related to their respective diseases (Bhatia et al., 2011; Society, 2016; Stanton, 2006), often variable depending on the presence of physical symptoms and elapsed time since diagnosis (Wu & Harden, 2015). For example, in a study of PLWH diagnosed within the past 90 days, 67% reported significant depressive symptoms (Bhatia et al., 2011). Many PLWH and cancer survivors struggle to cope with their illness (Ball, 2014; Society, 2016; Stanton, 2006). Such mental health concerns are critical, as they impact quality of life in general and physical health, specifically (Althoff et al., 2016; Bhatia et al., 2011).

Because opioids are often used to treat pain among PLWH and cancer survivors and their pain is commonly chronic, these medical populations are considered high risk for opioid-related morbidity and mortality (Voon et al., 2017). Indeed, many medical providers are hesitant to prescribe opioids in general as a result (Carr, 2016; Page & Blanchard, 2019; Shah & Diwan, 2010), and a multitude of challenges present themselves in patients accessing opioids (Page & Blanchard, 2019). Despite evidence suggesting that marijuana can relieve pain related to HIV-sensory neuropathy and cancer treatment, can improve mood and appetite, and can decrease nausea (M. Bennett et al., 2017; Elikkottil et al., 2009; P. Lucas, 2012), other research found that using marijuana for pain management was associated greater pain and lower self-efficacy in managing pain. Further, there was no evidence that cannabis use reduced pain severity, pain interference, nor exerted an opioid-sparing effect (i.e., reduced opioid doses while maintaining

analgesic efficacy) (Campbell et al., 2018). Moreover, there are implications of prescription medical marijuana, including adverse side effects, risk of abuse or addiction, and legal restrictions (M. Bennett et al., 2017; Elikkottil et al., 2009). With regard to the latter, for patients that do not live in these 33 states, obtaining prescription medical marijuana for symptom management continues to be a challenge and can have legal implications. Thus, PLWH, cancer survivors, and their healthcare providers are left to make decisions about managing symptoms within the context of a broad range of concerns about both medical options. However, very limited research has examined patient attitudes and ways of navigating these complex issues with regard to medical management of disease-related symptoms.

Conceptual Framework and Study Aims

This study is informed by the Health Belief Model (HBM) (I. M. J. H. e. m. Rosenstock, 1974) and the Health Information Seeking Model (HISM) (Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) (Figure 1). HBM suggests that a person's belief in the personal threat and/or seriousness of an illness or disease (i.e., perceived susceptibility and severity), in the effectiveness of the health behavior or treatment (i.e., perceived benefits), and in the challenges to accessing or using a treatment option (i.e., perceived barriers) predict health behaviors (I. M. J. H. e. m. Rosenstock, 1974). HISM (Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000) focuses on how individuals access and use information related to health, illness, and related risk factors in order to make medical decisions or health behavior changes (Cutilli, 2010; Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000). Based on this conceptual framework, an individual's prior experiences, including their illness, symptoms, medical treatments, and use of medications, and exposure to information about medical options, can shape the perceived utility or benefits (e.g., symptom relief) of using different treatment options and the barriers to using them (e.g.,

concerns about addiction, stigma related to use, adverse side effects) (M. Bennett et al., 2017; Elikkottil et al., 2009). These experiences likely influence their interest in and attitudes about using specific medical options and their actual use of them (I. M. J. H. e. m. Rosenstock, 1974).

Leveraging this overall conceptual framework, this study aimed to address a critical gap in the literature, specifically with regard to how two patient populations navigate the management of their symptoms as the opioid addiction epidemic has emerged and medical marijuana legislation has expanded. This study examined use history, interest in use, common and preferred information sources regarding these drugs, motives for use/potential motives for use, and perceived barriers to use regarding opioids and marijuana among two highly relevant patient populations – PLWH and cancer survivors. Motives for use and barriers to use in relation to current (past 30-day use) of the respective drugs and to interest in using these drugs among nonusers were also examined within these two patient populations.

METHODS

Procedures & Participants

The Emory University Institutional Review Board approved this study, IRB00095978. Participant recruitment was done via advertisements on two social networking websites, specifically Facebook and Reddit, modeled after other published research methods (Ramo & Prochaska, 2012). Advertisements targeted PLWH, cancer survivors, and symptom management, including taglines such as “Help researchers learn more about your experience using [opioids/marijuana] to address [HIV/cancer symptoms]” and “We want to know how those with [HIV/cancer] manage their pain. Let us know by participating in this research study!” Advertisement images included Pink/Red awareness ribbons, individuals diverse in age and ethnicity, and nature scenes such as lakes and mountains. Algorithms within each social media

site were used to increase ad exposure among (or target) individuals following certain topics (e.g., cancer survivorship, HIV, medical marijuana).

Individuals who clicked on the advertisements were directed to the online survey, administered via www.surveygizmo.com. The landing page provided a brief description of the study and a link to the informed consent form along with a more detailed description of the study. Once participants provided their consent to participate, they were screened for eligibility. In order to be eligible for the study, participants needed to: 1) reside in the US, 2) be at least 18 years old, and 3) either have been diagnosed with HIV/AIDS or be diagnosed with cancer and completed cancer treatment within the past 6 months. Those who consented and met eligibility criteria then completed the online survey. To limit duplicate responses, one response per IP address was permitted. Purposive sampling was used to ensure recruitment of roughly equal numbers of men and women, at least one-third of the sample was non-White, and at least one-third of the sample was PLWH and cancer survivors, respectively. The survey took approximately 30 minutes to complete. Each participant was compensated with a $5 gift card.

Recruitment occurred over between June 29 and July 4, 2018. Of the 702 individuals who clicked on the advertisements, 20 did not provide consent (4 did not respond to the consent form and 16 declined consent). Of the 682 who provided consent, 66 were deemed ineligible at the screening stage (i.e., 12 resided outside of the US, 6 were outside the eligible age range, 38 were HIV negative and had no prior cancer diagnosis, 10 cancer survivors were more than 6 months from treatment completion). In addition, we discontinued enrollment of women once our target enrollment was reached (i.e., 25 women who were eligible were not enrolled). Of the 591 who consented and were deemed eligible, 88 had incomplete data, and 5 were deemed to have invalid data (e.g., illogical response patterns). Thus, 498 had complete and valid responses (Figure 2).

Measures

Covariates: *Sociodemographics* included age, sex, race/ethnicity, marital status, children in the home, employment status, educational background, pre-tax monthly household income, and insurance coverage.

Descriptive factors: *Medical information* was obtained, including if participants had ever been diagnosed with HIV/AIDS, and if so, their HIV status (asymptomatic, symptomatic, or AIDS converted) and viral load status (detectable, undetectable, or don't know). They were also asked if they have ever been diagnosed with cancer, and if so, 1) type of cancer; 2) whether their treatment protocol included chemotherapy, surgery, or radiation; and 3) treatment status (currently undergoing treatment, within 6 months of completing treatment, between 6 months and 1 year of completing treatment, over 1 year since completing treatment).

