Medical Providers’ Knowledge, Beliefs and Attitudes in the Effectiveness of the Centers of Disease Control and Prevention 2016 Guideline for Prescribing Opioids for Chronic Pain

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Medical Providers’ Knowledge, Beliefs and Attitudes in the Effectiveness of the Centers of Disease Control and Prevention 2016 Guideline for Prescribing Opioids for Chronic Pain

by

Maria Adamian

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APPROVAL FOR SUCCESSFUL DEFENSE

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ABSTRACT

Statement of Problem: Opioid epidemic in United States has been, in part, linked to prescribing practices of practitioners who treat chronic pain. The increase in morbidity and mortality associated with widespread prescription of opioid pain relievers (OPRs) has been the driving force in the reassessment of clinical prescribing guidelines. Given the enormity and urgency of the problem, in 2016, the Centers for Disease Control and Prevention (CDC) introduced guidelines for prescribing opioids to chronic noncancer pain to primary care practitioners. The introduction of the clinical guidelines sparked much concerns from providers and activist groups. There is little known in the literature relating to providers’ knowledge, belief, attitudes relating to practices that utilize the 2016 CDC opioid guidelines for chronic pain. Therefore, the purpose of this study was to explore and understand the relationships among providers’ (physician, nurse practitioner and physician assistant) knowledge, belief, attitudes, and practices regarding 2016 CDC opioid prescribing guidelines, A secondary aim of the study was identifying the presence of mediating variable between knowledge and practice.

Theories: The constructs addressed in the study are knowledge, belief, attitude, innovation, and practice adherence. The study is built upon a novel framework created by the researcher based on well-established works of Diffusion of Innovation Theory (DOI) by E. M. Rogers and Knowledge-Attitude-Practice (KAP) model. Integrated elements of both theories are supporting pillars of the study.

Methods: The design was descriptive, cross-sectional, and correlational utilizing previously published quantitative survey tool (McCalmont et al., 2018). The sample consisted of 243 practitioners of 47 Physicians, 57 Physician Assistants and 55 Nurse Practitioners. A letter
of solicitation was emailed through national professional organizations of American Academy of Nurse Practitioners (AANP) and American Academy of Physician Assistants (AAPA).

Results: Survey respondents demonstrated varied knowledge recall of the 2016 opioid prescribing guidelines. Knowledge was a statistically significant predictor of belief variable ($r = 0.294, p < 0.001$). A statistically significant bivariate relationship emerged between belief and individual attitude ($r = 0.831, p < 0.001$). Aligned with an increase on the belief scale, a provider’s individual attitude scale score increased regarding implementation of the guidelines to improve patient outcomes. Knowledge was a significant predictor of the Belief Scale, Beta = 0.16, $p = 0.002$. As the knowledge variable increased, the belief variable also increased.

Knowledge was a significant predictor of the Individual Attitude Scale, Beta = 0.26, $p < 0.001$. As knowledge increased, scores on the individual Attitude Scale increased. Knowledge did not directly predict either of the practice variables (Practice Scale I or Practice Scale II).

Belief was a statistically significant predictor of Practice Scale I (harm reduction), Beta = 0.47, $p < 0.001$. As a provider’s belief increased, their Practice Scale (harm reduction) increased. However, belief was not a predictor for Practice Scale II (using nonopioid modalities). Individual attitude was a significant predictor of harm reduction, Beta = 0.20, $p = 0.008$. As individual attitude increased, practicing attitudes of harm reduction also increased.

Individual attitude was a significant predictor of Practice Scale in using nonopioid modalities, Beta = 0.56, $p < 0.001$. As individual attitude increased, a provider’s practice of using nonopioid modalities also increased. The study concludes knowledge effects were completely mediated through individual attitude and belief.

Conclusion: Complexity of pain requires multidisciplinary approach to management. Multidisciplinary practitioners include providers from nursing, physician assistant and medical
colleagues. All these practitioners have varied training philosophies and they share a common practice of managing patients with chronic pain in the primary care arena.

