INCREASING PRIMARY HEALTHCARE PROVIDERS' KNOWLEDGE ABOUT MEDICAL CANNABIS AS AN ALTERNATIVE TREATMENT FOR CHRONIC PAIN

by

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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by April Lynn DeGennaro, titled Increasing Primary Care Healthcare Providers' Knowledge About Medical Cannabis as an Alternative Treatment for Chronic Pain and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.

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Final approval and acceptance of this DNP project is contingent upon the candidate's submission of the final copies of the DNP project to the Graduate College.

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ABSTRACT

Background: Chronic pain is one of the most common patient complaints seen in primary care, affecting over 100 million Americans (Carlini, Garrett, & Carter, 2017). Widespread research and awareness for the safest and most effective methods for treating chronic pain necessitate further awareness. Medical cannabis (MC) can perhaps provide a safe, successful, and for some patients, superior intervention for chronic pain management. Healthcare providers have a critical role in facilitating patient access to and awareness of medical cannabis.

Purpose: To examine the attitudes, knowledge, intent to recommend, comfort level and beliefs regarding the use of medical cannabis as an alternative or conjunctive treatment for chronic pain, before and after an educational intervention on the topic.

Methods: The AANP provided a randomized mailing list of nurse practitioners in the state of Washington that fit the inclusion criteria of this DNP project. A pretest, an evidence-based educational flyer about the use of medical cannabis for chronic pain, and posttest were all printed and mailed to participants, with results then mailed back to the primary investigator. Data was analyzed through descriptive statistics. Mean averages for each question were determined and compared between pre and posttest.

Participants: 100 nurse practitioners providing primary care in Washington state and members of AANP were surveyed, 14 responded.

Results: The overall results revealed a positive change in provider knowledge, comfort with, belief in, and intent to recommend MC to patients with chronic pain after implementation of the educational flyer. The average score on knowledge questions and response to the attitudes and beliefs and intent to recommend Likert-style questions increased. The greatest increase in the

mean question responses were for the average knowledge questions score which increased by 23.2% and the belief that MC should be recommended as an alternative treatment to chronic pain which increased by 12%.

Discussion: This quality improvement project used a pretest/posttest design that resulted in promising findings, which support providing MC education to primary care providers. From a harm reduction viewpoint, this project's results have aimed to highlight the necessity for more extensive research into the use of MC as an alternative treatment option for patients suffering from chronic pain. Despite the limitations of the survey, important information was gathered overall about the potential effect that evidenced-based education can have on provider knowledge, attitudes, comfort, and intent to recommend medical cannabis for chronic pain. Regardless of the small sample size, this survey gave valuable insight into the role of medical cannabis education, which can be used as the basis for future projects.

INTRODUCTION

Chronic pain arises from a multitude of factors. It can be derived from a cellular or psychological level and can be influenced by elements such as gender, sleeping patterns, stress levels, and genetics (Piper et al., 2017). As defined by the International Association for the Study of Pain, chronic pain is defined as pain that lasts or recurs for more than three months.

In the US alone, it is estimated that anywhere from 11-40% of the population suffers from some form of chronic pain (Dahlhamer et al., 2018). Widespread research continues to search for the safest and most effective methods for treating chronic pain. Some common medications currently used for chronic pain include non-steroidal anti-inflammatory drugs, acetaminophen, selective serotonin reuptake inhibitors, tricyclic acid drugs, muscles relaxants, and opiates. Challenges arise due to many limitations in chronic pain treatment. These can include such things as varying inconsistencies in the efficacy of medications, numerous side effects, financial burdens, apprehensions regarding toxicity or safety, quality of life, and concerns about addiction (Piper et al., 2017). Medical cannabis (MC) can perhaps provide a safe, successful, and for some patients, superior intervention for chronic pain management.

Background and Significance

Opiate Prescription Practices

During the past decade, prescriptions of opioid medications for chronic pain treatment have doubled, along with increased unintentional overdose rates, opioid use disorders, and opioid related fatalities (Bachhuber, Saloner, Cunningham, & Barry, 2014). Policies are in place to monitor the use, and misuse of opiate prescriptions, such as monitoring systems which help identify both providers prescribing large or frequent quantities of opiate medications and patients

who may be receiving numerous opiate prescriptions from multiple providers. However, regardless of these safety checks, rates of abuse and overuse have continued to climb. For example, in 2012 over 259 million prescriptions were written for opioids, the equivalent of providing each adult in the US with their own prescription (National Institute on Drug Abuse, 2015).

The National Institute of Health (NIH) reports a broad variability in prescribing practices across the country. Notably, there are several key similarities in areas with higher prescribing rates. These characteristics include larger Caucasian populations, greater numbers of primary care providers and dentists per capita, increased unemployed and uninsured residents, and increased incidence of individuals with a disability, diabetes, or arthritis (NIH, 2018).

Although the 'opioid crisis' is a prevalent topic of concern, little change has been seen in abuse and opiate overdose rates in the past few years (NIH, 2018). In 2016, the Centers for Disease Control and Prevention (CDC) updated their guidelines for treating chronic pain with opioids. These changes offered suggestions to encourage alterations in prescribing practices in hopes of providing patients with more effective and safe pain management (NIH, 2018). There are several key updates in the new guidelines, including risk and harm assessments, dosage recommendations, and monitoring and discontinuation. For example, the previous guideline concentrated its efforts towards patients considered high risk. Newer evidence now shows that opiate prescriptions can pose a risk to all patients, demonstrating that previous assessment tools are not effective in ruling out any given patient's risk for opioid misuse or overdose (CDC, 2018). In addition, providers are encouraged but not required to use controlled substance monitoring programs (CDC, 2018). The new guideline exercises caution at lower doses of

opiates. This could be due largely because increased doses of opiate medications run higher risks of misuse and fatal overdoses (CDC, 2018). Lastly, the updated guideline provides more sensitive measures for monitoring and discontinuing these medications when the benefits outweigh the risks and harms (CDC, 2018).

Opiate Overdoses

In a trend that seems to parallel the escalating amount of narcotic prescriptions in this country, opiate overdoses are now the second leading cause of accidental death in the United States (Weisberg, Becker, Fiellin, & Stannard, 2014). In fact, each day over 130 people die from opiate overdoses (NIH, 2018). In the United States, some of the most commonly misused narcotics include medications such as oxycodone with acetaminophen (percocet), hydrocodone with acetaminophen (vicodin), and fentanyl (Weisberg, Becker, Fiellin, & Stannard, 2014). There was a four-fold increase in opioid related deaths from 2002-2017 (Figure 1) (NIH, 2018). The CDC also notes the dramatic financial burden that opiate abuse inflicts on the United States medical system as a whole. The Council for Economic Advisers (CEA) (CEA, 2017) reported that opiate misuse related healthcare costs climbed to over $78.5 billion in 2013 and has continued to rise.

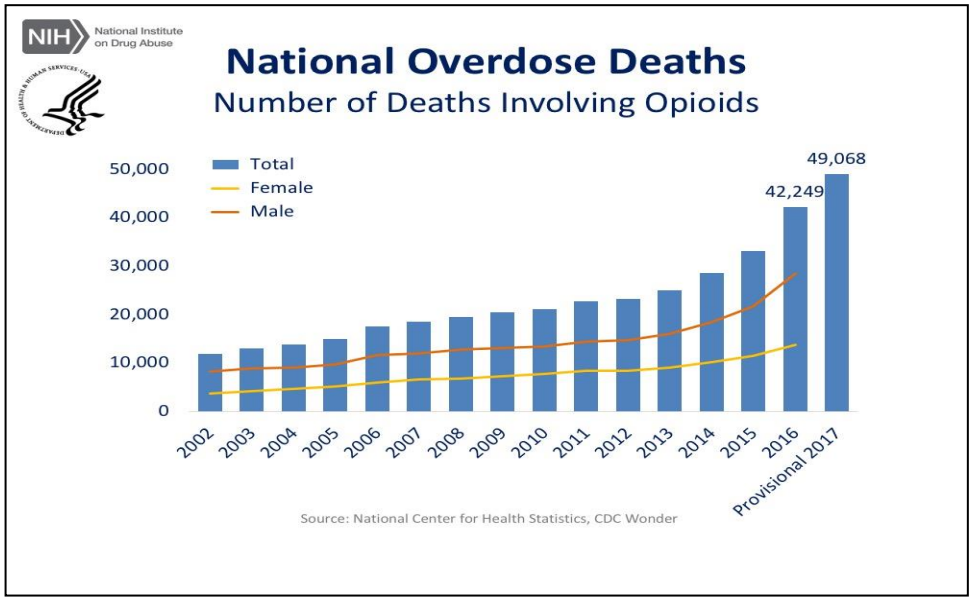


FIGURE 1. National overdose deaths. (NIH, 2018)

States with Legalized Medical Cannabis Laws

It is estimated that over 60% of unintentional opiate overdoses occur in individuals who have prescriptions from a single medical provider (Bachhuber, Saloner, Cunningham, & Barry, 2014). This powerful statistic supports the idea that prescription practices revolving around opiates need to change. Not only can MC deliver analgesia for many individuals, but it also has the potential to decrease overuse of opiates. This is due to a synergistic effect that MC has been noted to have for some chronic pain patients when combined with lower doses of their opiate medication regimen. For example, sub-analgesic doses of morphine or MC may both be ineffective at decreasing pain; however, when these same low doses are administered together, patients have reported a significant reduction pain (Wiese & Wilson-Poe, 2018). This not only provides more pain relief for the patient but also lowers the potential of overdose by utilizing fewer opiates in the patient's pain control regimen, which could help lessen unintentional overdoses from prescribed opiate medication. In fact, Bachhuber and colleagues (2014) found

that medical cannabis laws are connected to a significant decrease in opioid overdose fatalities. Researchers used time series analysis to try to find a connection between the incidence of fatal opiate overdoses and the incidence of medical cannabis laws in the US. They discovered that fatal opiate overdose rates dropped by 24.8% in pro-medical-cannabis states between the years of 1999 to 2010 (Bachhuber, Saloner, Cunningham, & Barry, 2014). In 2010 alone, Bachhuber and colleagues (2014) report that pro-medical-cannabis laws were linked with an estimated 1729 fewer unintentional opiate overdoses fatalities.

Barriers to Medical Cannabis Implementation

The largest organizational factors and barriers to implementing medical cannabis as a therapy for chronic pain involve state verses federal law regarding the use of this drug. Currently, 43 states have medical cannabis programs (Bellnier, Brown, & Ortega, 2018). Regardless, cannabis is still prohibited under federal law, as the government does not acknowledge a distinction between medical and recreational use (Bellnier, Brown, & Ortega, 2018). Before widespread implementation of medical cannabis can be recommended, more rigorous assessment of current policies is necessary. Bachhuber and colleagues (2014) found a positive association between the presence of medical cannabis laws and decreased opiate overdose fatalities in their research. In noting this encouraging correlation, future research may be produced and laws may be further enacted to allow the use of medical cannabis as a supported measure in policies aiming to reduce populations at risk of overdoses, including patients using opiate medications to manage chronic pain. If federal law considered rescheduling medical cannabis, it can be presumed that research would not only be facilitated, but possibly

encouraged. This would allow for not only superior controlled trials, but more robust research, and more conclusive results.

Opiate Abuse in Washington State

The dramatic increase in opiate medication related morbidity and mortality denotes a national public health crisis. It demands urgent and vital changes in policies and procedure related to the treatment of chronic pain. In Washington State alone, there were nearly 700 prescription opioid related deaths in 2015 (NIH, 2019). This is a rate of 9.7 deaths per 100,000 Washington residents (NIH, 2019). That same year medical providers supplied an average of 68.2 opioid medication prescriptions per 100,000 Washington residents (NIH, 2019). Additionally, healthcare related costs involved in the opioid epidemic in Washington have risen significantly over the past few years. The CEA reports that many previous estimations of these costs were dramatically underestimated (2017). In 2016 alone, the CEA reports that over $9.19 billion dollars were spent involving the opioid epidemic in Washington State (CEA, 2017) (Table 1). Fatalities from opiate overdoses also take a giant toll on Washington's economy, costing the state over $34 billion over a four-year span (Figure 2) (CEA, 2017). These statistics express a dramatic need for change when it comes to the treatment of chronic pain.

TABLE 1. *Economic cost of the opioid epidemic in Washington State.* (CEA, 2017)

In 2016, the economic cost of the opioid epidemic in Washington State was over $9.19 billion.

Type of Cost	Cost (in millions)
Opioid-related Fatalities	$7,177.37
Health Care Spending	$922.72
Addiction Treatment	$99.79
Criminal Justice	$270.85
Lost Productivity	$723.35
Total	$9,194.09

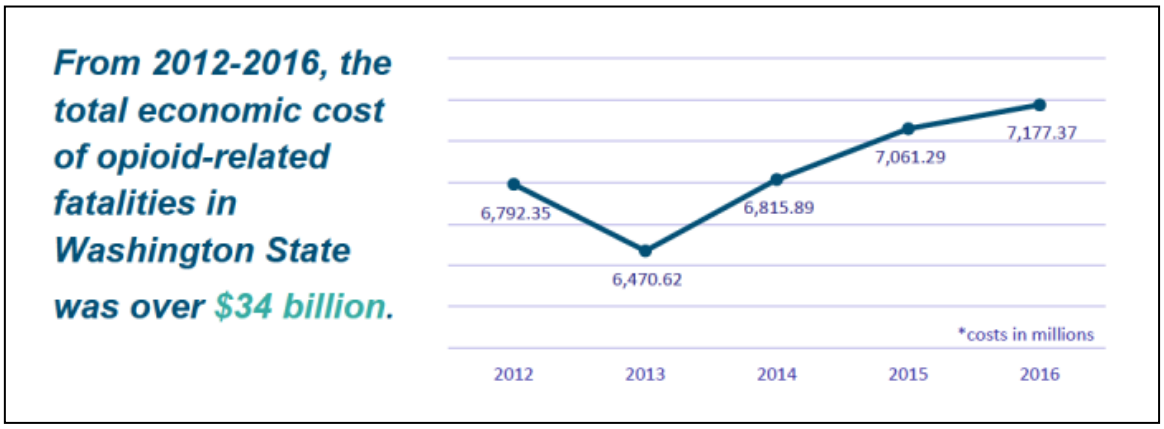


FIGURE 2. Total economic cost of opioid-related fatalities in Washington State. (CEA, 2017)

Medical Cannabis and Washington State

Washington State primary care providers are able to recommend medical cannabis to patients with qualifying conditions. These conditions include either terminal illnesses or debilitating illnesses, such as chronic pain (Washington State Department of Health [WADOH], 2019). After completing a thorough history and physical around the chronic pain diagnosis, providers document a written treatment plan, which may include recommendation for medical cannabis. The Washington State Department of Health reports that it does not discourage or promote the use of medical marijuana authorizations (WADOH, 2019). However, it states that providers must be aware of all requirements and restrictions established in legislature RCW 69.51A.030 (WADOH, 2019).

If the provider feels that the patient would benefit from this treatment option, the provider must authorize their patient to use marijuana for medical purposes by completing the Washington State Medical Marijuana Authorization Form (Appendix I) and print it on tamper-resistant paper (WADOH, 2019). To further ensure that healthcare providers are familiar with the rules and regulations regarding medical cannabis, an authorization practice guidelines for

recommending medical cannabis was developed (WADOH, 2019). Additionally, the Washington State Department of Health created a Medical Marijuana Authorization Form Guidelines (Appendix J) handout to be shared with patients. After full authorization, patients are directed to visit a medical cannabis retail store, which has medical endorsement and a certified Medical Marijuana Consultant on staff (WADOH, 2019). The certified consultant will be able to register the patient into the authorization database, and issue a medical recognition card (often referred to as a green card). Washington State Department of Health provides a list of medically endorsed cannabis retail stores, so that patients may find a retailer closet to them.

Despite the clearly identified process for the recommendation of MC, Washington State opioid prescription rates, overdoses and fatalities remain high.

Purpose

Opioid analgesics are all too often prescribed to treat patients suffering from chronic pain, regardless of absent evidence supporting their use in long-term chronic pain management (Boehnke, Litinas, & Claus, 2016). Safer and more effective treatment options are needed for the chronic pain population to thwart addiction and unintentional overdose rates from rising any higher. Medical cannabis could provide just that. In a recent study in Michigan, patients reported cannabis consumption was connected with a 64% decrease in opioid medication usage in patients suffering from chronic pain (Boehnke, Litinas, & Claus, 2016). Chronic pain is a major indication for the use of MC. In fact, pain relief is the most reported outcome noted by patients using medical cannabis (Black, Hocum, & Black, 2018).