Common and preferred information sources regarding drugs were assessed among all participants by asking, "From what sources do you get information on the use of [opioids and marijuana/cannabis] as it relates to your medical condition (either HIV or cancer)? (Check all that apply.)" Response options included: doctor/nurse, another patient, websites/blogs, naturopath/herbalist, [medicinal marijuana store for marijuana], friend/family member, pamphlet/handout, nutritionist, newspaper/magazine article, social media (Facebook, Twitter, etc.), TV/Radio advertisement, literature/research, other, or I haven't received this information (Lankenau et al., 2018). We also assessed participants' preferred information source about opioids or marijuana use by asking, "From what sources would you prefer to get information on [opioid or marijuana/cannabis] use as it relates to your medical condition (either HIV or cancer)? (Check all that apply.)", with the same response options (Lankenau et al., 2018).

Primary Predictors of Interest: ***Potential motives for use*** were assessed among all participants by asking, "For which of the following reasons would you use [opioids or marijuana/cannabis]?" Response options included: for pain related to your medical condition (either HIV or cancer-related), for another type of pain not caused by these conditions (such as back pain or arthritis), for nausea/upset stomach, to improve appetite, for depression/to improve mood, to help cope with illness, to help deal with stress/anxiety, to sleep, for recreational use/enjoyment, to treat your medical condition, none of these conditions, other, or refuse to answer (Pergam et al., 2017). Among past 12-month users, we assessed motives for actually using the respective drugs, by asking parallel questions for opioids and marijuana, reframing the stem to indicate, "For which of the following reasons do you use [opioids or marijuana/cannabis]?", with the same response options (Pergam et al., 2017). Index scores for motives for use and potential motives for use for each drug, respectively, were created by summing the number of motives/symptoms endorsed.

Perceived barriers to using opioids and marijuana were assessed using the Barriers Questionnaire – 13 (Boyd-Seale et al., 2010). We asked, "For each of the items below, please indicate the number (0=Do not agree at all to 5=Agree very much) that comes closest to how much you agree with that item." Example items include: "Drowsiness from [opioids or marijuana/cannabis] is or could be really a bother" and "People get addicted to [opioids or marijuana/cannabis] easily." Mean scores were computed for each item in the questionnaire, and aggregate scores was created for perceived barriers to using opioids and marijuana, respectively. Cronbach's alphas in the current study were .86 for opioids and .79 for marijuana.

Primary Outcomes: ***Opioid and marijuana use*** were assessed by asking about lifetime use and, among ever users of the respective drugs, age at first use and past 12-month use

(Pergam et al., 2017). Among past 12-month users, we assessed number of days of opioid and marijuana use in the past 30 days; response options included 0 through 30 and refuse (Pergam et al., 2017).

Interest in opioids and marijuana for symptom management was assessed by asking, "On a scale of 1 to 10, with 1 being "not at all interested" and 10 being "extremely interested", how interested are you in learning more about [opioids/marijuana/cannabis] to treat your medical condition (either HIV or cancer)?" (Lankenau et al., 2018). Average scores among participants were calculated to determine reported interest in opioids and marijuana, respectively.

Data Analysis

Participant characteristics and factors related to medical condition, information sources, motives for use, use barriers, drug use, and interest in use were summarized using descriptive statistics. Bivariate analyses were conducted to examine sociodemographics and the aforementioned characteristics in relation to medical condition to characterize the patient populations. Finally, multivariable binary logistic regressions were conducted examining correlates of current (past 30-day) use, and multivariable linear regressions were conducted examining the outcome of interest in use, entering the primary predictors of interest (i.e., motives for use, perceived barriers) and controlling for sociodemographics and medical condition. Using multivariable linear regressions, we also explored the outcomes of potential motives for use and barriers to use among current users and nonusers of the respective drugs. In preliminary analyses, we examined instances of collinearity among variables and cell sizes for some variables. Given small cell sizes for education, employment, and insurance status and the associations of income with these three variables, income was selected for entry into the multivariable models; given the small cell sizes for children in the home and the association between marital status and children

in the home, marital status was selected for entry into the multivariable models. SPSS 25.0 was used for all data analyses. Statistical significance was set at α=.05 for all tests.

RESULTS

Participant Characteristics

Participants in this study represented 42 states. Average age was 34.29 (SD=9.4); 51.6% were male, 58.4% White, 23.1% Black, 84.9% married/cohabitating, 64.1% employed, and 88.4% with ≥high school education.

In this sample, 304 (61.0%) were PLWH, and 194 (39.0%) cancer survivors (Table 1). Among PLWH, 118 (38.8%) reported being asymptomatic, 109 (35.9%) symptomatic, and 77 (25.3%) AIDS converted. Additionally, 119 (39.1%) reported a detectable viral load, 92 (30.3%) undetectable viral loads, and the remainder (n=93, 30.6%) were not aware of their current status. Among cancer survivors, the most represented cancer type was breast cancer (n=113, 58.2%), followed by prostate and bronchus cancers (n=21, 10.8%, respectively), with 87 (44.8%) having been treated with chemotherapy, 78 (40.2%) with surgery, and 11 (5.7%) with radiation. (Not shown in tables.) The patient subsamples differed such that the sample of cancer survivors relative to PLWH were older ($p<.001$) and were more likely to be male ($p<.001$), Black ($p=.003$), married/cohabitating ($p=.001$), unemployed ($p<.001$), higher education ($p=.002$), with children in the home ($p<.001$), lower income ($p<.001$), and uninsured ($p<.001$).

Overall, 129 participants (25.9%) reported past 12-month use of opioids, 143 (28.7%) marijuana, and 127 (25.5%) both; 128 (25.7%) reported current (past 30-day) use of opioids, 137 (27.5%) marijuana, and 125 (25.1%) both (Table 2). In general, there was greater interest in learning more about marijuana than opioids (M=7.36, SD=2.3 vs. M=6.55, SD=2.1, $p<.001$);

however, this did not hold true comparing past-year nonusers of the respective drugs (opioids: M=6.96, SD=1.5 vs. marijuana: M=7.22, SD=1.5, p=.151; not shown in tables).

Sources of Information Regarding Opioids and Marijuana

Among all participants, friends/family were common sources of information regarding opioid and marijuana use (46.0% and 44.8%, respectively), with other common sources of information regarding being websites/blogs (49.2% and 26.1%, respectively), doctors/nurses from their healthcare settings (20.5% and 18.3%, respectively; Table 2). Additional information sources regarding marijuana included naturopaths/herbalists (47.0%) and other patients (44.8%). The most commonly reported *preferred* sources of information regarding opioid use were websites/blogs (43.8%) and *preferred* sources of information regarding marijuana use were marijuana dispensaries (48.2%) and healthcare providers (42.0%).

Motives for use and Potential Motives for use

Among *all participants*, there were no differences in the number of *motives for potentially using* opioids versus marijuana among participants (M=2.03, SD=1.28 vs. M=2.19, SD=1.34, respectively, p=.055, Not shown in tables). Among all participants, the most common motives for potentially using opioids and marijuana, respectively, were to treat pain not related to their medical condition (52.6% and 45.4%, respectively) and to help improve appetite (33.5% and 33.5% respectively; Table 3). Additionally, common motives for potential using marijuana was for pain related to their medical condition (45.3%).