Perceptions influence practices and thus further understanding of perceptions will better steer practitioner guidance. Subjective construct of belief and attitude are interrelated, and they are significant drivers of professional autonomous practice. This study signals that subjective variable of belief and attitude have mediating effect and influence on acceptance and implementation of guidelines and thus exploring subjective constructs through qualitative methods may further illuminate participant characteristics, as barriers to guideline adoption.

Keywords and phrases: CDC Guideline, opioid epidemic, primary care management, guideline adherence.
DEDICATION

This dissertation is dedicated to my family for their unwavering support and encouragement throughout my career and academic ambitions.
ACKNOWLEDGEMENT

I would like to express my most sincere appreciation to all those who guided me patiently through my doctoral journey. The support provided by my committee was critical to my achievement. I am grateful for their insight, encouragement, and direction to develop the seed of an idea into a topic and continually nurture it through its progression and fruition. I would specifically like to express my gratitude to my committee chair, Dr. Ning Jackie Zhang, for all the time and effort that he dedicated to advising me through the process and through his expert knowledge in critical aspects of my statistical analysis. The breadth and depth of his knowledge and experience was instrumental in helping me surmount multiple challenges. My appreciation extends to Dr. Terrence Cahill for his encouragement from day one and course one. His steadfast commitment to my success in professional leadership positions and academic ambitions has been vital to my perseverance. His unique ability to connect through shared experiences has guided me through periods where I could not see forest for the trees. I am also thankful to Dr. Genevieve Pinto-Zipp for her guidance in helping me develop a much more polished version of my work. Her encouragement in elevating my confidence in my own work will always be noteworthy and memorable. Her ability to ignite thoughts and self-reflection will always be part of my future endeavors. Thank you, all, for the contributions to my scholarly development and personal growth. I would also like to thank all faculty and the students who provided me with insights and thoughts through late night forum presentations. I am truly humbled and appreciative.
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CHAPTER I

INTRODUCTION

Background of the Problem

Chronic pain is a common complaint in primary care, and it is the top cause of disability in the United States (Clark, 2002; Smith, Hopton, & Chambers, 1999). Primary care practitioners treat nearly half of all chronic-pain patients through various modalities, including prescriptive opioids (Clark, 2002). The pivotal event that spurred liberal opioid prescribing practices for pain management started with the notion that narcotics rarely lead to addiction (Porter & Jick, 1980). For decades that followed, health care providers, legislators and the pharmaceutical industry cited this study for encouragement to treat pain with opioids. Since then, the use of opioid pain reliever (OPR) for treatment of chronic pain in the United States has escalated dramatically and beyond containment (Jones, 2013). Some common OPRs include hydrocodone and oxycodone; hydrocodone usage has doubled, and consumption of oxycodone has increased by 500% (Jones, 2013). The overprescribing of OPRs has led to a concurrent increase in opioid misuse and addiction, closely followed by an increase in opioid-related overdose fatalities (Dart et al., 2015).

The National Survey on Drug Use and Health (Hughes et al., 2016) concluded that among individuals over 12 years of age, an estimated 97.5 million individuals (36.4% of the population) used prescription opioids, and 12.5 million (4.7% of the population) misused prescription opioids (Hughes et al., 2016). The increase in morbidity and mortality associated with widespread prescription of OPRs has been the driving force in reassessment of clinical prescribing guidelines. Given the enormity and urgency of the problem, in 2014, the Centers for Disease Control and Prevention (CDC) added opioid-overdose prevention to the priority list of the top five public health challenges (CDC, 2014).
Approximately one third of primary care practitioners encounter chronic pain patients in their practices (Gureje et al., 1998). Practitioners are overwhelmed and challenged to manage chronic noncancer pain (CNCP) and lack access to pain consultants who offer comprehensive pain care (Alford, 2016). Furthermore, the United States houses only 4,000 specialists certified in pain management (Breuer et al., 2007). As a result of the limited number of pain specialists, primary care providers treat most patients with chronic pain in the United States.