Due largely to inadequacies involving cannabis support, it is especially imperative for providers to educate themselves about the potential benefits of its use. More specifically, it is

crucial for providers to understand the potential benefits of MC use, to recognize patients and conditions that may benefit from MC use, and to initiate conversations with patients about their current or prospective use of MC. Today providers often depend on inconsistent and limited data regarding the safety and efficacy of cannabis for treating various health ailments. To encourage and provoke constructive conversations with patients about the potential health implications of MC, it is crucial for providers to be up to date on recent research regarding MC use for chronic pain.

The purpose of this DNP project was to examine the attitudes, knowledge, comfort level, intent to recommend and beliefs regarding the use of medical cannabis used as an alternative or conjunctive treatment for chronic pain, before and after an educational intervention on the topic. This DNP project aimed to first assesses the attitudes, knowledge, comfort level, intent to recommend, and beliefs regarding medical cannabis through a pretest composed of multiple choice and Likert scale questions (Appendix F). An educational flyer about medical cannabis was then be reviewed by participants (Appendix H). After viewing the educational flyer, participants completed the posttest (Appendix G). This method was used to determine if there is a change in provider attitudes, knowledge, beliefs and comfort level regarding MC and intention to recommend medical cannabis for the management of chronic pain after the educational intervention. A change in these measures has the potential to indirectly affect patient care, especially in the chronic pain patient population. If providers' attitude, knowledge, comfort level, beliefs and/or intention to recommend medical cannabis is enhanced after the education, there is the potential that more patients will have the opportunity to try this therapy for management of pain. Likewise, while this project's results are not generalizable, the findings could inform

projects in other settings, such as specific health care systems or other states with legalized medical cannabis.

Project Question

How do the attitudes, beliefs, comfort level, intent to recommend, and knowledge of the use of medical cannabis, as an alternative treatment for chronic pain, change after an educational flyer on the topic?

Theoretical Framework

Donabedian Model of Care

The Donabedian Model of Care is the theoretical framework that was used to guide this proposed DNP project. This model was developed by Avedis Donabedian to provide a framework for evaluating quality care and to further examine health services as a whole (Ayanian & Markel, 2016). To accomplish this, Donabedian proposed three main constructs for this model: structure, process, and outcomes. Structure involves the individual people, infrastructure, and technology (Moran, 2017). Process describes how care is provided, consumer (patient) satisfaction, and the impact on both health status and behavior (Moran, 2017). Outcome refers to final result that the combined structure and process have on both patients and the healthcare system as a whole. This result drives permanent change, and helps move progression forward (Moran, 2017).

This model is a suitable framework as this project aimed to assess the structure, process and outcomes regarding provider MC education, and implications for improving quality of care in the form of options for chronic pain patients. Guided by the Donabedian's Model of Care, this DNP project aimed to examine the following: (a) healthcare providers' attitude, knowledge,

beliefs and comfort level regarding use of MC for chronic pain through a survey (structure) and (b) provide educational materials to providers in order to increase their knowledge base to support MC, enhance their attitudes and beliefs around MC and enlighten them on their decisions to use MC for chronic pain (process). This structure and process is an attempt to increase the likelihood this option will be considered in the management of chronic pain (outcome). The outcome was measured through surveys as well, to highlight a change in provider comfort, knowledge, attitudes and beliefs regarding MC and intent to recommend MC as an option for chronic pain management.

Donabedian emphasized that this triad of structure, processes, and outcomes are vitally connected by genuine concern and care of patient needs and outcomes (Ayanian & Markel, 2016). This reflects the idea that medical providers should have the desire and know-how to provide the upmost care to their patients. Providers must be aware and informed about alternative treatments, which can provide safe and efficacious options for chronic pain management. Findings from this assessment, through the guide of Donabedian's Model of Care, may help identify: (a) the potential influence that education can have on provider knowledge and beliefs regarding MC and intent to recommend it for treatment of chronic pain (b) the impact education can have on provider comfort discussing MC with chronic pain patients; and (c) that increased provider education, awareness, and open communication enhances providers intent to recommend MC use in the chronic pain patient population.

Synthesis of Evidence

Synthesis of evidence was conducted regarding MC treatment recommendations for chronic pain patients. This took into account not only decreased pain with the use of MC, but

adverse side effects, patient safety, patient-provider communication regarding MC, and provider knowledge. The literature search was conducted using Medline-PubMed, Google Scholar, and EMBASE databases. When using Medline-PubMed, the key words searched were chronic pain, medical cannabis, treatment, provider communication, and provider knowledge, with a filter for any articles from 2015 or after, and English language. This provided five articles useful for review. Using Google Scholar, key words used included medical cannabis, chronic pain, provider knowledge, and pain management. This search also contained filters for English written articles and dates no further back than 2015, which resulted in four articles kept for further review. Lastly, EMBASE was searched with key words medical cannabis, medical marijuana, provider communication, systematic review, provider comfort, and provider knowledge, and chronic pain, as well as a date filter for articles published in 2015 or later. This search resulted in six articles which were reviewed, and three articles were found appropriate for the purpose of this analysis. In all, 14 articles were reviewed. Appendix A contains the articles reviewed in more detail.

Medical Cannabis for Chronic Pain

Pain relief. As MC becomes legalized in more states and is further introduced to the public, the same evidence based research should be assessed for MC as is done for other potent prescriptions for chronic pain control. One recent meta-analysis analyzed the safety and efficacy of inhaled MC for chronic neuropathic pain. Five placebo controlled, randomized, and double-blind, studies where reviewed (Andreae et al., 2015). The results showed that inhaled MC provides statistically significant, but minimal clinically important difference in pain (Andreae et al., 2015). From this, it can be interpreted that not all patients had pain relief from utilizing MC,

however, those that reported pain reduction had statistically significant relief. Researchers in Australia found that those using MC reported a 70% improvement in their pain, compared to an average of 50% improvement of pain while on opioid medications alone (Degenhardt et al., 2015). These researches also noted that the majority of participants in their study admitted to high doses of opioid medication, as well as difficulty controlling their pain (Degenhardt et al., 2015). In another recent study from several Northeastern areas of the US, 984 participants reported that MC improved their symptoms by 75% on average (Piper et al., 2017). Participants also reported favorable outcomes in using MC, such as better pain control, using more natural substances (compared to prescription medications), less side effects, and improved quality of life (Piper et al., 2017). Lastly, one systematic review and meta-analysis investigated the efficacy of MC to treat several diseases, conditions, and symptoms (Whiting et al. 2015). Their findings suggest that there is moderate-quality evidence to support using MC for the treatment of chronic pain (Whiting et al., 2015).

Decreased opiate usage. Multiple research articles reported that utilizing MC decreases opiate usage by chronic pain patients. In a retrospective cross sectional survey, Boehnke and colleagues (2016) examined the use of MC on opioid usage for chronic pain patients. Among the 244 patients surveyed, 64% decreased their use of opioids after initiating MC treatment. This research showed that 45% of participants reported an improvement in the quality of life and less side effects after initiating MC treatment as well (Boehnke, Litinas, & Claus, 2016). Another recent cross sectional study found similar results. In a survey of 2,774 participants, there were 2,473 total prescription substitutions made from prescribed medications to MC (Corroon, Mischley, & Sexton, 2017). Over 35% of these substitutions were from opioid medications to

MC (Corroon, Mischley, & Sexton, 2017). Enrollment in a MC program was associated with a 17.27% higher chance of stopping opioid prescriptions (CI 1.89 to 157.36, p = 0.012), as well as a 5.12% increased chance of reducing daily doses of opioid medications (Vigil, Stith, Adams, & Reeve, 2017). Vigil and colleagues (2017) survey also demonstrated patient reports of improvement in pain, increase social life, increase quality of life, better concentration, improved activity levels, and few side effects when compared to previous opioid usage after a year of enrollment in the MC program (ps<0.001).These findings suggest that MC programs can demonstrate clinically and statistically significant (up to 33%) reductions in opioid usage (Vigil, Stith, Adams, & Reeve, 2017).

Decreased healthcare spending. Bradford and Bradford (2016) reported that Medicaid cost savings were associated with MC laws. Medicaid beneficiaries in pro MC laws states fill fewer prescriptions, especially opioid medication prescriptions. Their study showed that by implementing MC law and regulation, states showed a 1,826 decrease in daily doses of opioid medication filled per physician per year (Bradford & Bradford, 2016). In fact, they found $19.825 million in savings per state for opioid prescriptions alone (Bradford & Bradford, 2016). If MC laws were recognized throughout the country, researchers estimate savings to reach $3.89 billion annually (Bradford & Bradford, 2016).

Provider's Role in Recommending Medical Cannabis

Provider knowledge. One electronic survey of primary care providers collected data regarding provider attitudes, characteristics, and beliefs about medical cannabis (Philpot, Ebbert, & Hurt, 2019). Their goal was to ascertain provider comfort levels in answering patient questions regarding medical cannabis, and whether or not providers were interested in obtaining additional

education about its use (Philpot, Ebbert, & Hurt, 2019). Sixty-two healthcare providers responded to the survey, with over 58% somewhat or strongly agreeing that medical cannabis should be seen as a valid medical treatment (Philpot, Ebbert, & Hurt, 2019). More than 50% of providers believed that MC was helpful for treating qualifying conditions such as intractable pain, terminal illness, and cancer. Although endorsing these potential benefits, a third of respondents reported concern that MC could interact with other medicinal therapies (Philpot, Ebbert, & Hurt, 2019).

Provider comfort. Many researchers believe the benefits of MC will continue to be seen once providers are confident in educating their patients about its use (Carlini, Garrett, & Carter, 2017). This includes education about MC plant and extract composition, side effects, and routes of administration. To further pursue this avenue, Carlini and colleagues (2017) composed a 47-item questionnaire to assess provider knowledge, clinical practices, beliefs, and training needs regarding MC. For their study, they targeted healthcare professionals in Washington State, consisting of MDs (Medical Doctor), DOs (Doctor of Osteopathic Medicine), PAs (Physician's Assistant), NDs (Naturopathic Doctor), pharmacists, ARNPs (Advanced Registered Nurse Practitioner), RNs (Registered Nurse), and LPNs (Licensed Practical Nurse), with a total of 494 providers completing the anonymous survey. Researchers found that providers who had or were currently recommending MC to patients reported greater knowledge about the endocannabinoid system compared to respondents who had not recommended this treatment modality (Carlini, Garrett, & Carter, 2017). In general, respondents conveyed low knowledge and comfort level related to MC recommendation, and noted a desire for further knowledge regarding the topic. In fact, a majority of respondents regarded MC use and knowledge as critically important and

showed support for increased MC training in provider curriculum. Over 75% of surveyed providers endorsed that MC had the ability to support patients suffering from chronic conditions. A majority of the providers not only support the federal rescheduling of MC, but agreed that providers should not have to fear legal action when recommending and prescribing MC to their patients (Carlini, Garrett, & Carter, 2017).

Provider attitude. Provider attitudes play a huge role in utilizing MC as a treatment option for patients. In the US where state MC laws are in place, providers generally show interest and growing support of MC utilization (Carlini, Garrett, & Carter, 2017). The same cannot be said in states without MC laws, leaving a massive patient population excluded from the potential benefits of MC (Carlini, Garrett, & Carter, 2017). In years to come, the US may look to how other countries have approached the legalization and utilization of cannabis for medicinal purposes. For example, the country of Israel is one of the world leaders in medical cannabis application and research (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018). In much of the country's recent research, Israel has demonstrated that with proper education and support, clinician's feel comfortable endorsing and prescribing cannabis for various conditions (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018). In an attempt to target providers using cannabis commonly in their practice, Goldway and colleagues (2018) created a survey distributed to every board-certified pain specialists in Israel. Some 64% of all practicing Israeli pain specialists, treating over 30,000 MC patients, responded (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018). Out of 79 providers who completed the survey, nearly all report they prescribe cannabis for chronic pain. In fact, 63% of providers report MC as moderately to highly effective in treating pain, and 56% report that their patients have encountered mild or no side

effects (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018). To note, 5% of providers reported that MC could be harmful, especially in patients: who are pregnant/breastfeeding, in those with schizophrenia, and those under the age of 18 (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018). Goldway and colleagues (2018) found that 12% of providers rated MC more dangerous than opiates prescribed for the same condition, yet half of the respondents noted a preference of MC to opiates for themselves and family members (Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018).

Provider and Patient Communication about Medical Cannabis

Although MC is becoming more permitted through state legislature, it is unclear if providers are having conversations with their patients about its use (Kondrad, Reed, Simpson, & Nease, 2018). Some authors note a specific challenge regarding the classification of MC by both patients and providers. Some may consider MC as a medication, yet it is not routinely seen in medication reconciliation, or dispensed at a pharmacy (Kondrad, Reed, Simpson, & Nease, 2018). Conversely, others may not consider it a drug when questioned about illicit drug use (Kondrad, Reed, Simpson, & Nease, 2018). Thus, this poses an issue for both provider and patient safety when determining all the substances, both prescribed and not, that a patient may be using. A recent longitudinal pain survey of Colorado primary care providers (PCPs) and patients assessed the lack of communication in this vital area. Patients who completed the survey answered questions about their MC use, communication about MC use with their PCP, and about their perceived risk and benefits of using MC (Kondrad, Reed, Simpson, & Nease, 2018). Providers were then questioned if their patients were using MC, if they had recommended MC to their patients, and about their knowledge involving the potential adverse effects and benefits of

MC use (Kondrad, Reed, Simpson, & Nease, 2018). In total, 54 patients and 54 providers completed the surveys. The results showed that 80% of patients reported that MC was in fact helping the condition they were using if for, and 45% reported that chronic pain was their reason for use. PCPs were aware of MC use in 53% of their patients, yet a majority of providers were unsure from where the patient had received the MC recommendation (Kondrad, Reed, Simpson, & Nease, 2018).

Kondrad and colleagues' (2018) findings demonstrate a lack of communication and open dialog between patients and providers. This is perhaps more distressing because patients who should not be using MC, such as those with undiagnosed mental health problems or a history of substance abuse, could be using this substance without their providers knowledge (Kondrad, Reed, Simpson, & Nease, 2018). This lack of communication has a huge significance in the realm of the opioid epidemic. As this misuse and abuse of opioid medications continue to rise, there is a heightened need for alternative therapies to address chronic pain. Providers, especially in primary care, should develop a heightened attentiveness to the possibility of their patients seeking MC as a source of chronic pain treatment and relief (Kondrad, Reed, Simpson, & Nease, 2018).

Strengths

In this recent search of the literature, several high quality findings were found backing the utilization of medical cannabis for chronic pain management (Andreae et al., 2015; Boehnke, Litinas, & Claus, 2016; Degenhardt et al., 2015; Whiting et al., 2015). This is a crucial period in the realm of cannabis scientific research and policy. There are a number of substantial recommendations that can be made for the utilization of medical cannabis as a remedy for

chronic pain (Hill, 2015). These recommendations include addressing: implementation of medical cannabis as a safe alternative therapy for chronic pain management; offering medical cannabis in lieu of increased opioid prescriptions; providing further medical education on the benefits, risks, and indications for medical cannabis to health care providers; and continuing research on medical cannabis to further support its use and benefits (Whiting et al., 2015). Another strength of this literature review is that there are minimal risks of MC use in current research, although these studies typically have small sample sizes (Boehnke, Litinas, & Claus, 2016). It also appears that the side effects of using MC are noted by patients to be mild to moderate adverse reactions, and are easily tolerated (Andreae et al., 2015; Boehnke, Litinas, & Claus, 2016; Whiting et al., 2015).

Weaknesses

Many articles note that MC may only provide mild to moderate pain relief (Boehnke, Litinas, & Claus, 2016; Whiting et al., 2015; Andreae et al., 2015; Degenhardt et al., 2015). Further research studies, including longer trial times and larger sample sizes are needed to understand the long-term side effects and consequences of MC use in it various forms (e.g., inhalation, vapor, topic, oral, etc.) In all, the most frequent recommendation in these articles is that authors support and request the need for further clinical evaluation related to cannabis for chronic pain (Andreae et al., 2015; Boehnke, Litinas, & Claus, 2016; Whiting et al., 2015). Another weakness noted is that there are few studies which have looked at provider patient communication regarding medical cannabis (Kondrad, Reed, Simpson, & Nease, 2018; Philpot, Ebbert, & Hurt, 2019). Similarly, further research needs to address provider knowledge regarding MC use. This literature review found limited articles assessing PCP education and

awareness of MC use, risks, and indications, although several articles included in the review acknowledged this as a need for further research (Kondrad, Reed, Simpson, & Nease, 2018; Philpot, Ebbert, & Hurt, 2019; Sharon, Goldway, Goor-Aryeh, Eisenberg, & Brill, 2018)

Limitations

There were several limitations to this literature review. MC is not federally legal, thus providers cannot actually prescribe it as a medication. MC can be a recommended therapy only in states that have MC laws in place (Bellnier, Brown, & Ortega, 2018). This limits the studies available to review and could impact not only provider knowledge and comfort regarding MC, but the conversations they have with patients about MC use, as well. Federally legal treatments may have more research in areas of safety, provider knowledge, and patient-provider communication regarding use and safety of said treatments. Research may also be limited due to provider unfamiliarity with MC laws. Even in states with legal MC laws in place, providers may not feel comfortable joining in research or participating in surveys about the role of MC in patient care (Carlini, Garrett, & Carter, 2017; Kondrad, Reed, Simpson, & Nease, 2018). This could be from stigma against MC, or fear of any implications MC recommendation could have on their professional licensure (Carlini, Garrett, & Carter, 2017). Lastly, a large limitation seen in various articles is that many of the studies have small sample sizes.