Table 3 also presents data regarding *actual* motives for use among *past 12-month users*. Among past 12-month opioid users (N=129 [25.9%]; 49 [16.1%] PLWH; 80 [41.5%] cancer survivors) and past 12-month marijuana users (N=143 [28.7%]; 57 [18.8%] PLWH; 86 [44.6%] cancer survivors), common motives for use for using opioids and marijuana were for pain related

to the medical condition (58.1% and 56.6%, respectively) and to cope with stress/anxiety (54.3% and 57.3%, respectively). There were two main distinctions regarding motives for use for the two drugs: 1) opioid users frequently reported using opioids to cope with their illness (59.7%), whereas this use motive was reported infrequently by marijuana users for use of marijuana (18.9%); and 2) marijuana users more often reported using marijuana to cope with depression/to improve mood (57.3%), whereas opioid users infrequently reported this as a motive for using opioids (11.6%). Across both drugs, cancer survivors were more likely to report each of these motives for use.

Multivariable linear regression analyses examining correlates of number of motives for using the respective drugs (not shown in tables) included medical condition and sociodemographics (i.e., age, sex, race/ethnicity, marital status, and income). Reporting greater *potential motives for using opioids among past-year opioid nonusers* was associated with history of cancer (B=1.27, CI: 0.95, 1.59, p<.001) and being female (B=0.51, CI: 024, 0.78, p<.001), White (vs. Black=-0.37, CI: -0.60, -0.14, p<.001), and lower income (B=-0.25, CI: -0.48, -0.02, p=.030; Adjusted R-square=.291). Reporting greater *actual motives for using opioids among past-year opioid users* was associated with being diagnosed with HIV (B=-0.67, CI: -1.31, -0.03, p=.039), female (B=1.26, CI: 0.80, 1.71, p<.001), Black (vs. White, B=1.35, CI: 0.64, 2.07, p<.001), married/cohabitating (B=-0.52, CI: -1.03, -0.01), and lower income (B=-0.88, CI: -1.40, -0.36, p=.001; Adjusted R-square=.370).

Reporting greater *potential motives for using marijuana among past-year marijuana nonusers* was associated with being diagnosed with cancer (B=0.01, CI: 0.25, 1.04, p=.001), married/cohabitating (B=-1.15, CI: -1.53, -0.77, p<.001), and higher income (B=0.80, CI: 0.54, 1.06, p<.001; Adjusted R-square=.267). Reporting greater *actual motives for using marijuana*

among past-year marijuana users was associated being diagnosed with HIV (B=-1.43, CI: -2.25, -0.62, p=.001), female (B=1.82, CI: 1.22, 2.42, p<.001), Black (vs. White, B=1.65, CI: 0.76, 2.55, p<.001), unmarried/not cohabitating (B=0.74, CI: 0.07, 1.41, p=.031), and lower income (B=-1.51, CI: -2.22, -0.81, p<.001; Adjusted R-square=.351).

Perceived Barriers to Use

Table 4 presents data regarding perceived barriers for opioid and marijuana use among all participants. Overall, participants reported fewer barriers to using marijuana versus opioids (M=30.57, SD=10.09 vs. M=36.93, SD=10.87, p<.001). Cancer survivors versus PLWH also reported fewer barriers to using opioids (M= 27.62, SD=7.72 vs. M=42.88, SD=8.06, p<.001) and marijuana (M=27.97, SD=6.98 vs. M=32.23, SD=11.36, p<.001). On average, among the highest-rated perceived barriers to using opioids and marijuana were because "having symptoms means the disease is getting worse" (M=3.32, SD=1.6 and M=2.64, SD=1.4, respectively) and concerns of addiction (M=3.27, SD=1.2 and M=2.55, SD=1.5, respectively).

Multivariable linear regression analyses examining correlates of the extent of perceived barriers to using the respective drugs (not shown in tables) included medical condition and sociodemographics (i.e., age, sex, race/ethnicity, marital status, and income). Among past-year opioid nonusers, greater perceived barriers for using opioids was associated with being diagnosed with HIV (B=-16.66, CI: -19.59, -13.73, p<.001), White (vs. Black, B=-2.92, CI: -5.03, -0.08, p=.007 and vs. other race, B=-2.32, CI: -4.52, -0.13, p=.038), unmarried/not cohabitating (B=6.10, CI: 3.34, 8.86, p<.001), and lower income (B=-3.07, CI: -5.16, -0.98, p=.004; Adjusted R-square=.555). Among past-year opioid users, greater perceived barriers for using opioids was associated with being younger (B=-0.23, CI: -0.47, -0.02, p=.048), male (B=-12.52, CI: -15.32, -9.73, p<.001), White (vs. Black, B=-4.80, CI: -9.19, -0.41, p=.033),

married/cohabitating (B=-4.96, CI: -8.09, -1.83, p=.002), and higher income (B=4.59, CI: 1.36, 7.80, p=.006; Adjusted R-square=.623).

Among past-year marijuana nonusers, greater perceived barriers for using marijuana was associated with being diagnosed with HIV (B=-3.43, CI: -6.50, -0.36, p=.029), male (B=-4.34, CI: -6.95, -1.72, p=.001), and unmarried/not cohabitating (B=15.44, CI: 12.51, 18.37, p<.001; Adjusted R-square=.468). Among past-year marijuana users, greater perceived barriers for using marijuana was associated with being younger (B=-0.30, CI: -0.52, -0.08, p=.010), male (B=-12.12, CI: -15.44, -8.80, p<.001), and married/cohabitating (B=-8.43, CI: -12.12, -4.75, p<.001; Adjusted R-square=.464).

Opioid and Marijuana Use and Interest in Use

Bivariate analyses indicated that, compared to PLWH, cancer survivors were more likely to report past 12-month and current use of opioids and marijuana, respectively (p's<.001; Table 2). Among current users of the respective drugs, PLWH, compared to cancer survivors, reported more days of opioid use (M=7.14, SD=5.8 vs. M=4.00, SD=3.3, p<.001), but there was no significant difference between PLWH and cancer survivors in number of days of use of marijuana (M=6.24 days, SD=5.0 vs. M=4.85, SD=3.0, p=.079). Compared to PLWH, cancer survivors indicated greater interest in learning about both drugs to address their symptoms. This held true with regard to opioid use among past-year opioid nonusers; however, no differences were found in interest in using marijuana among past-year nonusers.

Binary logistic regression indicated that current opioid use (past 30 days) was associated with reporting greater motives for opioid use (OR=2.32, p<.001), as well as being older (OR=1.08, p<.001), female (OR=0.22, p=.012), Black (vs. White, OR=0.09, p<.001), other race (vs. White, OR=0.04, p<.001), and higher income (OR=3.30, p=.005; Nagelkerke R-

square=.627; Table 5). Multivariable linear regression indicated that, among past-month opioid nonusers, greater interest in using opioids was associated with reporting greater motives for opioid use (B=0.42, p<.001) and greater barriers to use (B=0.02, p=.039), as well as being diagnosed with cancer (B=1.16, p<.001), female (B=0.86, p<.001), married/cohabitating (B=-4.11, p<.001), and lower income (B=-0.38, p=.032; Adjusted R-square=.698).