While primary care providers treat most of the chronic pain patients, they are challenged with having little formal training in pain management and minimal guidance for best opioid prescribing practices (Jamison et al., 2014). In 2016, the CDC released opioid prescribing guidelines for CNCP, aimed to alert primary care practitioners and other primary health care providers to the use of pharmaceutical management in treating chronic pain lasting longer than 3 months, excluding cancer pain and end-of-life pain care (Dowell et al., 2016). The intended purpose of the 2016 CDC Guideline is to promote safe prescribing practices among primary care providers while decreasing mortality associated with opioid-use disorder, thereby decreasing subsequent deaths from opioid-related overdoses. The well-intentioned recommendations have created some concern about the lack of user-friendliness and insufficiency in meeting the needs of both patients and providers.

**Statement of the Problem**

It is evident that opioid related deaths have become a personal tragedy and an economic burden to society. Attempts to rein the crisis through public initiatives have not shown an impactful and measured solution. Legislative initiatives have laid the foundations for accountability for health care providers and clinical guidelines have been released to provide direction for prescribing practices. However, practitioners are resistant to easily adopting
guidelines. The CDC 2016 guidelines relating to opioid prescribing has led to much outcry and controversy for its prescriptive direction rather than suggestive guidance.

Need for the Study

Primary care practitioners are responsible for prescribing and treating most of chronic pain patients utilizing all types of modalities including opioids. The primary care practitioners have varied training backgrounds and experiences which may influence their treatment approach and treatment philosophy. Therefore, further investigation of primary care providers’ perceptions of the value and effectiveness of these guidelines is warranted.

Purpose of the Study

The purpose of this study was to investigate primary care providers’ knowledge, belief, attitude, and practices of the 2016 CDC opioid prescribing guidelines relating to CNCP. Both practitioners and prescribers caring for chronic-pain patients have a critical need to be aware and understand the CDC Guideline and individual state mandates to best serve the chronic-pain population safely and knowledgeably. To gain insight into healthcare providers' perceptions related to the 2016 CDC Opioid Prescribing Guideline through knowledge, beliefs, attitudes paradigm and its impact on practice will be useful in practically guiding policy makers to tailor guidelines for greater adoption and adherence to the intended practitioner.

Theoretical Framework

The theoretical framework of this study is established by integrating two models, Knowledge-Attitude-Practice (KAP) model and Roger’s Diffusion of Innovation Theory. The constructs in E.M Roger’s Diffusion of Innovation Model, include innovation, communication, and time while the constructs of KAP Model explain a linear relationship through three constructs of knowledge, attitude, and practice. Combining elements of both frameworks and
appreciating complexity of guideline adherence, a novel framework was created to include elements of both frameworks discussed.

**Research Questions and Hypotheses**

To understand knowledge, attitudes, and practices regarding the adoption of CDC Guidelines of 2016 opioid prescribing by primary care practitioners. A quantitative analysis was chosen to investigate the proposed research questions.

**RQ1.** What is the relationship between the amount of provider’s post licensure training relating to the area of chronic pain management (CPM) and:

a. The provider’s knowledge of the 2016 CDC Guideline.

b. The provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.

c. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

**HA1a:** A statistically significant relationship exists between provider’s post licensure training and the provider’s knowledge of the 2016 CDC Guideline.

**HA1b:** A statistically significant relationship exists between provider’s post licensure training and the provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.

**HA1c:** A statistically significant relationship exists between provider’s post licensure training and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

**RQ2.** What is the relationship between the amount of provider’s years’ experience and:

a. The provider’s knowledge of the 2016 CDC Guideline.
b. The provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.

c. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

**HA2a:** A statistically significant relationship exists between provider’s years’ experience and the provider’s knowledge of the 2016 CDC Guideline.

**HA2b:** A statistically significant relationship exists between provider’s years’ experience and the provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.