Gaps in the Literature

Based on this literature review, there has been little study of communication practices studied revolving around medical cannabis discussions between providers and patients. There is also little research regarding provider attitude, knowledge, beliefs and comfort level regarding MC and intent to recommend medical cannabis. It appears that healthcare providers generally

have poor understanding of how MC works, including a limited knowledge of the endocannabinoid system (Carlini, Garrett, & Carter, 2017; Kondrad, Reed, Simpson, & Nease, 2018; Philpot, Ebbert, & Hurt, 2019). Future research is needed to examine the longitudinal impact of medical cannabis use on pain-related and substance use outcomes (Andreae et al., 2015; Boehnke, Litinas, & Claus, 2016; Nugent et. al, 2017; Whiting et al., 2015).

METHODS

Design

This DNP quality improvement project was implemented using a pretest-posttest design. The intervention consisted of education regarding medical cannabis use for chronic pain management. The pretest/posttest was an appropriate for this project, as the design assessed the impact of an evidence based education informing primary care providers about medical cannabis. By comparing provider responses before and after the education intervention, the project was able to assess changes in knowledge, attitudes, beliefs and comfort level regarding MC and the intent to utilize it for chronic pain.

Setting

The setting for this DNP project was conducted through a mailing list provided by the American Association of Nurse Practitioners (AANP). The AANP is the largest national professional organization for nurse practitioners (2019). With over 98,000 individual members, this society of advanced practice providers offers a united approach for NPs to advocate and network relevant healthcare concerns (AANP, 2019). The AANP supports and advocates on issues pertaining to nurse practitioners and their patients. As chronic pain is one of the most frequent patient complaints in primary care, family practice and adult acute care nurse

practitioners (practicing in primary care) have an even more critical role in understanding, communicating about, and facilitating patient access to and awareness of medical cannabis. Although this DNP project was aimed toward nurse practitioners in Washington State, findings may inform other projects and health care organization around the country, especially in states that have pro-medical cannabis laws in place. Medical cannabis is growing in popularity from state to state, and it is vital that providers are well informed about its potential role in the treatment of chronic pain.

Participants

A convenience sample from the AANP was used. The advantage of using convenience sampling was its practicality. Convenience sampling saves time, is less costly, and can help reach a large number of available and appropriate respondents (Polik & Beck, 2017). This sample included nurse practitioners. Inclusion criteria for participants included: (a) Members of the AANP; (b) nurse practitioners from Washington State; (c) provider in primary care practice; (d) either Family Nurse Practitioner (FNP) or Adult-Gerontology Acute Care Nurse Practitioner (AG-ACNP) specialty. Both FNP and AG-ACNP specialties are considered in the inclusion criteria, as both are able to work in primary care settings. Exclusion criteria included: (a) non-AANP members; (b) nurse practitioners residing in states other than Washington; (c) nurse practitioners not currently practicing in primary care; (d) specialty other than FNP or AG-ACNP, such as Psychiatric Nurse Practitioner, Pediatric Nurse Practitioner, etc.

The project director requested 100 mailing addresses from AANP, randomly selected from their list of members meeting the inclusion criteria. One hundred mailing addresses were utilized, as the response rate for external surveys may only be 10-15%, as reported by Survey

Gizmo. This project aimed to recruit a minimum of 20 participants to complete the project pretest/education/posttest in full. A recent statistic from the Bureau of Labor Statistics (2019) reported that there are roughly 3,430 nurse practitioners in Washington State. The AANP (2019) reports nationwide, 75% of nurse practitioners work in primary care. This roughly estimates that 2572 nurse practitioners are working in primary care in Washington State. Ideally, the author of the project would have preferred requesting enough addresses to represent 10%of the nurse practitioners working in primary care in Washington, or 257addresses. However, as this project director funded this project completely out of pocket, 250 mailing addresses were unaffordable at this time. With 100 mailing addresses, this DNP project was estimated to reach about 4% of the primary care nurse practitioner population in Washington State.

As stated, the limitation of one-hundred mailing addresses is largely because this was a DNP student project, and the project director/student paid for all costs of this project. Costs included a $55 fee to become an AANP student member, $125 fee to the AANP (for consideration of project implementation), $0.25/mail recipient (a total of $25), postage stamps to mail recipients ($55), postage stamps used for return envelopes ($55), paper for recruitment letters, surveys and educational flyer ($20), printer ink ($45), and envelopes ($25). Additionally, as this was a DNP project and not a research study, a power calculation of sample size would not typically be utilized, as the results of the project were not generalizable. The project remained open for two weeks (i.e., two days after the surveys were mailed out).

Intervention

The intervention was an evidence based educational flyer on medical cannabis use for chronic pain management. The flyer was mailed to the possible candidates, along with the pretest

and posttest. This method was chosen due to the convenience for those who choose to participation in this DNP project and the fact that the AANP only provided mailing addresses of its members. The flyer discussed cannabis as an alternative treatment for chronic pain, how cannabis affects the cannabinoid receptors in the body, and educated providers on how to recommend MC in Washington State. Research findings involving MC were summarized and presented, noting that while current studies have demonstrated minimal risks with MC use the studies are limited and with small samples sizes; more research is needed. Statistics on both pain improvement and patient reported quality of life were displayed. Past analyses of Medicare costs and spending in states with pro-MC laws in place were provided. Lastly, the flyer (Appendix H) reported on where providers can look for further information regarding MC recommendation, including the link for the "Medical Marijuana Authorization" form (Appendix I) and the "Medical Marijuana Authorization Guideline" form (Appendix J) from the Washington State Department of Health.

Data Collection

Prior to initiating project recruitment, approval from The University of Arizona Institutional Review Board (IRB) was obtained. Formal project approval through the AANP occurred as well. A copy of IRB approval is located in Appendix B.

A disclosure form (Appendix C) was included in the potential participants' mailed participation packet. The disclosure form included the DNP project purpose, any benefits or risks associated with the project, and that participation is completely voluntary. The AANP provided a randomly selected mailing list of recipients' addresses from their organization, who met the project's inclusion criteria. After gaining the randomly selected mailing addresses, recipients

were sent an envelope. Inside, recipients found: (a) invitation to participate letter (Appendix D); (b) disclosure form (Appendix C); (c) instructions for completing the pretest, presentation, posttest, and how to return the completed questionnaires (Appendix E); (d) pretest questionnaire (Appendix F); (e) posttest questionnaire (Appendix G); (f) the educational flyer (Appendix H); (g) a copy of the Medical Marijuana Authorization form (Appendix I); (h) a copy of the Medical Marijuana Authorization Guideline (Appendix J); and (i) a stamped envelope addressed to this author to mail back in results. In their mailed participation packet, participants were responsible for first reading the instructions provided. They were encouraged to read the full disclosure agreement prior to starting any questionnaire. If they decided to participate, respondents next completed the pretest questionnaire. After completion of the pretest, they were instructed to read the educational flyer. After viewing the flyer (which took roughly 15-20 minutes), the posttest questionnaire should have been completed. The instructions prompted respondents to place both their pretest and posttest questionnaires into the pre-stamped and preaddressed envelope provided in their participation packet. The project director's address was placed on both the "address" and "return address" areas on the return envelopes, to ensure the responses were returned to the appropriate destination. Participants were instructed to write no additional address on the return envelope. This allowed participant anonymity. All surveys were numbered so that if a participant decided they did not want their answers used, they could contact the project director who would shred the survey based on the identified number. Participants were instructed to remember or write down their survey number, in case they decided to withdraw their responses. No record of the survey numbers was kept by the project director.

The pretest and posttest questionnaires were reviewed prior to administering the project by the project committee chair and two committee members. The pretest also included demographic information, including age, gender, years of practice, and estimated percentage of patients treated for chronic pain on a monthly basis. The demographic section also asked participants what medications they typically use for the treatment of chronic pain, including NSAIDS, acetaminophen, muscle relaxers, opiates, SSRIs, TCAs, or medical cannabis. The pretest and posttest contained 10 questions regarding knowledge, attitudes, beliefs and comfort regarding MC use of chronic pain and intent to recommend MC. The format included multiple-choice and Likert scale questions. The posttest questions were identical to the pretest questions with the exception of: (a) posttest questions 5, 9, 10, which reflected that participants had now received evidence-based education on medical cannabis; (b) the demographic questions on the pretest; (c) and the optional open-ended response at the end of the posttest. Please refer to Appendices F and G for the pretest and posttest questions. After results were mailed back to the project director, the results were manually entered into an excel spread sheet for organization and calculation purposes.

Data Analysis

Data was analyzed through descriptive statistics. Descriptive statistics discuss what is occurring in the data, noting if there are significant differences when comparing the pretest and posttest data (Polit & Beck, 2017). The difference between pretest and posttest scores for each question was calculated, and the mean change was determined. This allowed for comparison between responses regarding providers' attitudes, knowledge, and beliefs about medical cannabis and intent to prescribe before and after the educational presentation. Specifically, the mean

multiple choice and Likert response of each pretest question were determined, as well as the mean multiple choice and Likert response of each posttest question. These means were then be compared, to identify if there was any change in provider attitude, beliefs, knowledge of, and intent to recommend after completion of the educational flyer. Demographic data was also collected on the pretest. Demographic analysis was used to develop an understanding of the population that responded to this survey, and examined characteristics such as gender, provider age, years practicing, and estimated percent of chronic pain patients treated monthly. At the end on the post survey, there was also an optional open-ended question section. If providers had any further questions, concerns, or insights on medical cannabis, they were able to share them with the DNP project author. These responses were analyzed to see if any common themes arise, and were shared in the final report of this project. The findings of this project were offered to be shared with the ARNPs United of Washington. Findings were also offered to the AANP, with intent to present at the 2020 AANP National Conference in New Orleans.

No identifying information was assessed from project participants. This was accomplished by ensuring return addresses of the respondents are not used, as the preaddressed return envelopes contained the DNP project director's address in both the "address" and "return address" areas of the envelope. This way, the author was not aware of which providers chose to complete the pretest, education, and posttest. All surveys were numbered so that if a participant decided they did not want their answers used, they could contact the project director who would shred the survey based on the identified number. Participants were instructed to remember or write down their survey number, in case they decided to withdraw their responses. No record of the survey numbers was kept by the project director.

Data was kept safe by using an encrypted computer drive. At the end of the project, all data was destroyed. Any and all paper records, including the pretest, posttest, and any other returned materials was shredded, after the data had been transferred to the encrypted computer drive and no earlier than October 31, 2019. This was the last day participants may contact the author and request their survey be kept out of analysis. All electronic data was deleted from their encrypted location at the completion of the project. As this DNP project was considered human research by the University of Arizona IRB, all data was retained and stored in the secure location for a minimum of six years, as the University requires.

Ethical Considerations

Respect for Persons

Respect for persons makes certain that each participant is aware of their role in the project, and that they understand they have full control to make their own decisions (Polit & Beck, 2017). This DNP project respected participant dignity by maintaining confidentiality, providing participants with disclaimer regarding the project, and making sure participants understand their participation is voluntary, and they may withdraw from the project at any time. If there were any questions that the participants do not want to answer, they were free to make that decision as well.

Beneficence

Beneficence revolves around the idea to "do good to others" (Polit & Beck, 2017). This project aimed to improve provide knowledge and comfort regarding medical cannabis and to enhance MC attitudes and beliefs and intent to recommend. As a result, this project hoped to

impact not only providers, but patients suffering from chronic pain. There were no foreseen or known immediate or long-term harm to the participants completing the project.

Justice

Justice refers to the idea that all project participants are treated equally, and have a right to fair treatment (Polit & Beck, 2017). Participants in this project experienced the same pretest, educational material, and posttest regardless of where they practice in Washington State.

RESULTS

Description of the Sample Population

The surveys were distributed to 100 members from the AANP. These members are currently practicing in primary care in the state of Washington, and are either an FNP or AG-ACNP specialty. A total of 14 participants completed and returned the surveys, while one survey was returned blank. In addition, six out of the 100 surveys were returned by the US postal service due to invalid addresses. Of the respondents, 12 (85.7%) were female and two (14.3%) were male. Participant's ages varied, as three respondents were 30-39 years old (21.4%), two were between 40-49 years (14.3%), and another two were 50-59 years old (14.3%). Six participants were between 60-69 years old (42.9%), and one was 70+ years or older (7.1%). Their years in practice were also diverse, as 7.1% had been in practice for 0-4 years (N=1), 21.4% had been in practice 5-9 years (N=3), and another 21.4% had been in practice 10-14 years (N=3). Of the remaining ARNPs, 21.4% had been in practice for 20-24 years (N=3), and 28.6% had been in practice 25 of more years (N=4).

Participants also varied in their estimation of percent of patients they treat monthly for chronic pain. Two participants (14.3%) reported only 0-5% of patients monthly are treated for

chronic pain. Four participants (28.6%) reported 6-10% of their patients monthly are treated. Another two participants (14.3%) report treating 11-15% of their patients monthly for chronic pain, while another two participants (14.3%) report treating 21-30%. Three participants (21.4%) reported treating 21-30% of patients for chronic pain, and only one participant (7.1%) reported treating 41-50% of patients for chronic pain.

Participants were diverse in the medications they typically use to treat chronic pain, as well. Six (42.9%) reported prescribing acetaminophen, as well as TCAs. A majority of participants, 85.7%, reported using NSAIDs for chronic pain. Use of SSRIs and muscle relaxants were both reported by 78.6% (N=11) of participants. Opiates were prescribed for chronic pain by 71.4% (N=10). Only two participants (14.3%) reported currently recommending cannabis for chronic pain, while three participants (21.4%) reported prescribing other medications not mentioned in the survey. The demographic characteristics of the sample (N=14) are reflected in Table 2, Figure 3, and Figure 4.

TABLE 2. *Participant demographics.*

Characteristic	Sample N = 14 (%)
Age	
20-29	0 (0%)
30-39	3 (21.4%)
40-49	2 (14.3%)
50-59	2 (14.3%)
60-69	6 (42.9%)
70+	1 (7.1%)
Gender	
Female	12 (85.7%)
Male	2 (14.3%)
Trans	0 (0%)
Other	0 (0%)
Years in Practice	
0-4	1 (7.1%)
5-9	3 (21.4%)
10-14	3 (21.4%)
15-20	0 (0%)
20-24	3 (21.4%)
25+	4 (28.6%)
Percentage of Patients Treated for Chronic Pain Treated for Chronic Pain (Estimated per Month)	
0-5%	2 (14.3%)
6-10%	4 (28.6%)
11-15%	2 (14.3%)
16-20%	2 (14.3%)
21-30%	3 (21.4%)
31-40%	0 (0%)
41-50%	1 (7.1%)
More than 50%	0 (0%)

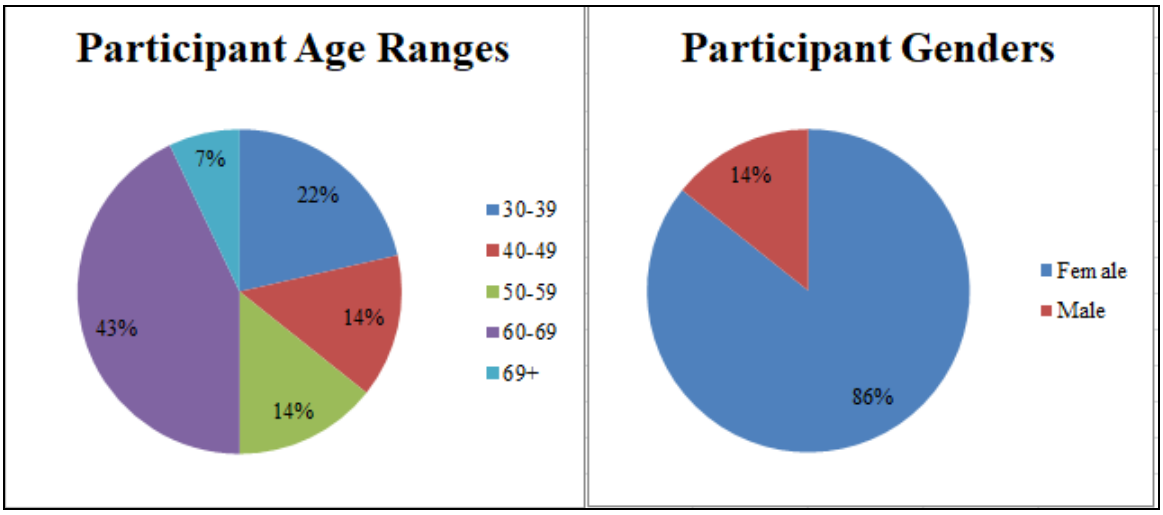


FIGURE 3. Participant age and gender distribution.