Binary logistic regression indicated that current marijuana use was associated with reporting greater motives for marijuana use (OR=2.57, p<.001), greater barriers to use (OR=1.18, p<.001), history of cancer (OR=5.17, p<.001), and being older (OR=1.12, p<.001) and White (vs. Black, OR=0.10, p<.001; vs. other race, OR=0.03, p<.001; Nagelkerke R-square=.702; Table 5). Multivariable linear regression indicated that, among past-month marijuana nonusers, greater interest in using marijuana was associated with reporting greater motives for marijuana use (B=0.64, p<.001) and reporting fewer barriers to using marijuana (B=-0.03, p=.002), as well as being diagnosed with cancer (B=1.37, p<.001), female (B=0.64, p=.002), married/cohabitating (B=-3.47, p<.001), and having lower income (B=-0.03, p=.002; Adjusted R-square=.802).

DISCUSSION

The controversy regarding the medical use of opioids and marijuana has important implications for medical populations, such as PLWH and cancer patients/survivors. Given the chronicity of these conditions and their health implications, it is important to understand patient perceptions of these treatments and the barriers to effectively managing their respective diseases. This study provides information on PLWH and cancer survivors' perceptions and barriers to using opioids and marijuana for symptom management. It is important to note that, in this sample, there was significant overlap in using opioids and marijuana, 25.7% reporting current

(past 30-day) use of opioids, 27.5% marijuana, and 25.1% both. Thus, examining motives for use and perceived barriers to use among both users and nonusers provided insights regarding how users perceive both medical options.

Over half of the overall sample and the subsample of past-year users reported that two critical motives for using both drugs were to cope with pain and stress/anxiety. Both opioids and medical marijuana are commonly prescribed for pain management (Krashin et al., 2012; P. Lucas, 2012; Park & Wu, 2017) and are critical for increasing quality of life among patient populations dealing with pain. However, using opioids and/or marijuana to treat anxiety is much more concerning. One qualitative study of 283 adults with electronic medical record (EMR) evidence of opioid dependence diagnoses (Stumbo, Yarborough, McCarty, Weisner, & Green, 2017) indicated five pathways to addiction. Three of these pathways were related to pain management, including chronic pain not being effectively managed, opioids being used to address acute pain episodes, and experiencing chronic pain among those with prior substance use disorders. Another was related to recreational/non-medical opioid use. The fifth pathway involved using opioids to cope with emotional distress or mental health issues (Stumbo et al., 2017). Along these lines, among the highest-rated perceived barriers to using both drugs were concerns of addiction. Thus, there is significant need both to promote appropriate use of these analgesics to manage pain effectively and to encourage appropriate medical and behavioral management of emotional distress. Also noteworthy is that a highly endorsed barrier to using both drugs was missing symptoms that signal worsening illness. Thus, ongoing surveillance of patient use of opioids or marijuana is critical in managing both their medical conditions and their mental health.

There were two main distinctions regarding motives for use for the two drugs. First, nearly 60% of opioid users reported using opioids to cope with their illness, whereas less than 20% of marijuana users reported this as a motive for using marijuana. Second, nearly 60% of marijuana users reported using marijuana to cope with depression/to improve mood, whereas only about 12% of opioid users reported this as a motive for using opioids. These distinctions may be due to several states with medical marijuana legislation including mental health (e.g., anxiety, post-traumatic stress disorder) as conditions for which medical marijuana may be used (Legislatures, 2019).

Greater motives for use correlated with current opioid and marijuana use and with interest in use among nonusers of the respective drugs, consistent with the HBM (I. M. J. H. e. m. Rosenstock, 1974). However, findings regarding barriers to use were less straightforward. While perceiving fewer barriers to use was associated with interest in using marijuana among nonusers, as theory might suggest (I. M. J. H. e. m. Rosenstock, 1974), perceived barriers to use was associated with interest in opioid use among nonusers. Perceiving greater barriers was associated with greater interest in using marijuana among current users, but was not associated with interest in opioids. The reasons for these latter findings are unclear. It is possible that, in this case, some of the concerns about using these options are more salient when one is considering the use of these drugs or has had to navigate these challenges in order to use these drugs.

With regard to sociodemographics, being older, Black or other race was associated with current use of each drug. Being higher income was associated with using opioids. While the finding regarding the association between higher income and opioid use contradicts other research (Friedman et al., 2019), these findings may also suggest that being of higher income facilitates access to opioids as a result of greater access to healthcare more broadly. Having a

history of cancer was associated with using marijuana, which may underscore the common state laws and the medical indications common for marijuana use (Legislatures, 2019).

Interest in these drugs among nonusers was associated with having a history of cancer and being female, married/cohabitating, and lower income. Given the nature of the cancer survivor population recruited (i.e., completed treatment in the prior six months), these individuals may be within a critical window of information seeking and may be open to exploring a broad range of symptom management options (Lalazaryan & Zare-Farashbandi, 2014; Wilson, 2000). The sample of PLWH in this study could have been diagnosed at any time and thus may be outside this critical window. Females may be more likely to engage in health information seeking (Jacobs, Amuta, & Alvares, 2017; Ren, Deng, Hong, & Zhang, 2019), which may be an indicator of openness to learning about different medical options. Findings regarding marital status and income level are much more difficult to interpret, particularly given the inconsistent findings across the regression analyses regarding correlates of motives for use and barriers to use. More specifically, lower income was associated with reporting greater motives across drugs and for both nonusers and users but was only correlated with barriers to using opioids among opioid users, while higher income was associated with greater perceived barriers to using opioids among nonusers. This latter point highlights the need to distinguish users from nonusers when examining motives for use and barriers to use. While motives and barriers were similar across drugs and across groups, the correlates of number of motives and the magnitude of the barriers were distinct, which warrants further examination.

With regard to information sources, distinctions between individuals' actual sources of information about these medical options versus their preferred information sources also were interesting to note from a theoretical perspective (Lalazaryan & Zare-Farashbandi, 2014; Wilson,

2000). The most common information source about using opioids or marijuana was a friend or a family member, with nearly half reporting them as a source. This study found that patients' most preferred source of information on opioids was websites and blogs, while the most preferred source of information on marijuana was their healthcare providers. A prior study (Jacobs et al., 2017) indicated that there is an age, socioeconomic, and ethnic divide among US adults' health information seeking behaviors with regard to active seeking and sources of information. For example, being younger, more educated, and higher income predicted using the internet for health information seeking, whereas being older, having lower internet skills, and being Hispanic were associated with using healthcare providers or traditional media (e.g., print, magazines) as information sources (Jacobs et al., 2017).

The current study has implications for research and practice. With regard to research, advances are needed with respect to how information is provided about different medical treatment options in order to best inform patient decision making around opioids and marijuana. Moreover, research is needed to inform best practices regarding medical management of symptoms using opioids and marijuana and how to predict negative consequences (e.g., addiction potential). In terms of practice, healthcare providers need to be cognizant of the motives for use and barriers to use in order to have effective conversations about medication options with patients and to make appropriate recommendations.