**HA2c:** A statistically significant relationship exists between provider’s years’ experience and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

**RQ3.** What is the relationship between the provider’s knowledge of the most current CDC Guideline and:

a. The provider’s belief that that the newest CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

b. The provider’s belief that the implementation of the most current CDC Guideline will produce improved outcomes in CPM.

**HA3a:** A statistically significant relationship exists between provider’s knowledge of the most current CDC Guideline and the provider’s belief that that the newest CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.
HA3b: A statistically significant relationship exists between provider’s knowledge of the most current CDC Guideline and the provider’s belief that the implementation of the most current CDC Guideline will produce improved outcomes in CPM.

RQ4. What is the relationship between the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s belief that the implementation of the CDC Guideline will produce improved outcomes with regard to CPM?

HA4: A statistically significant relationship exists between belief that the CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s belief that the implementation of the CDC Guideline will produce improved outcomes about CPM.

RQ5. Do either of following variables act as mediators between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice?

a. The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

b. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes in CPM.

HA5a. The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in CPM acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline in his or her own practice.

HA5b: The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes with CPM acts as a mediator between the provider’s
knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline in his or her own practice.

**Methodology**

The methodology for this study was quantitative analysis incorporating exploratory, cross sectional and correlational components. Additionally, the inferential statistics was utilized, which included multiple regression computation as well as a more comprehensive structural equation model with path diagram to identify presence of mediating variables.

**Results**

The respondents surveyed demonstrated varied recall of the 2016 CDC opioid prescribing guidelines. The study also found knowledge was a statistically significant predictor of belief variable. However, knowledge alone was not significant predictor of practice.

Belief that the newest CDC Guideline will reduce the epidemic opioid crisis in relation to CPM was found to be significant predictor practice efforts towards adapting practices to further impact harm reduction. Individual attitudes were a significant predictor of practice of harm reduction and practice of utilizing non opioid modalities.

This study results suggest that subjective variable of belief and attitude has a mediating effect and influence on acceptance and implementation of guidelines and thus exploring subjective constructs through qualitative methods may further illuminate participant characteristics, as barriers to guideline adoption.

**Significance**

The results of the study are integral in understanding healthcare providers' perceptions of the 2016 CDC opioid prescribing guidelines relating to the betterment of current opioid crisis.
The study measures practitioners’ knowledge of the guidelines and associated beliefs, attitudes, paradigm and its impact on practice individual clinical practice. Understanding of beliefs and attitudes of practitioners is significant in practically guiding policy makers to tailor guidelines for greater adoption and adherence to the intended practitioner.
CHAPTER II

REVIEW OF LITERATURE

The Clinical Problem-Pain

One of the most common ailments that causes an individual to seek medical attention is persistent, chronic pain (Gureje et al., 1998). The United States has more 116 million chronic-pain patients, exceeding other chronic conditions such as heart disease, cancer, and diabetes (Dzau & Pizzo, 2014; Institute of Medicine [IOM], 2011; Simon, 2012; Steglitz et al., 2012). More than 30% of Americans experience some form of chronic pain; among the rapidly aging population, the presence of chronic pain exceeds 40% of the population (Simon, 2012). The International Association for the Study of Pain (IASP, 1994) defined pain as an “unpleasant sensory and emotional experience associated with actual or potential tissue damage” (p. 210). According to IASP (1994), pain has strong cultural, religious, and psychological components that alter an individual’s perception and experience. The definition from IASP emphasizes that pain is chiefly a subjective experience. Pain can be acute, related to cancer, or CNCP (IASP, 1994). Chronic-pain conditions can originate from acute pain, recognized as pain that extends beyond the period of healing (Simon, 2012). One example is failed back-surgery syndrome, which reflects on a constellation of symptoms that result in persistent back pain following one or more spine surgeries (North et al., 1991). CNCP can also present insidiously and transition into a more prolonged state of unwellness stemming from common conditions such as physical injury, degenerative musculoskeletal changes of arthritis, fibromyalgia, migraines, shingles, and neuropathic conditions (Simon, 2012). The last qualifier for CNCP is any pain condition that is prolonged without relief for a period greater than 3 months (CDC, 2016).
The debilitating nature of CNCP can be progressively incapacitating when it interferes with daily functionality, the ability to work, sleep patterns, social activities, family relationships, and the ability to perform basic common tasks (Brennan, 2015). Additionally, the complexity of chronic pain also extends into the psychological realm, where 40 to 50% of patients experiencing chronic pain also experience some degree of anxiety and depressive disorder (Banks & Kerns, 1996). According to the American Pain Society, CNCP is the leading cause of disability and impacts 16,128 Americans. CNCP has shown to have a devastating effect on a person’s ability to work, function, and participate in society (Chou et al., 2009).