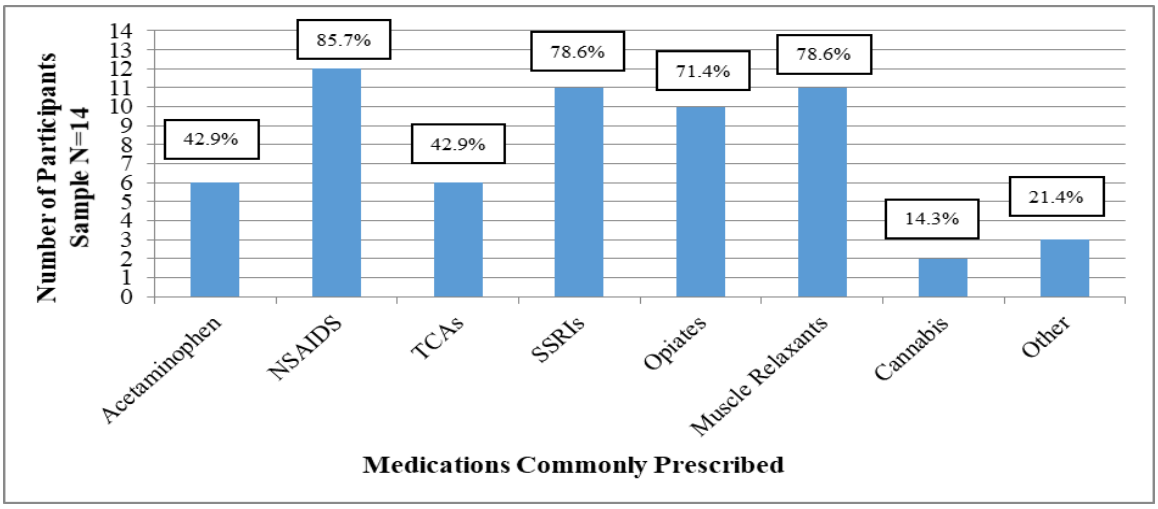


FIGURE 4. Medications participants commonly prescribe for chronic pain.

Survey Responses

Knowledge Questions

In all, scores on the knowledge section of the pretest and posttest surveys improved. To note, no scores decreased. On the pretest, two participants (14.3%) scored a 25%; two participants (14.3%) scored a 50%; six participants (42.9%) scored a 75%; and four participants (28.6%) scored a 100%. No participants scored less than a 25% on the pretest. On the posttest,

three participants (21.4%) scored a 75%, and eleven participants (78.6%) scored 100%. No participants scored less than a 75% on the posttest. This data is further examined in Figure 6.

Questions 2 and 3 were the questions that were answered correct most frequently on both the pretest and posttest. Question 2 asked: *Where are the cannabinoid receptors located naturally in the body*? On the pretest, 10 participants (71.4%) answered this question correctly, as "both peripheral and central pathways." This increased to 14 participants (100%) correctly choosing this answer on the posttest. Question 3 asked: *What is a contraindication for using medical cannabis*? On the pretest, one participant (7.1%) answered this question incorrectly, while 13 participants (92.9%) answered correctly, as the correct answer was "all of the above." This increased on the posttest, as all participants (100%) answered this question correctly. Questions 1 and 4 showed the most improvement from pretest to posttest scores. Question 1 stated*: __ and __ are two of the most commonly studied cannabinoids for chronic pain treatment*. On the pretest, seven (50%) participants answered this questions incorrectly, while the other seven (50%) answered correctly. On the posttest these scores improved, as only one participant (7.1%) answered incorrectly, and the remaining 13 (92.9%) chose the correct answer, "Delta (9)-tetrahydrocannabinol and Cannabidiol." Lastly, question 4 also showed improvement between pretest and posttest scores. Question 4 states: *Which of the following statements are false*? On the pretest, five participants (35.7%) answered incorrectly, while nine participants (64.3%) answered the question correctly. The correct answer was "Twenty-five states have active medical cannabis laws." On the posttest, this was answered incorrectly by only two participants (14.3%), while the remaining 12 participants (85.7%) answered the question correctly. These numbers are further compared in Figure 5 and Figure 6.

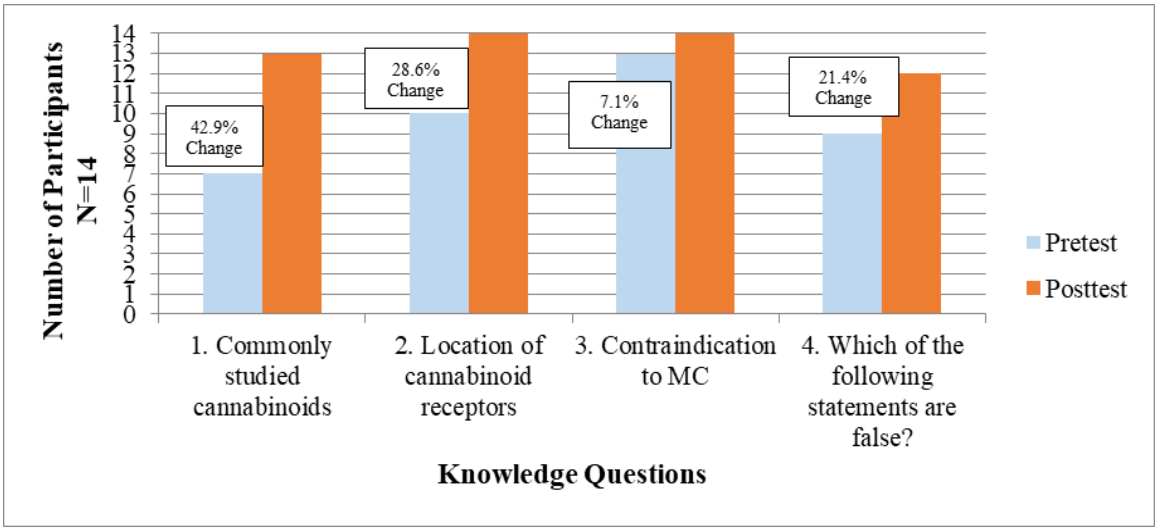


FIGURE 5. Correct response rates compared between pretest/posttest knowledge questions.

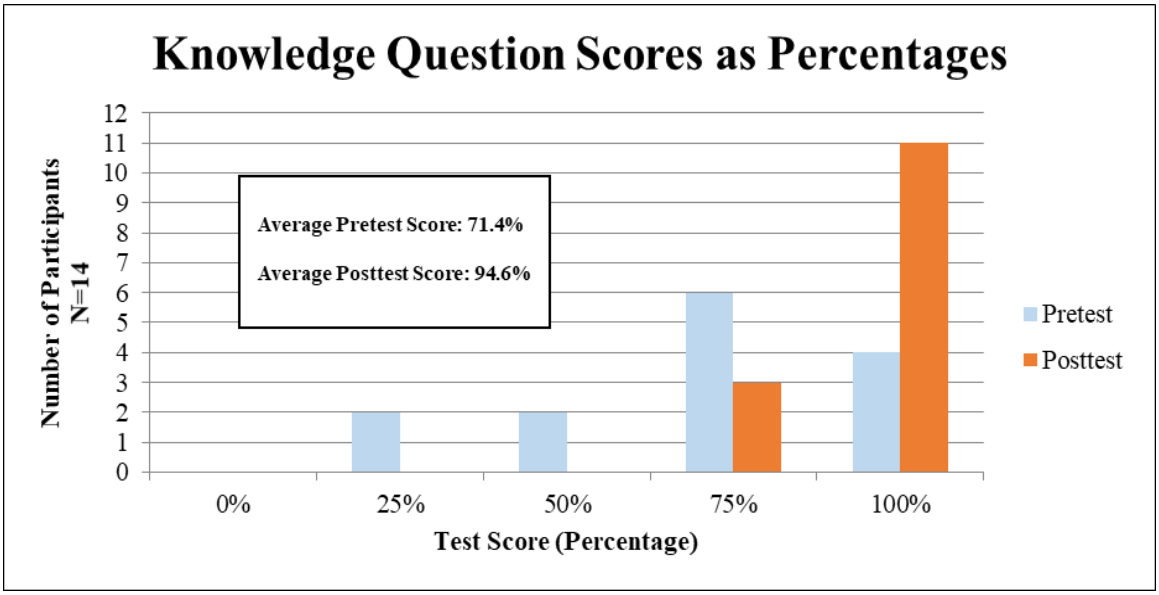


FIGURE 6. Knowledge questions pretest/posttest scores and averages compared.

Attitudes and Beliefs Questions

Questions 5 through 8 discussed provider comfort level, attitudes, and beliefs involving medical cannabis in Likert scale format. Participants were instructed to rate the questions from '1' (strongly disagree) to '5' (strongly agree). These results are displayed in Table 3 and Figure 7.

When asked how comfortable providers are talking about medical cannabis with patients on the pretest, two providers (14.3%) “disagreed” with that statement, while three providers (21.4%) “neither disagreed nor agreed.” Four providers (28.6%) “agreed” with the pretest statement, while the remaining five providers (35.7%) “strongly agreed.” In the posttest, five participants (35.7%) “neither disagreed nor agreed” with the statement. Half of the providers (50%) “agreed” with the statement, and the remaining two providers (14.3%) “strongly agreed.”

Question 6 asked if participants believe that medical cannabis could provide a safe alternative to opioid medications for chronic pain treatment. On the pretest, only one participant (7.1%) “disagreed” with this statement, while another six (42.9%) neither “disagreed nor agreed.” Three participants (21.4%) “agreed” with the statement, and the remaining four (28.6%) “strongly agreed.” After the educational flyer, no participants “strongly disagreed” or “disagreed” that medical cannabis could provide a safe alternative to opioid medication for chronic pain. Other posttest results for question 6 included five participants (35.7%) that “neither disagreed nor agreed’ with the statement, five participants (35.7%) that “agreed,” and four participants (28.6%) that “strongly agreed.”

In question 7, participants were asked whether or not they agreed that medical cannabis education should be a requirement for healthcare providers working in pro-medical cannabis states. For the pretest, two participants (14.3%) “disagreed” with this statement, while three (21.4%) “neither disagreed nor agreed.” Five participants (35.7%) “agreed” with the statement, and the last four participants (28.6%) “strongly agreed.” Although no participants “disagreed” with question 7 in the posttest, one respondent (7.1%) reported to “strongly disagree” that medical cannabis education should be a requirement. The number of responses that “neither

disagree nor agree" decreased from three (21.4%) on the pretest, to two (14.3%) on the posttest. Seven participants (50%) "agreed" with question 7 on the posttest, while the remaining four participants (28.6%) "strongly agreed."

Question 8 asks participants if the agree that medical cannabis should be recommended as an alternative therapy for chronic pain management. Although no participants "strongly disagreed" with the statement on the pretest, three participants (21.4%) "disagreed." Nearly half of participants (42.9%) reported that they "neither disagreed nor agreed" with the statement. Four participants (28.6%) "agreed," and one (7.1%) "strongly agreed" with the pretest statement. On the posttest, no participants "strongly disagreed" or "disagreed" that medical cannabis should be recommended as an alternative therapy for chronic pain management. In fact, only five respondents (35.7%) "neither disagreed or agree" with the statement. Seven providers "agreed" with the posttest statement, while the last two participants (14.3%) "strongly agreed."

TABLE 3. *Attitudes and beliefs questions, pretest/posttest answers, scores and averages.*

Question	Likert Scale	Pretest Responses (N=14)	Posttest Responses (N=14)	Average Pretest Response	Average Posttest Response	Change in Average Response
5. I am [more] comfortable discussing medical cannabis with patients [after receiving evidence based education]	Strongly Disagree Disagree Neither Agree Strongly agree	0 2 (14.3%) 3 (21.4%) 4 (28.6%) 5 (35.7%)	0 0 5 (35.7%) 7 (50%) 2 (14.3%)	3.9	3.8	2%
6. I believe medical cannabis could provide a safe alternative to opioid medications for chronic pain treatment	Strongly Disagree Disagree Neither Agree Strongly agree	0 1 (7.1%) 6 (42.9%) 3 (21.4%) 4 (28.6%)	0 0 5 (35.7%) 5 (35.7%) 4 (28.6%)	3.7	3.9	4%

TABLE 3 – *Continued*

Question	Likert Scale	Pretest Responses (N=14)	Posttest Responses (N=14)	Average Pretest Response	Average Posttest Response	Change in Average Response
7. Medical cannabis education should be a requirement for healthcare providers working in pro-medical cannabis states	Strongly Disagree Disagree Neither Agree Strongly agree	0 2 (14.3%) 3 (21.4%) 5 (35.7%) 4 (28.6%)	1 (7.1%) 0 2 (14.3%) 7 (50%) 4 (28.6%)	3.7	3.9	4%
8. Medical cannabis should be recommended as an alternative therapy for chronic pain management	Strongly Disagree Disagree Neither Agree Strongly agree	0 3 (21.4%) 6 (42.9%) 4 (28.6%) 1 (7.1%)	0 0 5 (35.7%) 7 (50%) 2 (14.3%)	3.2	3.8	12%

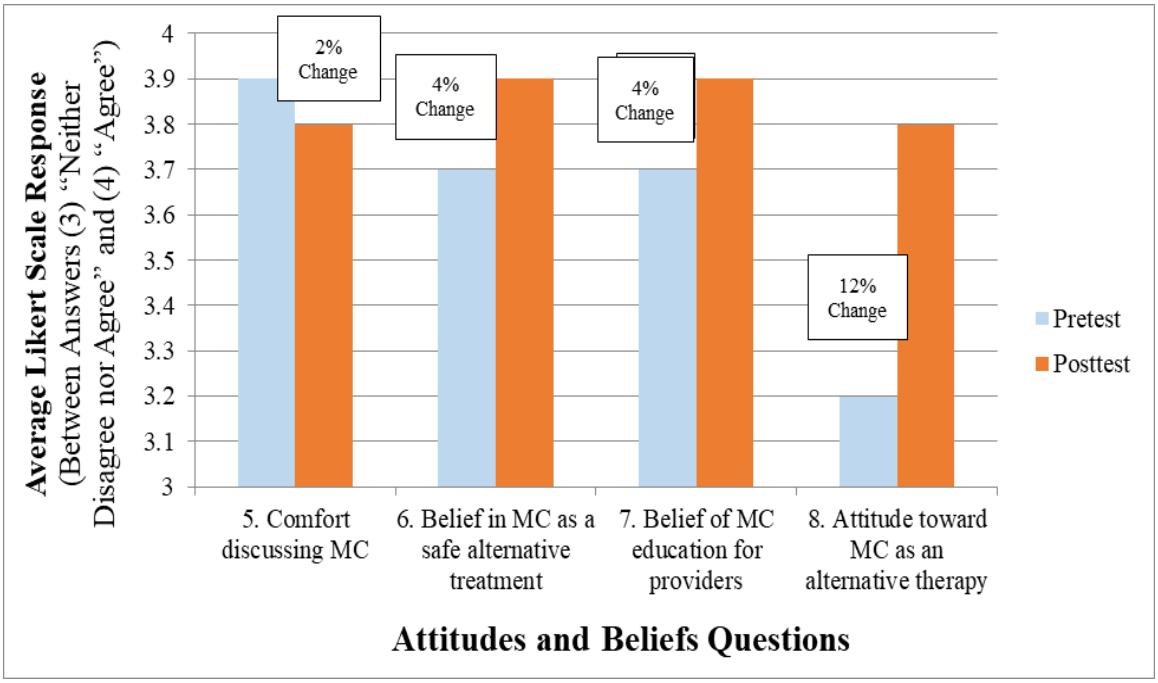


FIGURE 7. Attitudes and beliefs questions pretest/posttest average Likert responses compared.

Intent to Recommend Questions

Questions 9 and 10 on the pre and posttest surveys inquire about participants' intent to recommend and discuss medical cannabis with their patients. The posttest questions differ slightly from the pretest questions, in that they indicate that the participant has already viewed the education flyer. Results from these questions can be seen in Table 4 and Figure 8.