Limitations

Despite the strengths of the current study, the generalizability of our study is limited given that the sample was recruited via social networking sites. In addition, the wording of the advertisements and strategies used for social media recruitment may have led to the recruitment of a disproportionate number of opioid and marijuana users. We also had a relatively low

response rate, which is open to selection bias. Additionally, the cross-sectional nature of this study limits the ability to make causal attributions. With regard to assessment, this is a study of patient self-report through online survey. The data for analyses are based on patient perception and not on an objective measure of marijuana and opioid use. In addition, some measures were adapted to assess perceptions (e.g., motives for use and barriers) across drugs, with some of these items potentially being irrelevant for one of the drugs (e.g., constipation as a barrier to marijuana use). Moreover, the motives for use and barriers included in the assessments were not exhaustive. For example, we did not assess social stigma of taking opioids or marijuana and whether this hindered patients from using these medical options. This is significant, given that research has documented that social stigma is among the most common reasons patients refuse to take opioids for the treatment of pain (Carr, 2016; Shah & Diwan, 2010) and also is an important concern with regard to medical marijuana use (Bottorff et al., 2013; Satterlund, Lee, & Moore, 2015). Finally, we did not assess all potential factors that could impact opioid or marijuana use, including where participants actually accessed the drug they used. This is in part why we did not include state policies regarding opioid and medical marijuana use in these analyses.

Conclusions

This study suggested that PLWH and cancer survivors show greater interest in marijuana vs. opioids, generally indicate more motives for use of marijuana verses opioids, and perceive fewer barriers to using marijuana compared to opioids. Understanding patients' perceptions about prescription analgesics is an essential component to effectively managing symptoms related to an HIV or cancer diagnosis and improve quality of life for PLWH and cancer survivors.

STATEMENT OF ETHICAL APPROVAL

The Emory University Institutional Review Board approved this study, IRB00095978.

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COMPETING INTERESTS

The authors declare no conflicts of interest.

Table 1. Participant Characteristics and Bivariate Results Comparing PLWH and Cancer Survivors in Sample, N=498

	All Participants N=498	PLWH N=304	Cancer Survivors N=194	p
Age (M, SD)	34.29 (9.4)	30.86 (8.1)	39.66 (8.7)	<.001
Sex (N, %)				<.001
Male	257 (51.6)	123 (40.5)	134 (69.1)	
Female	241 (48.4)	181 (59.5)	60 (30.9)	
Race (N, %)				.003
White	291 (58.4)	196 (64.5)	95 (49.0)	
Black	115 (23.1)	61 (20.1)	54 (27.8)	
Other	92 (18.5)	47 (15.5)	45 (23.2)	
Relationship Status (N, %)				.001
Married/cohabitating	423 (84.9)	245 (80.6)	178 (91.8)	
Other	75 (15.1)	59 (19.4)	16 (8.2)	
Employed (N, %)				<.001
Full-/part-time	319 (64.1)	291 (95.7)	28 (14.4)	
Other	179 (35.9)	13 (4.3)	166 (85.6)	
Education (N, %)				.002
≤HS	58 (11.6)	46 (15.1)	12 (6.2)	
>HS	440 (88.4)	258 (84.9)	182 (93.8)	
Children in Home (N, %)				<.001
No	456 (91.6)	289 (95.1)	167 (86.1)	
Yes	42 (8.4)	15 (4.9)	27 (13.9)	
Income (N, %)				<.001
≤$1799/month	164 (32.9)	63 (20.7)	101 (52.1)	
>$1799/month	334 (67.1)	241 (79.3)	93 (47.9)	
Insurance (N, %)				<.001
Private	394 (79.1)	219 (72.0)	175 (90.2)	
Government	96 (19.3)	77 (25.3)	19 (9.8)	
None	8 (1.6)	8 (2.6)	0 (0.0)	

Note: Bivariate comparisons were conducted using t-tests for continuous variables and Chi-square for categorical variables.

Table 2. Bivariate Results Regarding Use History, Interest in Use, and Information Sources Regarding Opioids or Marijuana Among All Participants, N=498

	Opioids				Marijuana				
	All Participants N=498	**PLWH N=304**	**Cancer Survivors N=194**	**p**	**All Participants N=498**	**PLWH N=304**	**Cancer Survivors N=194**	**p**	**p***
Age at first use (M, SD)	21.93 (8.2)	21.19 (7.4)	23.36 (9.63)	.302	21.11 (7.4)	19.57 (5.8)	22.18 (8.2)	.024	.099
Used in past 12 months (N, %)	129 (25.9)	49 (16.1)	80 (41.5)	<.001	143 (28.7)	57 (18.8)	86 (44.6)	<.001	.323
Used in past 30 days (N, %)	128 (25.7)	49 (16.1)	79 (40.9)	<.001	137 (27.5)	55 (18.1)	82 (42.5)	<.001	.522
Number of days of use, past 30 days (M, SD)	5.38 (3.9)	6.24 (5.0)	4.85 (2.96)	.079	5.25 (4.7)	7.14 (5.8)	4.00 (3.3)	<.001	.096
Interest in learning about [med] (M, SD)	6.55 (2.1)	5.97 (2.3)	7.46 (1.44)	<.001	7.36 (2.3)	6.60 (2.3)	8.54 (1.9)	<.001	<.001
Sources of information on [med] (N, %)									
Doctor/nurse	102 (20.5)	29 (9.5)	73 (37.6)	<.001	91 (18.3)	18 (5.9)	73 (37.6)	<.001	.380
Another patient	27 (5.4)	15 (4.9)	12 (6.2)	.548	223 (44.8)	11 (5.7)	212 (69.7)	<.001	<.001
Websites/blogs	245 (49.2)	234 (77.0)	11 (5.7)	<.001	130 (26.1)	35 (11.5)	95 (49.0)	<.001	<.001
Naturopath/herbalist	106 (21.3)	17 (5.6)	89 (45.9)	<.001	234 (47.0)	219 (72.0)	15 (7.7)	<.001	<.001
Friend/family member	229 (46.0)	219 (72.0)	10 (46.0)	<.001	223 (44.8)	216 (71.1)	7 (3.6)	<.001	.704
Pamphlet/handout	25 (5.0)	16 (5.3)	9 (4.6)	.756	99 (19.9)	8 (2.6)	91 (46.9)	<.001	<.001
Nutritionist	16 (3.2)	9 (3.0)	7 (3.6)	.689	15 (3.0)	12 (3.9)	3 (1.5)	.126	.856
Newspaper/magazine article	25 (5.0)	13 (4.3)	12 (6.2)	.341	33 (6.6)	21 (6.9)	12 (6.2)	.752	.310
Social media (Facebook, Twitter, etc.)	35 (7.0)	22 (7.1)	13 (6.7)	.820	93 (18.7)	25 (8.2)	68 (35.1)	<.001	<.001
TV/Radio advertisement	12 (2.4)	9 (3.0)	3 (1.5)	.316	67 (13.5)	5 (1.6)	62 (32.0)	<.001	<.001
Literature/research	5 (1.0)	4 (1.3)	1 (0.5)	.382	4 (0.8)	2 (1.0)	2(0.7)	.649	<.001
Doctor/nurse outside of the health center	125 (25.1)	110 (36.2)	15 (7.7)	<.001	--	--	--	--	--
Medicinal marijuana store	--	--	--	--	43 (8.6)	25 (8.2)	18 (9.3)	.683	--
Preferred sources of information on [med] (N, %)									
Doctor/nurse	109 (21.9)	29 (9.5)	80 (41.2)	<.001	209 (42.0)	127 (41.8)	82 (42.3)	.914	<.001
Another patient	121 (24.3)	109 (35.9)	12 (6.2)	<.001	128 (25.7)	116 (38.2)	12 (6.2)	<.001	.610
Websites/blogs	218 (43.8)	130 (42.8)	88 (45.4)	.569	154 (30.9)	134 (44.1)	20 (10.3)	<.001	<.001
Naturopath/herbalist	124 (24.9)	115 (37.8)	9 (4.6)	<.001	83 (16.7)	13 (4.3)	70 (36.1)	<.001	<.001
Friend/family member	37 (7.4)	14 (4.6)	23 (11.9)	.003	43 (8.6)	26 (8.6)	17 (8.8)	.935	.485
Pamphlet/handout	44 (8.8)	19 (6.3)	25 (12.9)	.011	86 (17.3)	16 (5.3)	70 (36.1)	<.001	<.001
Nutritionist	26 (5.2)	7 (2.3)	19 (9.8)	<.001	23 (4.6)	11 (3.6)	12 (6.2)	.183	.661
Newspaper/magazine article	49 (9.8)	13 (4.3)	36 (18.6)	<.001	34 (6.8)	16 (5.3)	18 (9.3)	.083	.086
Social media (Facebook, Twitter, etc.)	28 (5.6)	10 (3.3)	18 (9.3)	.005	136 (27.3)	112 (36.8)	24 (12.4)	<.001	<.001
TV/Radio advertisement	117 (23.5)	109 (35.9)	8 (4.1)	<.001	15 (3.0)	6 (2.0)	9 (4.6)	.090	<.001
Literature/research	8 (1.6)	3 (1.0)	5 (2.6)	.169	7 (1.4)	5 (1.6)	2 (1.0)	.570	.795
Doctor/nurse outside of the health center	0 (0.0)	0 (0.0)	0 (0.0)	<.001	--	--	--	--	--
Medicinal marijuana store	--	--	--	--	240 (48.2)	216 (71.1)	24 (12.4)	<.001	--