Gaskin and Richard (2012) analyzed Medical Expenditure Panel Survey (MEPS) data from 2008 to 2010 and determined that health-related costs due to chronic pain reached as high as $261–$300 billion annually, with an additional loss of value from lost productivity ranging from $299 to $335 billion. Based on these data, pain carries a high burden in health care expenditures, disability compensation, lost productivity, lack of employment, and potential loss of quality of life. The impact of financial strain on the health care system and human suffering created an urgency to alleviate this pervasive health problem.

Kirson et al. (2017) studied economic burden on insurers using claims from large commercially insured data banks containing a population sample of more than 18 million beneficiaries. The authors compared the cost of treatment for two mutually exclusive groups of opioid abusers and opioid nonabusers. The health care costs of opioid abusers yielded higher resource use with an additional $14,810 per patient on an annual basis. However, the increase in costs for these patients began 5 months prior to a formal diagnosis of opioid abuse, with treatment for alcohol and other polysubstance abuse that predated the opioid-abuse diagnosis.
Over the past 20 years, professional organizations and governmental health agencies supported medical professionals, encouraging the use of opioids as part of their armamentarium to manage pain conditions (Desbiens et al., 1996; Porter & Jick, 1980). Policymakers and authoritative agencies championed better treatment and management of undertreated pain through promotional campaigns such as “Decade of Pain Control and Research” (Brennan et al., 2016) and pain relief as “a human right” (Baker, 2017, p. 215). The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and the American Pain Society (APS) consensus statement on undertreated pain was the impetus for the development and nationwide initiative called “Pain as the 5th Vital Sign,” which required use of a patient reported numeric pain rating scale for all clinical encounters (Berry & Dahl, 2000; Kirsch et al., 2000). This mandatory objective measure of pain was an expected inquiry, upon every patient encounter. This may have inadvertently steered practitioners to prescribe an easily accessible pharmaceutical to relieve the symptom of pain and thereby resolve the pain concern of the patient.

**Societal Problem-Opioids**

In response to the demand from the medical community and urgency to treat pain and suffering, the pharmaceutical industry and market forces increased production of newer formulations of opioids with higher degrees of potency and extended half-lives (Rowbotham et al., 2003; Van Zee, 2009). Moreover, prescribers followed in tandem, treating the suffering and undertreatment of pain with now easily accessible narcotics, thereby decreasing the cost of unrelieved pain to individuals and society. The realization of decreased pain (despite the choice of treatment) helped patients feel better and return to more productive life. (Kirson et al., 2017).
As the production of opioids increased to meet the treatment demand for chronic pain, the National Vital Statistics System (NVSS) noted that the trajectory of opioid prescriptions for CNCP treatment had increased dramatically since 2011 (CDC, 2015b; Hedegaard & Miniño 2017; Manchikanti et al., 2012). This increased prescriptive availability of opioids also paralleled an increase in opioid misuse, with a growing prevalence of abuse, diversion, and mortality (CDC, 2015a; U.S. Department of Health and Human Services, 2016). Between 2000 and 2014, opioid-related overdose deaths increased by 137% (Rudd et al., 2016). Nearly 2.1 million people have misused prescription opioids for the first time (Murphy et al., 2018). According to U.S. Department of Health and Human Services (2016), 63,600 deaths involved drug overdoses, which translates to approximately 89 deaths per day (Hedegaard & Miniño, 2017 Seth et al., 2018). Of those deaths, 66.4% (42,249) were opioid-related and 32,445 were prescription-related opioid mortalities (Hughes et al., 2016; Seth et al., 2016). Clearly, prescription opioids are heavily used to treat CNCP.