Question 9 asked participants if they are likely to have conversations with patients about medical cannabis. Two participants (14.3%) "disagreed" with this statement, while five (35.7%) "neither disagreed nor agreed." Another five participants (35.7%) "agreed" with this statement, and the remaining two (14.3%) "strongly agreed." After the education flyer, no participants "disagreed" or "strongly disagreed" with question 9. Four participants (28.6%) continued to report that they "neither disagreed nor agreed" with the statement. Nine participants (64.3%) responded that they "agree" with question 9, while the remaining one (7.1%) responded that they "strongly agree."

For the final question, respondents were asked if they were likely to recommend medical cannabis as an alternative therapy for chronic pain management. No respondents "strongly disagreed" with the statement, however two (14.3%) did indicate that they "disagreed" with the pretest statement. Half of the respondents (50%) indicated that they "neither disagreed nor agreed" with the statement. Four (28.6%) reported they "agreed," while the last respondent (7.1%) indicated they "strongly agreed" with the statement in question 10. In the posttest, no respondents "strongly disagreed" or "disagreed" that they are likely to recommend medical cannabis. The number of respondents who "neither disagreed nor agreed" with question 10

increased to eight (57.1%). Five respondents (35.7%) “agreed” and one (7.1%) “strongly agreed” that they are likely to recommend medical cannabis.

TABLE 4. *Intent to recommend questions, pretest/posttest answers, scores and averages.*

Question	Likert Scale	Pretest Responses (N=14)	Posttest Responses (N=14)	Average Pretest Response	Average Posttest Response	Change in Average Response
9. I [am more likely to] have conversations with chronic pain patients about medical cannabis use to treat the pain [after receiving evidence based education about its use]	Strongly Disagree Disagree Neither Agree Strongly agree	0 2 (14.3%) 5 (35.7%) 5 (35.7%) 2 (14.3%)	0 0 4 (28.6%) 9 (64.3%) 1 (7.1%)	3.5	3.8	6%
10. I am [more] likely to recommend medical cannabis as an alternative therapy for chronic pain management [after receiving evidence based education about its use]	Strongly Disagree Disagree Neither Agree Strongly agree	0 2 (14.3%) 7 (50%) 4 (28.6%) 1 (7.1%)	0 0 8 (57.1%) 5 (35.7%) 1 (7.1%)	3.3	3.5	4%

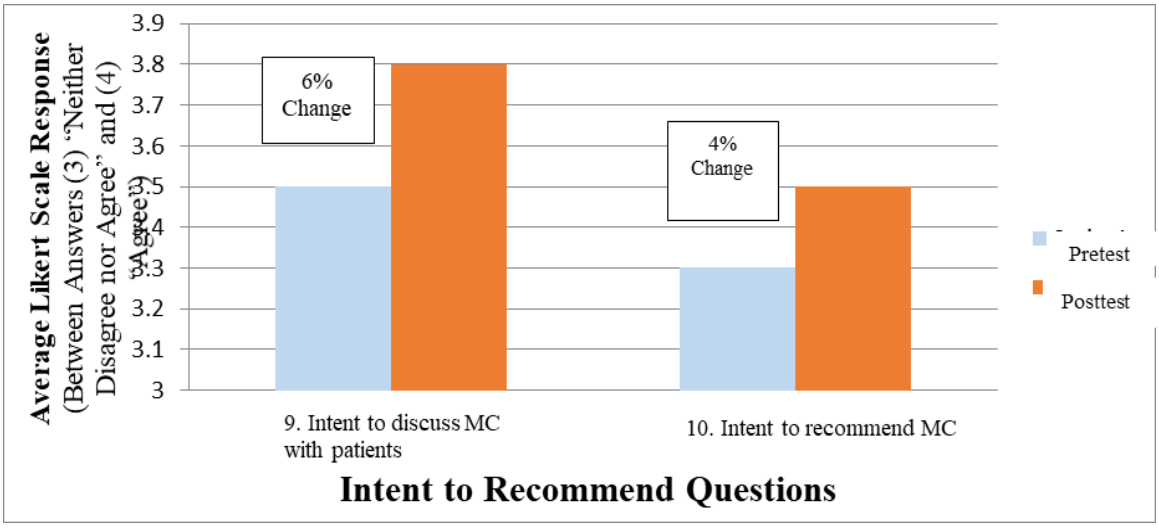


FIGURE 8. Intent to recommend questions pretest/posttest average Likert responses compared.

DISCUSSION

Interpretation of Knowledge Results

From these results, the data demonstrates that an increase in knowledge occurred after implementation of the educational flyer regarding medical cannabis. The average score between the fourteen participants on the pretest was a 71.4%. After the education flyer was viewed and participants took the posttest, the average test score increased to 94.6% (Figure 5). One of the goals of this project was to determine if an education flyer would impact provider knowledge regarding medical cannabis. This is a promising positive result, as average knowledge scores increased by 23.2% after the implementation of the educational flyer. As such, the findings of this portion of the project reflect that, in this surveyed population, an educational flyer about medical cannabis had a positive impact on provider knowledge regarding medical cannabis. These results can be interpreted as an increase in provider knowledge regarding medical cannabis in the surveyed provider population.

Interpretation of Attitudes and Beliefs Results

The mean pretest score for question 5 was 3.9, which on the Likert scale would be found between “neither disagree nor agree” and “agree.” After the education, the posttest average score for this question was 3.8, which would also fall between “neither disagree nor agree” and “agree.” This was a 2% change in question 5. A key factor in this question is the fact that question 5 is one of the questions that ask respondents if they are more comfortable discussing cannabis after receiving evidence based education on the topic. The pretest version of the question simply asks if they are comfortable discussing medical cannabis with their patients. When comparing the average answer for this question, it does not appear that the education

based flyer strongly impacted provider comfort level discussing medical cannabis with patients. One important statistic to keep in mind, however, is that no providers disagreed (0%) or strongly disagreed (0%) with the statement after receiving the evidence based education flyer.

The average pretest score for question 6 was 3.7, which on the Likert scale, falls between "neither disagrees nor agrees" and "agrees". The average answer for the posttest improved by 0.2. This average posttest score of 3.9 also lays between Likert points of "neither disagrees nor agrees" and "agrees." This was as a 4% increase in average provider response after the educational flyer. Similar to results from question 5, the posttest results from question 6 did not contain any "strongly disagree" or "disagree" responses. The number of "agree" responses increased from three (21.4%) on the pretest to five (35.7%) on the posttest. Likewise, the number of respondents who "neither disagreed nor agreed" with question 6, decreased by one (7.1%) response from the pretest to posttest. Since there were no "disagree" answers on the posttest, an increase in the number of "agree" responses, and a decrease in the number of responses that "neither disagreed nor agreed," could be interpreted that the educational flyer had a positive impact on question 6. Thus, an increase in provider's belief of medical cannabis as a safe alternative treatment for chronic pain was demonstrated.

Compared results for question 7 are slightly confounding. Although no participants "strongly disagreed" with this question on the pretest, one participant (7.1%) did "strongly disagree" on the posttest. To note, this same participant only "disagreed" with question 7 on the pretest. This could be interpreted that the evidence based educational flyer deterred this participant away from believing that providers in pro-medical cannabis state should receive education on the topic, which is not an expected result. The expected result for this question was

that providers may see the benefit of evidence based education when making informed decisions regarding medical cannabis as an alternative therapy for chronic pain. The remaining results do demonstrate this idea. The average score for question 7 on the pretest was 3.7, compared to the posttest average of 3.9, which is a 4% increase after the educational flyer Both of these results fall between "neither disagree nor agree" and "agree." However, if observed more closely, results do demonstrate a positive change. For example, the number of participants that either "disagreed" (14.3%) or "neither disagreed nor agreed" (21.4%) with question 7 on the pretest, decreased on the posttest to zero and 14.3% respectively. This is a positive finding, as less participants chose disagreeing or neutral answers regarding required medical cannabis education for providers. The results also show that the number of participants who either "agreed" or "strongly agree" with question 7 on the pretest ([total] 64.3%) increased by 14.3% on the posttest ([total] 78.6%).

Question 8 may best describe the positive increase in provider attitudes towards medical cannabis as an alternative therapy for chronic pain management before and after the educational flyer. The average Likert response for the pretest was 3.2, while the posttest average was 3.8. This is a 12% increase in Likert responses after the educational material. The number of participants who either "strongly disagreed" or "disagreed" with question 8 decreased from three on the pretest (21.4%), to zero on the posttest. This data demonstrates that after receiving the evidence based education flyer, participants were less likely to disagree that medical cannabis should be recommended as an alternative therapy for chronic pain. Pretest and posttest responses for question 8 only minimally improved for the "neither disagree nor agree" answer, decrease from six responses (42.9%) initially, down to five responses (35.7%) after the educations flyer.

These changes, as well as the lack of "disagreeing" responses in the posttest, demonstrate a positive trend in results, meaning participants appear more in favor of agreeing responses for question 8. Similarly, selected "agreeable" responses increased in this question. In the pretest, five participants (35.7%) reported they either "agreed" or "strongly agreed" with the statement medical cannabis should be recommended as an alternative to chronic pain. In the posttest, this number increased to nine participants (64.3%).

Interpretation of Intent to Recommend Results

For question 9, there is compelling data that the evidence-based educational flyer positively impacted participant's intent to discuss medical cannabis with patients. Ten participants (71.4%) either "agreed" or "strongly agreed" that they are more likely to have conversations with chronic pain patients about medical cannabis use to treat the pain after receiving evidence-based education about its use. This demonstrates a 21.4% increase in agreeing responses in the posttest survey, when compared to the agreeing responses in the pretest (50%). Correspondingly, pretest results show that half of participants (50%) either "disagreed" or "neither disagreed nor agreed" with the statement in question 9. However, after the educational flyer, posttest results show that only four participants "neither disagreed nor agreed," with that statement, and no disagreeing answers were chosen. The decrease in the Likert scale answers "disagree" and "neither disagree nor agree," suggests that the educational flyer had a positive impact on participants' intent to have conversation with their patients about medical cannabis. This idea is also supported by a positive change in the average scores for question 9. Pretest scores for question 9 showed an average response of 3.5 on the Likert scale. After the

educational flyer, that average was increased to 3.8. This is a 6% increase in Likert responses after the educational flyer.

Pretest and posttest data for question 10 differed only slightly in results, with a Likert scale average of 3.3 on the pretest, and 3.5 on the posttest. These results indicate a 4% increase in Likert responses after the intervention. To note, the answers do trend in a positive pattern, similar to the rest of the findings. For example, pretest data found that two participants (14.3%) made disagreeing answer selections. On the posttest, this dropped to zero, meaning no participant disagreed with the statement, "I am more likely to recommend medical cannabis as an alternative therapy for chronic pain management after receiving evidence based education about its use." From these results, one could interpret that educational materials may not sway providers to recommend medical cannabis, but perhaps allow them to be more open minded about it potential use. In addition, posttest data showed that the number of participants that "neither disagreed or agreed" and who "agreed" both increased by one participants. Eight participants (57.1%) "neither disagreed or agreed" with question 10. Nearly half of the participants (42.9%) either "agreed" or "strongly agreed" that they were more likely to recommend medical cannabis as an alternative therapy for chronic pain management after receiving evidence based education about its use.

Participant Comments and Themes

Half of the participants (50%) left comments or questions for this author to include in the final project write up. One participant wrote: "How? What route/dose …? This is patient specific, and without guidelines [it is] so difficult to recommend…where to buy a trustworthy product?" Another participant wrote: "Drug interactions? What are reputable dispensaries – how

does a patient evaluate [this]? How are dispensary consultants trained? Can liver failure patients use cannabis? How does one evaluate whether or not they are safe to drive? Dosing guidelines? Are there standards so one batch is equal to the next?" The last participant wrote: "Interesting project idea…Providers in pro [medical cannabis] states would benefit from in-services and education. Where should providers look for dosing and product recommendations?" Several participants voiced concerned over cost of medical cannabis, noting that patients have to pay for it out of pocket, and that many of the patients they see could not afford it. Another participant commented that it should not be required that providers learn about medical cannabis as "there are already too many required CE topics," and that required medical cannabis education "would take away from subjects more valuable" to their practice. The most common theme found in the open-ended, optional comments involved asking about dosing guidelines, as well as where to find a reputable dispensaries or trustworthy product. Two participants voiced concern over how to ensure their patients are receiving quality products for the treatment of pain, if they were to recommend cannabis.

Integration of Theoretical Framework

The Donabedian Model of Care was the theoretical framework used to guide this DNP project. The concepts used from this framework included structure, process, and outcome. This project: (a) examined healthcare providers' attitude, knowledge, beliefs and comfort level regarding use of MC for chronic pain (structure); (b) provided an evidence based educational flyer to increase provider knowledge, enhance their attitudes and beliefs, and enlighten them about the potential uses of MC for chronic pain (process); and (c) measured change through the pretest/posttest design (outcome). Analyses of results revealed that provider knowledge,

attitudes, comfort, and intent to recommend did increase from pre to posttest. This would suggest that the evidence-based educational flyer guided the change in knowledge, attitudes, comfort, and intent to recommend. Primary care providers play a critical role in being informed and educating patients about the potential uses, benefits of, and contraindications involving MC. For this reason, providers must stay educated and up to date on the current research and recommendations revolving around MC use for chronic pain.

Strengths

There were several key strengths within this project. Overall strengths included: (a) improved knowledge of medical cannabis after the educational flyer intervention; (b) increased belief in and intent to recommend MC with chronic pain patients; and (c) increased intent to discuss MC with qualifying patients. Also, the utilization of a pretest/posttest design enhanced the likelihood that the changes seen in knowledge, attitudes, beliefs, and intent to recommend, were a likely result of the evidence based educational flyer.

Limitation of the Study

The first limitation for this DNP project was the small sample size. The sample size was small for a numerous reasons. For one, this author used convenience sampling, which limited the distribution of surveys to only 100 ARNPs practicing primary care in Washington State. The ARNPs reached were also all members of the AANP. The director of this project was unable to pay for more than 100 participants, due to the cost of AANP application, AANP addresses, paper, ink, stamps, and other materials to fund the project. Due to the limitations of the distribution of this project to providers in one organization, generalizability, while not intended, would be difficult to determine if the project were used in other settings or other states. The

number of respondents was also low, as only 14 of the 100 (14%) surveys were completed and returned.

Time also plays a huge factor in limitations for this project. Due to a rigorous application and approval process, as many DNP project entail, the timeline for this project was pushed back much further than first anticipated. For this reason the project was limited to two weeks for collecting responses, although the project director had originally planned for four weeks. However, it is debatable whether more time would allow for a greater number of responses. If this project had been completed electronically, the project director could have sent out a reminder email to encourage or remind participants to complete and turn in their surveys. As this project used physical mail, there was no ability to easily send any sort of reminder within the timeframe.

The paper format of the survey is another limitation for this project. Although not as convenient as electronic surveys, the director of this project was not able to gain any electronic information about potential participants. Instead, only physical mailing addresses were provided by the AANP, thus the decision was made to keep everything on paper. The project director attempted to make this as convenient as possible for respondents, and tried to encourage participation by providing all the means necessary to return the surveys. In the initial mail packet, participants received a return envelope that was pre-stamped and preaddressed back to the author, to streamline the survey return process as much as possible.

Another limitation is the premise of the survey, which could have influenced or discouraged some providers who have little or no experience with medical cannabis or chronic pain, and therefore did not complete it. Medical cannabis, even in states like Washington with

pro-MC laws in place, is still a very taboo subject in the medical community. Providers who did receive the survey may still feel uncomfortable discussing or sharing views on medical cannabis, even though the surveys were both voluntary and anonymous.

The survey design was also a limitation to the study. Likert scales questions allow for participants to rate questions from '1' to '5.' However, the middle response in the case of this project, was "neither disagree nor agre," or a '3' on the Likert scale. This neutral response can be difficult to draw conclusion from, as it does not fit into a "disagreeing" or "agreeing" response category.

Lastly, the common themes in the open-ended section of the posttest can represent limitations as well. These included more specific dosing recommendations of type of MC products, reliable MC dispensaries, and increasing provider familiarity with how to go about recommending MC for their patients. By not addressing these items in the educational flyer, participant's willingness to discuss and recommend MC with patient could be limited. Likewise, as only half of the participants offered their comments, there may have been additional information gleaned had the remainder of the participants answered the open-ended question.

Future Implications

Despite the limitations of the survey, important information was gathered overall about the potential effect that evidenced-based education can have on provider knowledge, attitudes, comfort, and intent to recommend medical cannabis for chronic pain. Regardless of the small sample size, this survey gave valuable insight into the role of medical cannabis education, which can be used as the basis for future projects. The results of this project show that providers generally do consider it important to obtain knowledge about MC. Results also demonstrate that

most providers feel that MC could provide a safe alternative therapy option instead of opiate medications. Providers also report being more likely to talk with patients about MC, as well as recommend it for chronic pain management after receiving evidence-based education. These findings are consistent with many of the reviewed literature. Similarly, many of the open-ended responses from project participants mirror previous researcher recommendations for future MC exploration. These included larger sample sizes, more specific dosing recommendations, and increasing provider familiarity with how to recommend and discuss MC with their patients.