* Comparisons between responses to opioid vs. marijuana items.

Note: Bivariate comparisons were conducted using t-tests for continuous variables and Chi-square for categorical variables.

Table 3. Bivariate Analyses Regarding Motives/Potential Motives for Using Opioids or Marijuana

	Opioids				Marijuana				
	All Participants N=498	**PLWH N=304**	**Cancer Survivors N=194**	**p**	**All Participants N=498**	**PLWH N=304**	**Cancer Survivors N=194**	**p**	**p***
Potential motives to use [med] in all participants (N, %)									
For pain related to your medical condition	124 (24.9)	42 (13.8)	82 (42.3)	<.001	225 (45.3)	149 (49.0)	76 (39.4)	.035	<.001
For another type of pain not caused by these conditions	262 (52.6)	217 (71.4)	45 (23.2)	<.001	226 (45.4)	199 (65.5)	27 (13.9)	<.001	.023
For nausea/upset stomach	114 (22.9)	17 (5.6)	97 (50.0)	<.001	79 (15.9)	23 (7.6)	56 (28.9)	<.001	.005
To improve appetite	167 (33.5)	118 (38.8)	49 (25.3)	.002	167 (33.5)	135 (44.4)	32 (16.5)	<.001	.999
For depression/to improve mood	74 (14.9)	25 (8.2)	49 (25.3)	<.001	99 (19.9)	28 (9.2)	71 (36.6)	<.001	.038
To help cope with illness	70 (14.1)	22 (7.2)	48 (24.7)	<.001	74 (14.9)	34 (11.2)	40 (20.6)	.004	.720
To help deal with stress/anxiety	95 (19.1)	18 (5.9)	77 (39.7)	<.001	129 (25.9)	25 (8.2)	104 (53.6)	<.001	.010
To sleep	18 (3.6)	7 (2.3)	11 (5.7)	.050	29 (5.8)	16 (5.3)	13 (6.7)	.504	.101
For recreational use/enjoyment	12 (2.4)	4 (1.3)	8 (4.1)	.046	28 (5.6)	8 (2.6)	20 (10.3)	<.001	.010
To treat medical condition	78 (15.7)	11 (3.6)	67 (34.5)	<.001	34 (6.8)	14 (4.6)	20 (10.3)	.014	<.001
None of these conditions	20 (4.0)	15 (4.9)	5 (2.6)	.191	18 (3.6)	14 (4.6)	4 (2.1)	.138	.741
Motives for use (in past 12-month users) (N, %)	**N=129**	**N=49**	**N=81**		**N=143**	**N=57**	**N=86**		
For pain related to your medical condition	75 (58.1)	11 (22.4)	64 (80.0)	<.001	81 (56.6)	18 (31.6)	63 (73.3)	<.001	.605
For another type of pain not caused by these conditions	16 (12.4)	10 (20.4)	6 (7.5)	.051	22 (15.4)	15 (26.3)	7 (8.1)	.004	.322
For nausea/upset stomach	19 (14.7)	15 (30.6)	4 (5.0)	<.001	29 (20.3)	22 (38.6)	7 (8.1)	<.001	.140
To improve appetite	28 (21.7)	26 (53.1)	2 (2.5)	<.001	30 (21.0)	22 (38.6)	8 (9.3)	<.001	.787
For depression/to improve mood	15 (11.6)	12 (24.5)	3 (3.8)	.001	82 (57.3)	15 (26.3)	67 (77.9)	<.001	<.001
To help cope with illness	77 (59.7)	15 (30.6)	62 (77.5)	<.001	27 (18.9)	19 (33.3)	8 (9.3)	<.001	.721
To help deal with stress/anxiety	70 (54.3)	14 (28.6)	56 (70.0)	<.001	82 (57.3)	20 (35.1)	62 (72.1)	<.001	.296
To sleep	11 (8.5)	10 (20.4)	1 (1.3)	<.001	14 (9.8)	10 (17.5)	4 (4.7)	.019	.544
For recreational use/enjoyment	6 (4.7)	2 (4.1)	4 (5.0)	1.00	11 (7.7)	7 (12.3)	4 (4.7)	.115	.222
To treat medical condition	64 (49.6)	7 (14.3)	57 (71.3)	<.001	9 (6.3)	8 (14.0)	1 (1.2)	.003	<.001
None of the conditions above	0 (0.0)	0 (0.0)	0 (0.0)	<.001	2 (1.4)	0 (0.0)	2 (2.3)	.517	.160

* Comparisons between responses to opioid vs. marijuana items.

Note: Bivariate comparisons were conducted using t-tests for continuous variables and Chi-square for categorical variables.