Conclusion

Despite the limitations mentioned, this DNP project has the potential to guide future research. This quality improvement project used a pretest/posttest design that resulted in promising findings, which support providing MC education to primary care providers. From a harm reduction viewpoint, this project's results have aimed to highlight the necessity for more extensive research into the use of MC as an alternative treatment option for patients suffering from chronic pain. If medical cannabis can serve as an alternative therapy for chronic pain management, healthcare providers should consider cannabis education as a potential tool for combating the opioid epidemic. This project has reviewed a substantial body of research involving medical cannabis, and has put forth several recommendations for its efficacy in the treatment of chronic pain, as well as the benefits of provider education on the subject. Although further studies are need to study long term therapy, medical cannabis may play a pivotal role in solving the opioid crisis faced in the US today.

APPENDIX A:

SYNTHESIS OF EVIDENCE

Synthesis of evidence.

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
Andreae, M., Carter, G., Shaparin, N., et al. (2015). Inhaled cannabis for chronic neuropathic pain: A meta-analysis of individual patient data.	Chronic neuropathic pain remains difficult to treat and under-diagnosed Authors performed a meta-analysis (individual patient data/ Bayesian responder) to research if inhaled cannabis provides relief for chronic neuropathic pain.	n/a	Meta-Analysis All 5 studies were randomized, placebo controlled and double-blind, four used a cross-over, and one study was a parallel design Bayesian responder meta-analysis of patient data individually (this method was used due to concerns over incomplete outcome reporting, limited availability of patient statistics, varied endpoints, and variety of study designs with different statistical analysis). The Bayesian method also provides more robust approximations of between-study	Studies included RCTs about chronic pain neuropathy, including traumatic, HIV related, and diabetic. Studies also needed to report on n =178 participants in 5 RCTs. Inhaled cannabis vs other routes. Multiple sclerosis was excluded (central vs. peripheral pain)	Databases used: Cochrane Central, PubMed, EMBASE, and AMED. No language barrier was used Researchers performed a hand search of conference abstracts from the World Congress of Pain, the International AIDS Conference, and the Conference on Retroviruses and Opportunistic Infections The 5 studies were placebo-controlled, double-blind, and randomized; 1 used a parallel design and the other 4 utilized a crossover design. Length of follow up ranged from hours/days/weeks Their protocol was registered with PROSPERO.	The primary reported outcomes were patient reported intensities of pain. Bayesian posterior probability > 99.7% describes a great likelihood that inhaled cannabis is successful in short term pain relief for 1 in 5 or 6 patients (authors note the difference of this statistic compared to a usual “p” value) Their reported that their findings show statistically significant change in pain for 1 in 5 to 6 patients, but noted this effect as a minimal clinically important difference (this means that when applied to larger parent populations, a large

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
			variance			effect will likely be seen, but at the individual patient level, effects will be very minimal, or perhaps not seen). For chronic neuropathy pain, researchers projected an odds ratio for more than 30% decrease in pain scores with inhaled cannabis compared to placebo -3.2 with a Bayesian CRI (CRI95%) [1.59, 7.24]CRI 95%, and the NNT as 5.55 [3.35, 13.7]CRI 95%. Cannabis's effect of chronic neuropathy pain was estimated to be 99.7% and with a Bayes factor of 332. Researchers reported that any withdrawal symptoms noted were rare.

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						They also stated that participants rarely complained of side effects such as euphoria or feeling "high."
Boehnke, K., Litinas, E., & Clauwz, D. (2016). Medical cannabis use is associated with decreased opiate medication use in a retrospective cross-sectional survey of patients with chronic pain.	Authors hypothesized that cannabis user's use cannabis for chronic pain reduction and as a substitute for opioids. They further hypothesize that there is evidence that cannabis is reported to be more effective for centralized chronic pain (central nervous system pain, which has previously decreased responsiveness to opioids)	n/a	Retrospective Cross-Sectional Survey The survey contained 46 questions, detailing the medical condition(s) for which cannabis was used, method/ frequency of cannabis use, changes in non-cannabis medication use, changes in medication side effects, quality of life changes since starting cannabis use, and demographic information	374 participants were recruited for the study, and 244 of the participants used cannabis to treat chronic pain. Sensitivity analyses showed that exclusion of incomplete questionnaires did not have a significant effect on outcomes , and only the complete questionnaires of participants with chronic pain were used for analysis (n = 185).	Survey distribution was carried out in collaboration with owners of a local medical cannabis dispensary in Ann Arbor, Michigan	With the initiation of medical cannabis use, chronic pain patients reported significant decreases in medication side effects that affected their daily functioning (including opioids), decreases in total number of medications being taken, and improvements in quality of life. Reported reduction in opioid use and decreased medication side effects were significantly correlated (r = .37, P = .0002), indicating

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						a potential health benefit of replacing opioids with cannabis The mean change in self-reported opioid use among all respondents answering this question was 64%. The reduction of opioid use was the least drastic in the highest fibromyalgia score quartile (48%), which was significantly different from the lowest fibromyalgia score quartile (79%, P = .03) but not the second and third (74% and 63%, P = .14 and .59, respectively).
Bradford, A., & Bradford, W. (2016). Medical marijuana laws	Report the association between medical cannabis laws and amount of	Substitution effect model	Regression modeling Difference-in-differences	24 states with medical marijuana law Nine clinical areas	Medicaid fee-for service prescription data, state drug utilization data	Medicaid cost savings associated with MC laws = $19.825 million per

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
reduce prescription medication use in Medicare Part D.	prescriptions filled by Medicaid patients For FDA-approved prescription drugs (where medical marijuana can serve as a replacement) researchers hypothesized prescribing would decline		regression framework (separately estimated for each condition categories) Bivariate comparison	of prescription drugs for which MC could be a substitute Medicare Part D enrollees from 2010 to 2013		state = total of $3.89 billion nationally if all states had MC laws. Medicaid beneficiaries in states with MC laws will fill fewer prescriptions. 7/10 categories (all but glaucoma and spasticity) researchers noted that implementing an medical marijuana law resulted in a decrease of 265 daily doses (for depression) and 1,826 daily doses (for pain) filled per physician per year.
Carlini, B., Garrett, S., & Carter, G. (2017). Medicinal cannabis: A survey among health care providers in Washington State	Washington State allows marijuana use for medical (since 1998) and recreational (since 2012) purposes. The benefits of medicinal cannabis (MC) can be	n/a	An anonymous online survey assessed providers' MC knowledge, beliefs, clinical practices, and training needs. Utilized a 47-item questionnaire based	494 health care providers responded to the survey.	The survey was disseminated through health care providers' professional organizations in Washington State. Descriptive analysis compared providers who had and had not	Approximately two-third were women, aged 30 to 60 years, and working in family or internal medicine. More than half of the respondents were legally allowed to

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	maximized if clinicians educate patients about dosing, routes of administration, side effects, and plant composition. However, little is known about clinicians' knowledge and practices in Washington State		on instruments developed in 2 similar studies, 11, 12 adapted to Washington State-specific needs.		authorized MC for patients. Survey results informed the approach and content of an online training on best clinical practices of MC.	write MC authorizations per Washington State law, and 27% of those had issued written MC authorizations. Overall, respondents reported low knowledge and comfort level related to recommending MC. Respondents rated MC knowledge as important and supported inclusion of MC training in medical/health provider curriculum. Most Washington State providers have not received education on scientific basis of MC or training on best clinical practices of MC. Clinicians who had issued MC authorizations were more likely to have

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						received MC training than those who had not issued MC authorization.
Corroon, J., Mischley, L., & Sexton, M. (2017). Cannabis as a substitute for prescription drugs--a cross-sectional study.	Survey cannabis users for intentional substitutions of cannabis for prescription drugs	n/a	Cross-sectional survey	n = 2,774 WA, CA, OR, CO, recruit via social media and cannabis dispensary in WA Anonymous online survey convenience sample	Self-selected convenience sample who reported having used cannabis at least once in the previous 90 days. Subjects were surveyed via an online anonymous questionnaire on cannabis substitution effects. 1,248 (46%) of the convenience sample reported using cannabis as a substitute for prescription drugs.	Common classes of drugs substituted were narcotics/opioids (35.8%), anxiolytics/benzodiazepines (13.6%) and antidepressants (12.7%). 2,473 total substitutions were reported Approximately 2 drug substitutions per respondent. Slightly higher percentage of substitution was noted in legal medical cannabis states compared to states where it was illegal (47% vs. 44%, p=0.47) (not statistically significant) These outcomes

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						support prior research that individuals are using cannabis as a substitute for prescription drugs, particularly, narcotics/opioids
Degenhardt, L., Lintzeris, N., Campbell, G., Bruno, R., Cohen, M., Farrell, M., & Hall, W. (2015). Experience of adjunctive cannabis use for chronic non-cancer pain: Findings from the Pain and Opioids IN Treatment (POINT) study.	Authors acknowledge limited data, but report there is strong advocacy by users for the symptomatic benefit of adjunctive cannabis, and increasing general interest in its use. Short-term controlled trials have evaluated pharmaceutical opioids in the treatment of a range of chronic non-cancer pain conditions and have demonstrated modest attenuation of pain; one systematic review	n/a	Pharmacists were asked to approach customers that were prescribed a Schedule 8 opioid for chronic non-cancer pain (for greater than 6 weeks). Interested participants were provided a flyer about the study via the pharmacist, and then either contacted the POINT team or by researchers.	The Pain and Opioids IN Treatment (POINT) study includes 1514 people in Australia who have been prescribed opioids for chronic non-cancer pain	Researchers used data from a national, community-based sample of people who have been prescribed opioids for their pain to examine the extent to which cannabis is in fact used by this group. Cannabis use disorders (ICD-10 harmful use and dependence) assessed by the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI) Pain ratings/participant reports of pain relief	In those using cannabis, the average pain relief reported from using cannabis was 70% (where 100% meant complete pain relief). The average reported pain relief from their medications was 50%. Of those who had used cannabis for pain relief, n = 34 felt that cannabis provided 100% pain relief (4 of these reported that their medications gave them 100% pain relief)

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	concluded that there is only weak evidence of long-term analgesic benefit				obtained by the Brief Pain Inventory Proportions and 95% confidence intervals estimated for cannabis use variables. Odds ratios and 95% CI from logistic regressions calculated to compare participants using cannabis for pain vs the rest of the POINT cohort Also used among cannabis users, to compare recreational use to uses for pain control.	Among all those using cannabis for pain relief, n = 10 reported 100% pain relief from their medications Cannabis use for pain relief purposes appears common among people living with chronic non-cancer pain, and users report greater pain relief in combination with opioids than when opioids are used alone
Kondrad, E., Reed, A., Simpson, M., & Nease, D. (2018). Lack of communication about medical marijuana use between doctors and their patients.	Medical marijuana is now permitted in most states, but it is not clear whether primary care physicians (PCPs) are aware of or recommend its use in their patients.	n/a	Researchers distributed paired surveys to PCPs and their patients to assess the frequency of patient marijuana use and communication with PCPs about use paired "card study" method	54 patients, 54 providers qualified	Performed an observational study in 2013, after Colorado legalized medical marijuana in 2000 but before recreational marijuana sales started in 2014. Using a paired "card study" method where medical assistants	22% reported marijuana use in the past 6 months, and 61% of these identified as medical marijuana users. PCPs did not complete state forms to recommend medical marijuana for any of the

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
					distributed paper surveys linked by corresponding random numbers to patients and their providers during office visits to family medicine clinics. Nine patient surveys asked about marijuana use, PCP communication about use, and perceived benefits and adverse effects. Provider surveys asked about patient marijuana use, reasons for use, where the patient obtained a recommendation for medical marijuana, and potential medical benefits and adverse effects.	surveyed medical marijuana users. PCPs were aware of marijuana use in their patients only 53% of the time. PCPs identified conditions they believed could be adversely affected by marijuana use in 31% of users**.** There is poor communication between patients and PCPs about medical marijuana use, which is being sanctioned by physicians other than patients' PCPs. We suggest more frequent assessment of and discussion about marijuana use in patients, particularly in states that have approved medical marijuana.
Philpot, L., Ebbert, J., & Hurt, R.	Healthcare providers play a	n/a	Electronic survey of primary care	Sixty-two providers	Researchers obtained information about	A majority of providers believed

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
(2019). A survey of the attitudes, beliefs and knowledge about medical cannabis among primary care providers.	critical role in facilitating patient access to medical cannabis. However, previous surveys suggest only a minority of providers believe that medical cannabis confers benefits to patients. Understanding current attitudes and beliefs of providers may provide insight into the ongoing challenges they face as states expand access to medical cannabis.		providers	completed the survey. Providers were from a large Minnesota-based healthcare system between January 23 and February 5, 2018	provider characteristics, attitudes and beliefs about medical cannabis, provider comfort level in answering patient questions about medical cannabis, and whether providers were interested in receiving additional education.	(“strongly agree” or “somewhat agree”) that medical cannabis was a legitimate medical therapy (58.1%) and 38.7% believed that providers should be offering to patients for managing medical conditions. A majority (> 50%) of providers believed that medical cannabis was helpful for treating the qualifying medical conditions of cancer, terminal illness, and intractable pain. A majority of providers did not know if medical cannabis was effective for managing nearly one-half of the other state designated qualifying medical conditions. Few

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						believed that medical cannabis improved quality of life domains. Over one-third of providers believed that medical cannabis interacted with medical therapies. One-half of providers were not ready to or did not want to answer patient questions about medical cannabis, and the majority of providers wanted to learn more about it.
Piper, B., Beals, M., Abess, A., Nichols, S., Martin, M., Cobb, C., and DeKeuster, R. (2017). Chronic pain patients' perspectives of medical cannabis.	The goal of this report was to provide an in-depth qualitative exploration of patient perspectives on the strengths and limitations of MC. Another objective of this report was to expand on this foundation and	Qualitative analyses were conducted from a Grounded Theory perspective.	Participants completed a 77-item online survey	Study participants (N 5 984) were legal members of MC dispensaries in the Northeastern United States, including Maine (57.9%), Vermont (30.6%), and Rhode Island (11.5%). The sample	The MC patient survey included quantitative and qualitative items. A psychologist who was not a cannabinoid expert identified themes and subthemes, first using the results with 1 dispensary and then with full data set.	In response to "How effective is medical cannabis in treating your symptoms or conditions?," with options of "0 to100%"complete relief," the average was 74.6% The average amount spent on MC each year was $3064.47

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	examine both the strengths and limitations of MC in the Northeastern United States			consisted primarily of patients with chronic pain from a wide variety of often overlapping sources, including back pain, arthritis, neuropathic pain, postsurgical pain, abdominal pain, and headaches.	Quantitative analysis was completed with Systat version 13.1. Variability was expressed as theSEM Qualitative analyses were conducted from a Grounded Theory perspective.	with a range between $52.14 to $52,140.00. Open-ended responses were coded into themes and subthemes. Analysis of answers to "What is it that you like most about MC?" identified 10 themes, including health benefits (36.0%), "Changes perception and experience of my chronic pain.", the product (14.2%), "Knowing exactly what strain you are getting"), non-health benefits (14.1%), general considerations (10.3%), and medications (7.1%).
Sharon H, Goldway N, Goor-Aryeh I, Eisenberg E, & Brill S. (2018). Personal experience and	The scientific study of the role of cannabis in pain medicine still lags far behind the	n/a	Registered, active, board-certified pain specialists in Israel were asked to complete a Web-	79 providers completed the survery	The survey was developed using the Qualtrics Online Survey Software. Questions were	Sixty-four percent of all practicing pain specialists in Israel responded. Almost all prescribe

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
attitudes of pain medicine specialists in Israel regarding the medical use of cannabis for chronic pain.	growing use driven by public approval. Accumulated clinical experience is therefore an important source of knowledge. However, no study to date has targeted physicians who actually use cannabis in their daily practice.		based survey.		formulated as multiple-choice questions, and these addressed three areas of interest: 1) doctors' personal experience; 2) the role of cannabis in pain medicine; and 3) cannabis medicalization and legalization.	cannabis. Among them, 63% find cannabis moderately to highly effective, 56% have encountered mild or no side effects, and only 5% perceive it as significantly harmful. Common indications are neuropathic pain (65%), oncological pain (50%), arthralgias (25%), and any intractable pain (29%). Leading contraindications are schizophrenia (76%), pregnancy/breastfeeding (65%), and age <18 years (59%). Only 12% rated cannabis as more hazardous than opiates. On a personal note, 45% prefer cannabis for themselves or a family member. Lastly, 54% would

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						like to see cannabis legalized in Israel.
Vigil, J., Stith, S., Adams, I., & Reeve, A. (2017). Associations between medical cannabis and prescription opioid use in chronic pain patients: A preliminary cohort study.	Current levels and dangers of opioid use in the U.S. warrant the investigation of harm-reducing treatment alternatives	n/a	A preliminary, historical, cohort study was used to examine the association between enrollment in the New Mexico Medical Cannabis Program (MCP) and opioid prescription use.	N= 66 As in other states, New Mexico only permits medical cannabis use for patients with certain debilitating medical conditions. All the patients in our study had a diagnosis of "severe chronic pain," annually validated by two independent physicians, including a board-certified specialist	A single-physician rehabilitation clinic (Albuquerque, NM) where the study took place provides all eligible patients with the opportunity to enroll in the MCP, an option which roughly one third of chronic pain patients decide to explore	Medical cannabis program enrollment was associated with: -17.27 higher (age and gender adjusted) odds of ceasing opioid prescriptions (CI 1.89 to 157.36, p = 0.012) -5.12 higher odds of reducing daily prescription opioid dosages (CI 1.56 to 16.88, p = 0.007) -47% point reduction in daily opioid dosages (relative to a mean change of positive 10.4% points in the comparison group) (CI -90.68 to -3.59, p = 0.034). Survey responses indicated improvements in pain reduction, quality of life, social life, activity levels,

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
						and concentration, and few side effects from using cannabis one year after enrollment in the MCP (ps<0.001). The current preliminary findings build upon recent studies suggesting that medical cannabis laws result in clinically and statistically significant (up to 33%) reductions in opioid-related causes of death and opioid usage
Vyas, M., Lebaron, V., & Gilson, A. (2018). The use of cannabis in response to the opioid crisis: A review of the literature.	Purpose of the article was to examine state medical cannabis use, laws, and policies, as well as and the potential association with prescription opioid medication use and harms. In response to the	n/a	Systematic literature review Inclusion search criteria: peer-reviewed articles published in English between 2010-2017 Articles addressing costs, overdose, and uses of opioid and/or cannabis	Of 134 articles, 10 articles met inclusion criteria. Four articles were cross-sectional online survey studies of MC substitution for prescription opioid medications (POM), six were secondary data	A systematic literature review was conducted to explore United States policies related to MC use and the association with POM use and related harms. Medline, PubMed, CINAHL, and Cochrane databases were searched to identify	Review of the current literature suggests states that implement MC policies could reduce POM-associated mortality, improve pain management, and significantly reduce health care costs. However, MC

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	opioid crisis, overdose prevention, harm reduction strategies, and alternative therapies for pain management need to be addressed (such as medical cannabis)		treatment for pain US only 11,513 possible articles, only 10 used for review	analyses exploring state-level POM overdose fatalities, hospitalizations related to MC or POM harms, opioid use disorder admissions, motor vehicle fatalities, and Medicare and Medicaid prescription cost analyses.	peer reviewed articles published between 2010 and 2017. Using the search criteria, 11,513 records were identified, with 789 abstracts reviewed, and then 134 full-text articles screened for eligibility	research is constrained by federal policy restrictions, and more research related to MC as a potential alternative to POM for pain management, MC harms, and its impact on POM-related harms and health care costs should be a priority of public health, medical, and nursing research
Whiting, P., Wolff, R., Deshpande, S., et al. (2015). Cannabinoids for medical use: A systematic review and meta-analysis.	This systemic review/meta-analysis goal: to report the benefits/adverse events of cannabinoids used for a wide assortment of medical treatments. Conditions causing chronic pain included diabetic peripheral	n/a	Systemic Review & Meta-Analysis	28 research studies assessed cannabis and chronic pain specifically 63 reports with 2454 participants in total	Cochrane Collaboration guidance and Centre for Reviews and Dissemination was used for the review (but the authors created a protocol for the review). Cochrane Risk of Bias tool used to assess the RCTs. GRADE used to evaluate evidence	In relation to chronic pain, on average a minimum 30% pain improvement was reported by patients using cannabinoids compared to placebo (OR, 1.41 [95% CI, 0.99-2.00]). The trial that assessed inhaled THC reported the greatest beneficial

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
	neuropathy, neuropathic pain, fibromyalgia, multiple sclerosis, HIV-associated sensory neuropathy, rheumatoid arthritis, non-cancer pain, musculoskeletal problems, central pain, and chemotherapy-induced pain.				quality for risk of publication bias, imprecision, indirectness, bias, inconsistency, and magnitude of effect. Authors reduced risk of publication bias by using a sensitive examination strategy, and by searching wide-ranging resources (guidelines, systematic reviews, and electronic databases). Eligibility for inclusion included both published and unpublished trials. A second information specialist peer reviewed EMBASE strategies. Two reviewers also independently assessed the review process. Cochrane risk of bias tool used to assess RCTs. This emphasized	effect (OR, 3.43 [95% CI, 1.03-11.48]). The pain conditions assessed: neuropathic pain (OR, 1.38 [95% CI, 0.93-2.03]; 6 trials) and cancer pain (OR, 1.41 [95% CI, 0.99-2.00]; 2 trials). **Nabiximol**, when compared with placebo, was linked with larger average reduction in the: -*Numerical Rating Scale* (NRS; 0-10 scale) pain assessment (weighted mean difference [WMD], −0.46 [95% CI, −0.80 to −0.11]) -*Brief pain inventory-short form, severity composite index* (WMD,−0.17 [95% CI, −0.50 to 0.16] -*Neuropathic pain*

Author/Article	Qual: Concepts or Phenomena Quan: Key Variables/Hypothesis/Research Question	Theoretical Framework	Design	Sample (N)	Data Collection (Instruments/Tools)	Findings
					methodological weaknesses like: -Failure to manage withdrawals appropriately -Being selective with outcome reporting -Describing methods, concealment, allocation, randomization, and blinding inadequately Small sample sizes were noted as a limitation.	*scale* (WMD, −3.89 [95% CI, −7.32 to −0.47] -Proportion of patients stating improvement on a *global impression of change score* (OR, 2.08 [95% CI, 1.21 to 3.59] Of note, no differences between pain conditions were found by the authors. Cause of pain did not appear to have a difference in results.

APPENDIX B:

THE UNIVERSITY OF ARIZONA INSTITUTIONAL REVIEW BOARD APPROVAL LETTER

THE UNIVERSITY OF ARIZONA
Research, Discovery & Innovation

Human Subjects Protection Program

1618 E. Helen St.
P.O.Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
http://rgw.arizona.edu/compliance/home

Date:	October 10, 2019
Principal Investigator:	April Lynn DeGennaro
Protocol Number:	1910034156
Protocol Title:	INCREASING PRIMARY HEALTHCARE PROVIDERS' KNOWLEDGE ABOUT MEDICAL CANNABIS AS AN ALTERNATIVE TREATMENT FOR CHRONIC PAIN
Determination:	Approved
Expiration Date:	October 08, 2024

Documents Reviewed Concurrently:

Data Collection Tools: *PostTest post defense.docx*
Data Collection Tools: *PreTest post defense.docx*
HSPP Forms/Correspondence: *DeGennaro appendix_waiver_v2019-08.pdf*
HSPP Forms/Correspondence: *DeGennaro Human Research Form.pdf*
HSPP Forms/Correspondence: *DeGennaro list_of_research_personnel_v2019.pdf*
Informed Consent/PHI Forms: *Disclosure statement post defense.docx*
Informed Consent/PHI Forms: *Disclosure statement post defense.pdf*
Other Approvals and Authorizations: *AANP email.pdf*
Other Approvals and Authorizations: *COI Certification Complete for 1910034156.msg*
Participant Material: *Educational Flyer-1 post defense.docx*
Participant Material: *Instructions post defense.docx*
Participant Material: *MC authorization guideline.pdf*
Participant Material: *Medical Marijuana Authorization form.pdf*

Regulatory Determinations/Comments:

- The project is not federally funded or supported and has been deemed to be no more than minimal risk.
- The project listed is required to update the HSPP on the status of the research in 5 years. A reminder notice will be sent 60 days prior to the expiration noted to submit a 'Project Update' form.

This project has been reviewed and approved by an IRB Chair or designee.

- The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).
- All research procedures should be conducted according to the approved protocol and the policies and guidance of the IRB.
- The Principal Investigator should notify the IRB immediately of any proposed changes that affect the protocol and report any unanticipated problems involving risks to participants or others. Please refer to Guidance Investigators Responsibility after IRB Approval, Reporting Local Information and Minimal Risk or Exempt Research.

APPENDIX C:

DISCLOSURE FORM

DISCLOSURE FORM

Introduction
My name is April DeGennaro and I am a student from the University of Arizona College of Nursing. I am a Doctor of Nursing Practice (DNP) student in the Family Nurse Practitioner program. To meet the requirements of my practice degree, I am required to complete a doctoral project.

Purpose of Project
The purpose of this DNP project is to examine the attitudes, knowledge, comfort level, intent to recommend and beliefs regarding the use of medical cannabis used as an alternative or conjunctive treatment for chronic pain, before and after an educational intervention on the topic.

Why are you being asked to participate?
You are being invited to participate in this project because you are a primary care provider in the state of Washington, where both recreational and medicinal cannabis is legal. Your mailing address was provided by the American Association of Nurse Practitioners (AANP), as a nurse practitioner member in their database who works in primary care in Washington State.

Description of the Project
This project involves a written pretest, which should be completed prior to viewing the educational flyer. The pretest will also include demographic questions. After viewing the educational handout, responders are encouraged to complete the written posttest questionnaire. With a few exceptions, the pretest and posttest questions are identical. All data will be summarized and no personal identifying information will be shared. The overall time estimated to complete the pretest, educational handout, and posttest should is 20 -30 minutes.

Are there any risks?
There are no foreseeable risks for those participating in this project. The pretest/posttests will remain anonymous. Addresses on the provided return envelopes will be not be filled in by participants. The project director will be unable to determine who from the AANP's mailing list has filled out and responded to the project. In addition, this project has been reviewed by the University of Arizona Institutional Review Board to ensure respondent confidentiality and safety. AANP has also reviewed the project and approved it.

What are the benefits?
The benefits of the study will be to enhance primary care provider attitudes, knowledge, beliefs, comfort level and intent to recommend medical cannabis for chronic pain.

The study is voluntary
By completing the pretest and posttest, and viewing the educational handout, you are agreeing to participate in this project. Your participation is completely voluntary. If you do not wish to participate, please do not send back the completed pretest and posttest. The surveys are numbered and randomly sent to potential participants. These survey numbers are not recorded

anywhere. Please make a note of this number. If you have completed and sent in the survey, then later decide you would not like your data used, please contact the project director with only your survey number, no later than October 31, 2019. You may also skip any survey question you do not want to answer.

You may contact, April DeGennaro, BSN, RN for concerns or questions regarding the project at: adegennaro80@email.arizona.edu. You may also contact me for results of the study.

APPENDIX D:

INVITATION TO PARTICIPATE

April DeGennaro BSN, RN
22251 98th PL S
Kent, WA 98031

Hello,

My name is April DeGennaro. I am a Doctor of Nursing Practice (DNP) Family Nurse Practitioner student at the University of Arizona. You are invited to participate in a DNP project with an educational flyer on medical cannabis as an alternative treatment for chronic pain management. A pretest and posttest will also be provided. In total, this project will take about 20 – 30 minutes. Please review the disclosure form for details about the project, expectations, consent, and IRB approval. If any questions arise while completing the pretest, educational flyer, or posttest, please do not hesitate to reach out to me either the phone number or email address provided below. Thank you for your consideration, I look forward to receiving your survey responses.

April DeGennaro, BSN, RN

253-330-1376
adegennaro80@email.arizona.edu

APPENDIX E:

INSTRUCTIONS

Instructions

Thank you for choosing to participate in this DNP Project! Please remember, your participation is completely voluntary, and you may choose to stop participation at any time. Your responses will be completely anonymous. After reading the invitation to participate and disclosure form, you may begin. Please read the instructions carefully before proceeding. Feel free to refer back to the instruction page at any time.

1). Read all Instructions

2). Please, do not write any identifying information on any of the returning forms, as this project aims to keep all responses anonymous.

3). Kindly, fill out the pretest questionnaire. Be aware, the presets questionnaire contains demographic information, but will ask for no identifying information (such as name, date of birth, company employment).

4). Next, please read the educational flyer "Medical Cannabis Education for Primary Care Providers" provided in this packet. Reading the flyer should take 10-20 minutes.

5). After reading the informational flyer, please fill out the posttest questionnaire. These questions are identical to the pretest questions with the exception of: (a) posttest questions 5, 9, 10, which reflect that you have now received evidence based education on medical cannabis; (b) the demographic questions on the pretest; (c) and the optional open-ended response at the end of the posttest.

6). Please place both the completed pretest and posttest questionnaires into the provided return envelope. The return envelope is preaddressed to the project director along with a provided stamp. Please DO NOT write your address on the return envelope. This is to further ensure that your response remains anonymous for this project. Please mail the envelope (and the required contents) back by (DATE TBD).

7). Please make a note of the number at the top of the surveys. Should you decide that you do not want your data used, you may contact the author at adegennaro80@email.arizona.edu and request that surveys be destroyed. The numbered surveys are sent randomly to potential participants. The survey numbers are not recorded anywhere. The last date to make this request is Oct. 31st, 2019.

8). Thank you very much!

APPENDIX F:

PRETEST QUESTIONNAIRE

PRETEST

Demographic Information (please circle):

Age: 20-29 30-39 40-49 50-59 60-69 70+

Gender: Female Male Trans Other

Years in Practice: 0-4 5-9 10-14 15-19 20-24 25+

Please note, for the purpose of this questionnaire, chronic pain is defined as pain that lasts or recurs for more than three months
(As defined by the International Association for the Study of Pain)

Percentage of patients you treat for chronic pain on a monthly basis (estimate)

0-5% 6-10% 11-15% 16-20% 21-30% 31-40% 41-50% more than 50%

Medications you commonly prescribe for chronic pain treatment (circle all that apply):

Acetaminophen NSAIDS TCAs SSRIs Opiates Muscle Relaxants Cannabis Other

Knowledge Questions:

Multiple Choice

1. _____ and _____ are two of the most commonly studied cannabinoids for chronic pain treatment.

A. Cannabidiol and Cannabigerol
B. Cannabigerol and Cannabivarin
C. Delta (9)-tetrahydrocannabinol and Cannabidiol
D. Cannabivarin and Delta (9)-tetrahydrocannabinol

2. Where are cannabinoid receptors located naturally in the body's pain pathway?

a. Peripheral pain pathways
b. Central pain pathways
c. Neither peripheral or centrals pain pathways
d. Both peripheral and central pain pathways

3. What is a contraindication for using medical cannabis?

a. Schizophrenia
b. History of psychosis
c. Pregnant/breastfeeding
d. All of the above

4. Which of the following statements are false?

    a. Medical cannabis state laws are associated with significantly lower state level opioid overdoses
    b. Medical cannabis usage is associated with lower opioid use in chronic pain patients
    c. Twenty-five states have active medical cannabis laws
    d. States with pro-cannabis laws have significant decreases in Medicare part D spending on conventional pain medications

Attitudes and Beliefs Questions

Please rate the follow questions from 1 (strongly disagree) to 5 (strongly agree)

5. I am comfortable discussing medical cannabis with patients

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

6. I believe medical cannabis could provide a safe alternative to opioid medications for chronic pain treatment

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

7. Medical cannabis education should be a requirement for healthcare providers working in pro-medical cannabis states

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

8. Medical cannabis should be recommended as an alternative therapy for chronic pain management

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

Intent to Recommend Questions

Please rate the follow questions from 1 (strongly disagree) to 5 (strongly agree)

9. I have conversations with chronic pain patients about medical cannabis use to treat the pain

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

10. I am likely to recommend medical cannabis as an alternative therapy for chronic pain management

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

APPENDIX G:

POSTTEST QUESTIONNNAIRE

POST-TEST

Knowledge Questions:

Multiple Choice

As a reminder, for the purpose of this questionnaire, chronic pain is defined as pain that lasts or recurs for more than three months
(As defined by the International Association for the Study of Pain)

1. _____ and _____ are two of the most commonly studied cannabinoids for chronic pain treatment.