Table 4. Bivariate Analyses Regarding Perceived Barriers to Using Opioids or Marijuana Among All Participants

	Opioids				Marijuana				
	All Participants N=498	PLWH N=304	Cancer Survivors N=194	p	All Participants N=498	PLWH N=304	Cancer Survivors N=194	p	p*
Barriers (M, SD)									
Drowsiness	2.89 (1.4)	3.55 (1.0)	1.85 (1.3)	<.001	2.17 (1.5)	2.40 (1.6)	1.80 (1.3)	<.001	<.001
Symptoms signal worsening disease	3.32 (1.6)	3.92 (1.5)	2.39 (1.2)	<.001	2.64 (1.4)	2.59 (1.4)	2.74 (1.4)	.250	<.001
Confusion	2.57 (1.4)	3.01 (1.2)	1.87 (1.3)	<.001	2.32 (1.4)	2.54 (1.5)	1.97 (1.3)	<.001	.005
Do/would not like	2.32 (1.3)	2.68 (1.1)	1.76 (1.4)	<.001	2.21 (1.5)	2.46 (1.6)	1.81 (1.3)	<.001	.207
Cannot control my symptoms/pain	2.68 (1.4)	3.25 (1.1)	1.78 (1.3)	<.001	2.47 (1.4)	2.66 (1.6)	2.16 (1.1)	<.001	.019
Concern of addiction	3.27 (1.2)	3.60 (1.0)	2.74 (1.4)	<.001	2.55 (1.5)	2.45 (1.5)	2.72 (1.4)	.048	<.001
Nausea	2.99 (1.5)	3.66 (1.2)	1.94 (1.3)	<.001	2.18 (1.4)	2.37 (1.5)	1.88 (1.3)	<.001	<.001
Important to be strong by not talking about symptoms	2.75 (1.2)	2.85 (1.0)	2.61 (1.5)	.051	2.58 (1.5)	2.51 (1.5)	2.69 (1.4)	.179	.046
Doctors should focus on cure, not symptoms	2.79 (1.5)	3.19 (1.5)	2.15 (1.2)	<.001	2.36 (1.5)	2.49 (1.6)	2.16 (1.2)	.010	<.001
Could cause embarrassing behavior	2.96 (1.3)	3.26 (1.0)	2.48 (1.5)	<.001	2.37 (1.5)	2.37 (1.6)	2.38 (1.3)	.920	<.001
Concern about habituating to medication	2.91 (1.4)	3.53 (1.1)	1.94 (1.3)	<.001	2.31 (1.4)	2.52 (1.5)	1.98 (1.3)	<.001	<.001
Constipation	3.00 (1.4)	3.40 (1.4)	2.37 (1.2)	<.001	2.28 (1.5)	2.53 (1.5)	1.90 (1.3)	<.001	<.001
Medication side effects	2.50 (1.3)	2.98 (1.0)	1.75 (1.3)	<.001	2.12 (1.4)	2.34 (1.4)	1.77 (1.3)	<.001	<.001

* Comparisons between responses to opioid vs. marijuana items.

Note: Bivariate comparisons were conducted using t-tests for continuous variables and Chi-square for categorical variables.

Table 5. Multivariable Results from Multivariable Regression Regarding Past 30-Day Use of Opioids and Marijuana, Respectively, and Interest in Use Among Nonusers

	Opioids						Marijuana					
	Past 30-day use, N=128			Interest among use among nonusers, N=370			Past 30-day use, N=137			Interest among use among nonusers, N=361		
	OR	**CI**	**p**	**B**	**CI**	**p**	**OR**	**CI**	**p**	**B**	**CI**	**p**
Medical Condition												
HIV	Ref	--	--	Ref	--	--	Ref	--	--	Ref	--	--
Cancer	1.59	0.66,	.309	1.16	0.56, 1.76	<.001	5.17	2.08, 12.86	<.001	1.37	0.90, 1.84	<.001
Age	1.08	1.04, 1.13	<.001	0.01	-0.01, 0.02	.445	1.12	1.07, 1.18	<.001	0.01	-0.01, 0.03	.085
Sex												
Male	Ref	--	--	Ref	--	--	Ref	--	--	Ref	--	--
Female	0.22	0.11, 0.47	.012	0.86	0.44, 1.27	<.001	1.01	0.44, 2.37	.974	0.64	0.23,1.05	.002
Race												
White	Ref	--	--	Ref	--	--	Ref	--	--	Ref	--	--
Black	0.09	0.03, 0.24	<.001	0.22	-0.13, 0.58	.216	0.10	0.04, 0.26	<.001	0.28	-0.05, 0.60	.097
Other	0.04	0.01, 0.18	<.001	0.02	-0.35, 0.38	.933	0.03	0.01, 0.13	<.001	0.02	-0.32, 0.36	.926
Relationship Status												
Married/cohabitating	Ref	--	--	Ref	--	--	Ref	--	--	Ref	--	--
Other	0.87	0.45, 2.56	.867	-4.11	-4.57, -3.64	<.001	0.97	0.40, 2.39	.952	-3.47	-3.98, -2.97	<.001
Income												
≤$1799/month	Ref	--	--	Ref	--	--	Ref	--	--	Ref	--	--
>$1799/month	3.30	1.44, 7.57	.005	-0.38	0.73, -0.03	.032	1.62	0.62, 4.26	.328	-1.57	-1.90, -1.24	<.001
Potential motives for use	2.32	1.78, 3.01	<.001	0.42	0.26, 0.59	<.001	2.57	1.92, 3.46	<.001	0.64	0.52, 0.75	<.001
Perceived barriers to use	1.02	0.98, 1.05	.442	0.02	0.01, 0.04	.039	1.18	1.12, 1.23	<.001	-0.03	-0.04, -0.01	.002
Nagelkerke R-square		.627			.698			.702			.802	

Figure 1. Conceptual Model

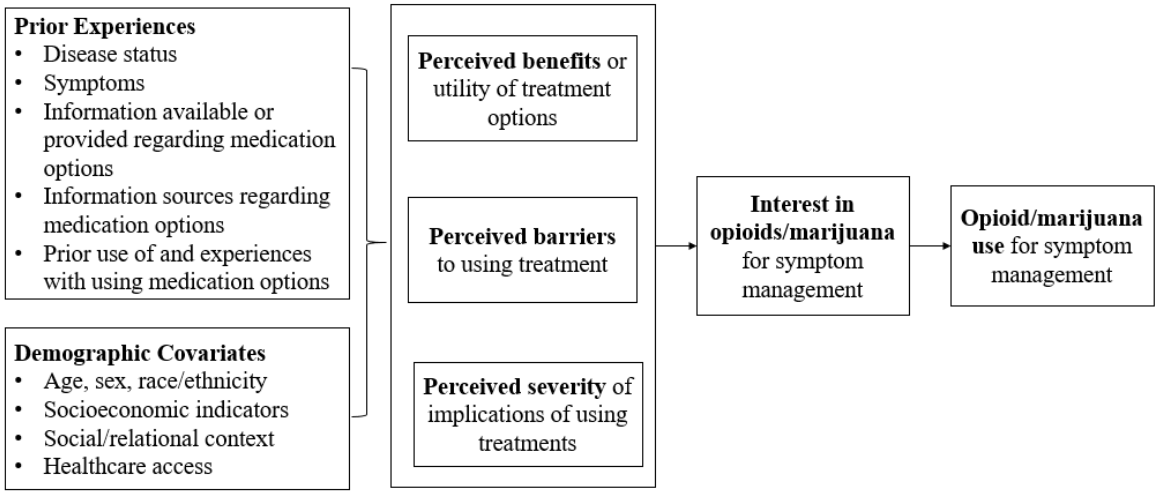
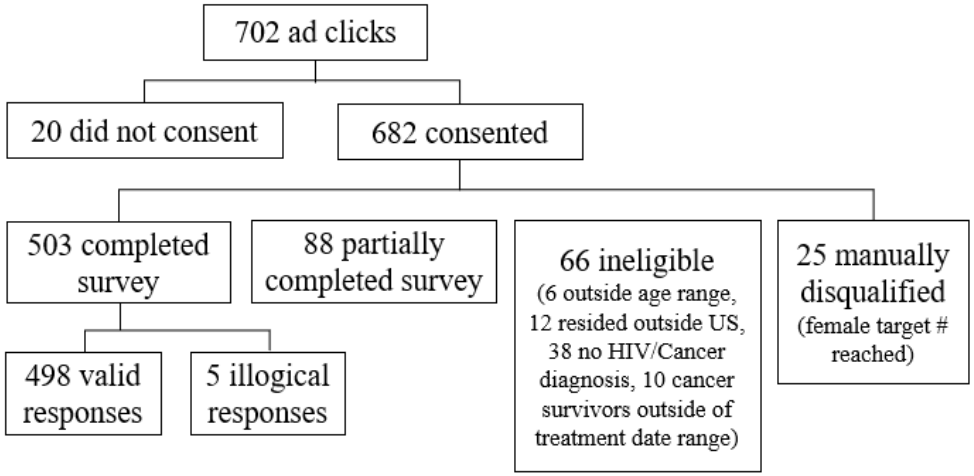