A. Cannabidiol and Cannabigerol
B. Cannabigerol and Cannabivarin
C. Delta (9)-tetrahydrocannabinol and Cannabidiol
D. Cannabivarin and Delta (9)-tetrahydrocannabinol

2. Where are cannabinoid receptors located naturally in the body's pain pathway?

a. Peripheral pain pathways
b. Central pain pathways
c. Neither peripheral or centrals pain pathways
d. Both peripheral and central pain pathways

3. What is a contraindication for using medical cannabis?

a. Schizophrenia
b. History of psychosis
c. Pregnant/breastfeeding
d. All of the above

4. Which of the following statements are false?

a. Medical cannabis state laws are associated with significantly lower state level opioid overdoses
b. Medical cannabis usage is associated with lower opioid use in chronic pain patients
c. Twenty-five states have active medical cannabis laws
d. States with pro-cannabis laws have significant decreases in Medicare part D spending on conventional pain medications

Attitudes and Beliefs Questions

Please rate the follow questions from 1 (strongly disagree) to 5 (strongly agree)

5. I am more comfortable discussing medical cannabis with patients after receiving evidence based education

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

6. I believe medical cannabis could provide a safe alternative to opioid medications for chronic pain treatment

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

7. Medical cannabis education should be a requirement for healthcare providers working in pro-medical cannabis states

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

8. Medical cannabis should be recommended as an alternative therapy for chronic pain management

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

Intent to Recommend Questions

Please rate the follow questions from 1 (strongly disagree) to 5 (strongly agree)

9. I am more likely to have conversations with patients about medical cannabis after receiving evidence based education about its use

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

10. I am more likely to recommend medical cannabis as an alternative therapy for chronic pain management after receiving evidence based education about its use

Strongly Disagree	Disagree	Neither Disagree nor Agree	Agree	Strongly Agree
1	2	3	4	5

(Optional)

What further comments or questions do you have about medical cannabis use after participating in this project?

APPENDIX H:

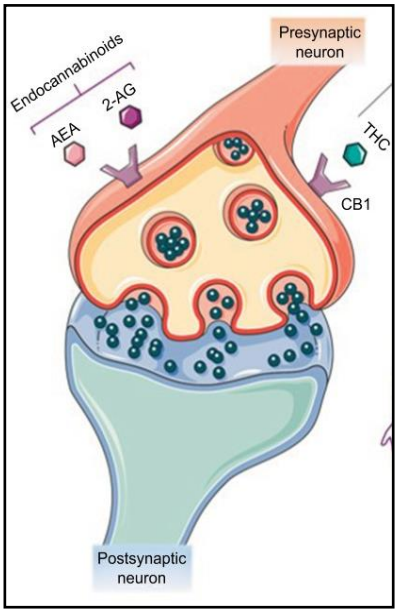
EDUCATIONAL FLYER

Educational Flyer

Medical Cannabis Education for Primary Care Providers

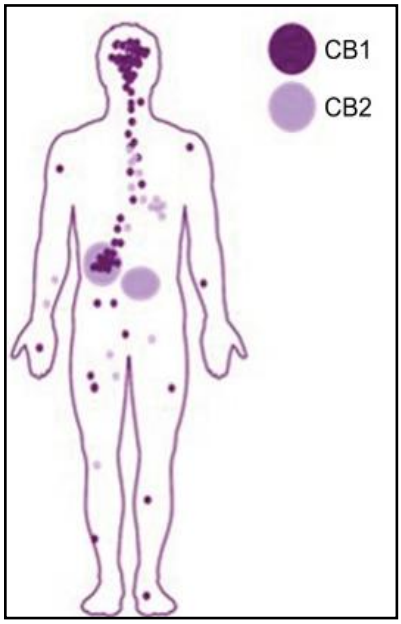
What is medical cannabis?

- Cannabis (also known as marijuana) is a plant which has been used for medical purposes for thousands of years[11]
- The Cannabis plant makes a thick resin which contains compounds known as cannabinoids[11]
- These are chemicals that can cause drug-like effects in the body, and can affect both the central nervous system and the immune system[11]
- Although there are over 100 cannabinoids found in cannabis, the two most commonly studied are delta-9-THC, more commonly known as THC, and cannabidiol, known as CBD[11]



How do cannabinoids affect the body?

- Cannabinoid receptors are present naturally in the pain pathway, located in both the peripheral and central levels[10]
- Mechanism of action: human endocannabinoids AEA or 2-AG bind to CB1 to initiate a signaling cascade through the release of neurotransmitters [10]
- Supra-spinal CB1 receptors are found in areas of the brain and brainstem involved in nociceptive perception (including the amygdala, thalamus, and periaqueductal grey matter)[10]
- CB1 receptors are also present in the peripheral sensory nerve endings[11]
- Both CB1 and CB2 receptors have been detected in non-neuronal cells participating in immune and inflammatory processes (in primary afferent neuron nerve terminals)[11]



Is there evidence to recommend medical cannabis as an alternative treatment for chronic pain?

- In 2017, the National Academy of Science, Engineering, and Medicine created one of the most comprehensive reports of recent research on the health effects of recreational and therapeutic cannabis use[11]. The publication concluded that there is **substantial evidence** that cannabis is an **effective** treatment for chronic pain in adults[11].
- The Journal of the American Medical Association published a meta-analysis and systematic review of 28 trials demonstrating **moderate-quality** evidence to **support** the use of cannabinoids for the treatment of chronic pain[17].
- In 2015, the American Pain Society distributed a meta-analysis which showed that inhaled cannabis **provides relief** from chronic neuropathic pain for **one in five to six patients**[11].

- Pain Medicine released a systematic review and meta-analysis of 18 double-blind randomized controlled trials in 2009, reporting on the efficacy of cannabis for chronic pain. Their findings suggest that cannabis is **moderately efficacious** for treating chronic pain[9].
- Other findings include:
- Medical cannabis use is associated with better quality of life in patients with chronic pain[1, 2, 4, 12, 15, 16]
- Medical cannabis use is associated with fewer medication side effects and fewer medications used[4, 8, 12, 16]
- With medical cannabis access, individuals using opioids for chronic pain decrease their usage of opioids by 40–60%[16]

How is medical cannabis affecting the opioid epidemic?

- States with medical cannabis laws have a 24.8% lower mean annual opioid overdose mortality rate compared to states without[2,4]
- Cannabis use was associated with 64% lower opioid use in patients with chronic pain[4,11]
- Evaluation of prescription data from Medicare Part D enrollees in states with medical cannabis shows a significant reduction in the prescription for conventional pain medications[11]
- Recent systematic reviews and meta-analyses of current literature suggests that medical cannabis states see a reduction in prescription opioid medication-associated mortality, improvement in pain management, and a significant reduction in health care costs[14,15,16]

Are there any adverse effects of medical cannabis? Who should not use cannabis?

- Withdrawals due to adverse effects were rare[1]
- Side effects of using MC are noted by patients to be mild to moderate, and are easily tolerated[1,4,17]
- Common side effects noted by patients include: dry mouth, nausea, vomiting, dry eyes, cough, headache, anxiety, dizziness, numbness, impaired mental functioning, panic reactions, hallucinations, depression like symptoms.[1,4,11,13,17]
- Leading contraindications are schizophrenia, psychosis, pregnancy/breastfeeding, and age <18 years[11,13]

Key points:

- Chronic pain is one of the most common reasons adults seek medical care. It has been linked to restrictions in daily activity and mobility, dependence on opioids, anxiety and depression, and reduced quality of life[7]
- It is estimated that over 100 million Americans have chronic pain conditions[5]
- Chronic pain contributes to an estimated $560 billion each year in direct medical costs, lost productivity, and disability programs[7]
- Medical cannabis laws are associated with significantly lower state-level opioid overdose mortality rates[2,3]
- Currently, 33 states have medical cannabis programs . Regardless, cannabis is still prohibited under federal law, as the government does not acknowledge a distinction between medical and recreational use
- The lack of clarity and consistency in the regulation of cannabinoids at the state and federal levels makes it especially imperative for providers to educate themselves about the potential benefits and risks of cannabis use[3]
- The potential of MCs to benefit some patients is hindered by the lack of comfort of clinicians to recommend it. Training opportunities are greatly needed to address these issues[6]

How to Recommend medical Cannabis in Washington

- Providers must be aware of all requirements and restrictions established in legislature RCW 69.51A.030.
- Patients must have a qualifying condition to be considered for medical cannabis.
- The provider must complete the Washington State Medical Marijuana Authorization and print it on tamper-resistant paper.
- The provider should be familiar with the authorization practice guidelines for recommending medical cannabis, developed by the Washington State Department of Health.
- After authorization, patients will be directed to visit a medical cannabis retail store which has medical endorsement and a certified Medical Marijuana Consultant on staff.
- The certified consultant will be able to register patient into the authorization database, and is then able to issue a medical recognition card (often referred to as a green card).

Information regarding legislature RCW 69.51A.030, medical marijuana authorizations, or medical cannabis authorization practice guidelines, can be found at: https://www.doh.wa.gov/YouandYourFamily/Marijuana/MedicalMarijuana.

Medically endorsed cannabis retail stores identified by the Washington State Department of Health: https://www.doh.wa.gov/Portals/1/Documents/Pubs/608017.pdf.

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APPENDIX I:

MEDICAL MARIJUANA AUTHORIZATION FORM

Medical Marijuana Authorization Form

Health

This authorization does not provide protection from arrest unless the qualifying patient or designated provider is also entered in the medical marijuana authorization database and holds a recognition card.

Patient Information and Attestation

Full Legal Name			Date of Birth
Street Address	**City**	**State** WA	**Zip Code**

I hereby attest that I have discussed the risks and benefits of the medical use of marijuana with my healthcare practitioner. I understand some of the risks may include possible long-term effects to the brain in the areas of memory, coordination, and cognition; impairment of the ability to drive or operate heavy machinery; physical or psychological dependence; and respiratory damage if smoked. I understand that I may revoke my designated provider (if applicable) at any time in writing. I have read chapter 69.51A RCW and understand the legal requirements of being a patient.

Note: The parent/legal guardian must sign on behalf of the minor (under 18) by printing the minor's name, their relationship to the minor and signing their own name on the signature line.

Patient Signature: _____ Date: _____

Designated Provider Information and Attestation (If any – Mark N/A in each box if not applicable)

Full Legal Name			Date of Birth
Street Address	**City**	**State** WA	**Zip Code**

I hereby attest that I am over the age of 21 and agree to serve as the designated provider for the patient identified on this form. I understand I may serve as the designated provider for only one patient at a time. I can stop serving as designated provider for this patient by revoking the designation in writing. The revocation must be signed, dated, and provided to the patient and the medical marijuana authorization database administrator if I am entered into the database. I understand 14 days must go by before I may begin serving as the designated provider for a different patient. I have read chapter 69.51A RCW and understand the legal requirements of being a designated provider.

Designated Provider Signature: _____ Date: _____

Authorizing Healthcare Practitioner Information and Attestation

Name of Healthcare Practitioner (as it appears on license)		Healthcare Practitioner License # (Ex: MD00001111)	
Office Address	**City**	**State**	**Zip Code**

Phone (Please list the phone number where this authorization can be verified during normal business hours.

I am licensed in the state of Washington and have diagnosed the above named patient as having the following terminal or debilitating medical condition that is severe enough to significantly interfere with the patient's activities of daily living and ability to function, and can be objectively assessed and evaluated (check all that apply):

- ☐ Cancer
- ☐ Chronic renal failure requiring hemodialysis
- ☐ Crohn's disease
- ☐ Epilepsy or other seizure disorder
- ☐ Glaucoma
- ☐ Hepatitis C
- ☐ HIV
- ☐ Intractable pain
- ☐ Multiple sclerosis
- ☐ Post traumatic stress disorder
- ☐ Spasticity disorder
- ☐ Traumatic brain injury
- ☐ A disease that results in nausea, vomiting, wasting, appetite loss, cramping, seizures, muscle spasms or spasticity

I further attest that I have performed an in-person examination of the above named patient and assessed his or her medical history and medical condition. I have advised this patient about the potential risks and benefits of the medical use of marijuana. It is my professional opinion that this patient may benefit from the medical use of marijuana.

Healthcare Practitioner Signature: _____ Issue Date: _____

Authorization Expiration Date: Maximum from issue date of six months for minors and one year for adults. _____

Additional Plant Authorization (Optional)

This provision is valid only if the person is entered into the authorization database and possesses a recognition card. A second signature is required if authorizing additional plants. Authorization must not exceed 15 plants.

Healthcare Practitioner Attestation: In my professional opinion, the medical needs of this patient exceed the pre-sumptive number of plants allowed by law of 4 plants with just an authorization form or 6 plants if entered in the database. I recommend this patient or their designated provider be allowed to grow in his or her domicile up to _____ plants for the patient's personal use.

Healthcare Practitioner Signature:
(second signature only required if recommending additional plants) _____

APPENDIX J:

MEDICAL MARIJUANA AUTHORIZATION FORM GUIDELINES

MEDICAL MARIJUANA AUTHORIZATION FORM GUIDELINES

INSTRUCTIONS FOR HEALTHCARE PRACTITIONERS – RCW 69.51.030

Healthcare practitioners should refer to the Medical Marijuana Authorization Practice Guidelines for professional practice standards related to authorizing marijuana for medical purposes.

- A qualifying patient is a patient of a healthcare practitioner who has been diagnosed as having a qualifying condition, is a resident of the state of Washington at the time of diagnosis, has been advised by the practitioner of the risks and benefits of the medical use of marijuana, and has been issued an authorization form from a healthcare practitioner.
- All authorizations issued on or after July 1, 2018, must be completed on the new authorization form (DOH 630-123 July 2017), signed by the authorizing healthcare practitioner (practitioner) and printed on the new tamper-resistant paper containing the RCW logo as defined in RCW 69.51A.010 – see Medical Marijuana Authorization Form for details.
- When completing the authorization form, every field must be filled in unless described as optional. Use the full name of the patient or designated provider (DP) **(no nicknames)** and physical street address **(no post office box)**.
- If the patient does not have a designated provider, mark N/A in each box of the "Designated Provider" section.
- For minor patient (under 18) authorizations, the DP (parent or legal guardian) must sign the "Patient Attestation" section on behalf of the minor by printing the minor patient's name and the parent or legal guardian's relationship to the patient on the signature line, and signing his or her own name next to it.
- Keep a copy of the authorization in the patient's medical record and give the original form to the patient (and designated provider) for their records. **Do not mail, email or fax a copy to the Department of Health.**
- **Remember,** an authorization allows a patient to grow up to four plants; six plants if the patient becomes a cardholder. To recommend additional plants, enter the number of plants and sign "Additional Plants" section, otherwise, leave it blank.

INFORMATION FOR PATIENTS AND DESIGNATED PROVIDERS – chapter 69.51A RCW

An authorized patient (and DP) may not:

- Sell, donate, or otherwise supply the patient's marijuana to another person, except as authorized in RCW 69.50.4013.
- Use or display marijuana in a manner or place that is open to the view of the general public.
- Grow, possess, or use marijuana on federal property.
- Grow more than 15 plants in any one housing unit even if multiple qualifying patients or designated providers reside in the housing unit, unless growing within a cooperative registered with the Washington State Liquor and Cannabis Board (WSLCB), which allows a maximum of 60 plants (up to 15 per participant).
- Grow, store, produce, or process marijuana or marijuana-infused products if any portion of such activity can be readily seen by normal unaided vision or readily smelled from a public place or the private property of another housing unit.

MEDICAL MARIJUANA RECOGNITION CARD BENEFITS – RCW 69.51A.230

Adult patients (18 or over) with a valid authorization may voluntarily join the medical marijuana authorization database (database) to receive a medical marijuana recognition card. Minor patients (under 18) and their DP are required to join the database. Patients between the ages of 18 and 20 are not required to have a DP but must have a recognition card to purchase products from a medically endorsed store.

A recognition card holder may:

- Purchase products **sales-tax free** at a licensed marijuana store with a medical endorsement.
- Purchase up to **three times** the current limits at a licensed, marijuana store with a medical endorsement.
- Purchase immature plants, clones and seeds from a WSLCB-licensed marijuana producer.
- Purchase compliant high THC products at licensed marijuana store with a medical endorsement –
- Possess **six plants and eight ounces** of usable marijuana. A healthcare practitioner may authorize additional plants to a maximum of 15; an authorized patient may possess up to 16 ounces of usable marijuana produced from the plants.
- Participate in a **medical marijuana cooperative** regulated by the WSLCB.
- Have **arrest protection**, whereas an authorization alone provides only an affirmative defense to criminal prosecution for possession of marijuana, including up to four marijuana plants.

To receive a medical marijuana recognition card, call a nearby licensed, marijuana store with a medical endorsement and schedule an appointment with a certified medical marijuana consultant. Bring your authorization and state-issued identification with you to the appointment. The consultant will enter your information into the database, take your photo, and create a recognition card for you. Your original authorization form will be returned to you for safekeeping at home. The store is required by state law to collect a $1 fee at the time the card is created.

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