Figure 2. Recruitment and Eligibility Flowchart



Chapter 5: Public Health Implications

Major Findings

This study examined motives for use and perceived barriers to the use of opioids among PLWH and cancer survivors. The most common motives for use among both patient populations for either or both drugs were to cope with pain, stress and anxiety. Participants noted various barriers to use, but the most highly rated barriers included missing symptoms of worsening conditions and concerns of addiction. Greater interest in use for both drugs was associated with reporting greater motives for use, as well as barriers for use.

This study also explored the information sources PLWH and cancer survivors use and prefer related to information seeking surrounding opioids and marijuana. Among all participants, family and friends were the most common sources of information regarding opioids and marijuana. Additional sources for opioid information included websites and blogs while additional sources for marijuana information naturopath/herbalists or other patients. Among this sample, there was greater interest in learning more about marijuana than opioids.

Implications for Research

The current study has implications for research and practice. With regard to research, advances are needed with respect to how information is provided about different treatment options in order to best inform patient decision making around opioids and marijuana.

Information Sources and Information Seeking Behaviors

There are various sources of information available making decision making surrounding treatment options tedious and confusing. Credible sources of health information exist, and practitioners may direct patients to specific information sources, yet we live in a digital age where information is constantly evolving. Engagement in health information seeking is

dependent upon self-efficacy, sources used, the content provided, source credibility, and satisfaction with the health information found (Anker et al., 2011).

Higher levels of health information seeking is associated with being White, younger, greater income and of greater health literacy (Anker et al., 2011). Such differences in access to information is known as the digital divide, which highlights the various demographic characteristics or prior experiences that impact this behavior (Cline & Haynes, 2001). PLWH and cancer survivors may engage in health information seeking behaviors differently based on the trajectory of their disease (Anker et al., 2011). For example, someone who is recently diagnosed with cancer would participate in more health information seeking behaviors than someone who has been living with a cancer diagnosis for 5 years. An estimated 45% of children in the US have internet access yet, disparities exist among age, race, and income levels (Cline & Haynes, 2001). Health literacy levels hinders Internet use and those with the greatest health care needs such as elderly, minority or poor persons with lower education levels often have less access to information due to lower health literacy levels, therefore leading to poorer health outcomes (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011; Cline & Haynes, 2001). Further research is needed to determine differences in health information seeking behaviors based on disease status, and other factors such as race, age and health literacy levels.

Recommendations

In order to streamline the various sources of health information, public health professionals can provide healthcare practitioners, clinics and patients with lists of credible sources surrounding the use of opioids and marijuana for symptom management. In addition to providing credible information sources, interventions to improve health information seeking skills are needed. An increase in health information seeking is likely to influence the health care

system due to increased availability of information, health promotion and social support (Cline & Haynes, 2001). Exploring information seeking behaviors related to the use of opioids and marijuana among patient populations can identify the most influential aspects of the decision-making process in order to lend recommendations for patient care.

Moreover, research is needed to inform best practices regarding distributing appropriate information pertaining to medical management of symptoms using opioids and marijuana and how to predict negative consequences (e.g., addiction potential). Previous studies report medical professional's perceptions on the issues surrounding prescribing analgesics such as the absence of clear guidelines and a lack of specialized training in pain management (Jacobsen et al., 2007; Matthias et al., 2010) In order to address these patient concerns, physicians need to become more knowledgeable about symptom management strategies and treatment plans that are tailored to meet the physical and psychological needs of the patient (Glajchen, 2001). These reported barriers highlight the importance of streamlining information sources about opioids and marijuana as well as increasing patient- provider communication about their concerns.

Implications for Practice

In terms of practice, practitioners need to move away from the traditional model of patient-provider interaction and increase communication during their visits. Newer models suggest increasing patient-provider communication in order to include the values of the patient into decision-making processes and increase levels of autonomy among patients (Anker et al., 2011). These practices leverage shared decision-making models and patient's active involvement in health-related decisions.

Patient Provider Relationships and Communication

When it comes to the using controversial analgesics such as opioids and marijuana, healthcare providers need to be cognizant of the motives for use and barriers to use in order to have meaningful conversations about medication options with patients and to make appropriate recommendations. The CDC's guidelines for prescribing opioids intended to improve communication between practitioners and patients about the risks and benefits of using opioids, improve the safety and effectiveness and reduce the risks associated with long-term opioid use (Pergolizzi et al., 2018). Practitioners should encourage their patients to do independent research on available treatments for their respective diseases, as well as consulting with their healthcare providers. A study focused on provider perceptions on prescribing opioids, found that many providers emphasized the importance of strong relationships with their patients in order to enhance trust when it comes to making decisions surrounding symptom management (Matthias et al., 2010) in order to increase care satisfaction and better adherence to treatment (Matthias et al., 2010).

Recommendations

In order to increase health care satisfaction and improve quality of life among PLWH and cancer survivors, providers need to have meaningful and effective conversations with their patients. By having these conversations, practitioners can determine the level of knowledge a patient has, the sources of information they rely on, how they feel about the information they learned and how the patient intends to act following their information search surrounding opioids and marijuana.

Health information seeking is crucial to a shared decision making model, and it is encouraged for patients to share information they have found from various sources with their healthcare practitioners (Anker et al., 2011). Throughout these conversations, the patient can

express any opinions, concerns or precautions they are having surrounding managing their disease. A clear implication of this study is that efforts to improve patient-centered care are needed and hold promise to improve symptom management for PLWH and cancer survivors.

Conclusions

Improved information sources and patient-provider relationships will lead to increased overall satisfaction and confidence surrounding treating their disease. Given the prevalence of health information seeking behaviors and the trend toward patient involvement in healthcare, further research surrounding health information seeking, use motives and barriers surrounding opioids and marijuana is both necessary and timely.

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