In 2013, medical personnel dispensed an astonishing 207 million prescriptions in the United States (Volkow et al., 2014). The 2015 National Survey on Drug Use and Health discovered that approximately 12.5 million people, age 12 and older, misused prescription pain relievers (Hughes et al., 2016). The Council of Economic Advisors estimated the economic burden of the opioid epidemic at $504.0 billion in 2015, reaching 2.8% of the gross domestic product for that year (Council of Economic Advisors, 2018).

On the regional front, according to the National Institute of Drug Abuse (2016), New Jersey alone had 1,409 opioid-related overdose deaths, accounting for 16 deaths per 100,000 people. This statistic places New Jersey higher than the national average category, which is 13.3 deaths per 100,000 (National Institute of Drug Abuse, 2016). Furthermore, the Institute
determined the largest increase in deaths occurred from heroin, with 97 deaths in 2010; heroin deaths rose to 850 by 2016. In view of this public health crisis, deaths from prescription synthetic opioids have also risen from 35 to 689 deaths in the same period of 2010 to 2016 (National Institute of Drug Abuse, 2016). To show the connection between usage and availability, prescription data from IMS (2016) Health National Prescription Audit revealed that New Jersey healthcare providers wrote 55 opioid prescriptions per 100 people, accounting for 4.9 million prescriptions in a single year. Thus, the opioid drug problem has reached a magnitude of crisis proportions in the United States. The escalation of the negative impact has once again captured the attention of government agencies, medical organizations, legislators, and the public. Now, the urgency to curtail this matter has escalated to the highest priority level by all. In particular, the CDC called this calamity the worst drug-overdose epidemic in U.S. history (Kolodny et al., 2015).

Naliboff et al. (2011) conducted a 12-month prospective randomized clinical trial to compare the effectiveness of conservative opioid prescribing strategies with liberal dose-escalation strategies on pain relief, functionality, and misuse outcomes. The researchers recruited a sample of 130 patients exclusively from the pain clinic of the Veterans Affairs Health Care System of Greater Los Angeles. Accounting for similar variabilities of sex and age among two groups (94% male with an average age of 52.6 years), the authors showed a significantly greater rate of increase in the liberal prescribing strategy of opioid-medication dosages compared with the conservative dose group. Patients in the liberal-dosing strategy experienced an 80% increase in opioid dosage over the 12 months, whereas the conservative group showed only a 16% increase in dosage. The liberal group showed a modest benefit in self-reported pain relief with the liberal-dosing strategy but not in disability functioning. Naliboff et al. concluded the liberal
escalating-dose group experienced more immediate decreases in pain after taking medication than those in the conservative group. However, the effect did not last or did not translate into any group differences in pain scores or greater functioning (Naliboff et al., 2011). One simple explanation for this phenomenon was the repeated doses needed and tolerance built over time to a single dosage and a single medication. Tolerance is common problem when prescribing narcotics but may easily be overlooked by inexperienced practitioner, who is unfamiliar with pain pathology and nociceptive receptor theory. It is in this regard that practice guidelines are most relevant.

**Practice Guidelines**

The American Institute of Medicine (1990) defined clinical-practice guidelines as “systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances” (p. 6). A decade later, the IOM added that clinical-practice guidelines are statements intended to optimize patient care. Furthermore, practice guidelines include statements and recommendations resulting from consensus-based systematic reviews of research evidence, an assessment of the benefits and harms, and alternative care options, addressing the manner in which patients with a specific condition should be managed. Moreover, guidelines may identify one or multiple strategies for treatment and are advisory rather than compulsory suggestions to influence practitioners’ adoption of evidence-based practices in the clinical setting (IOM, 2011). Practice guidelines may be developed by variety of specialist disciplines from pediatric to geriatric governing bodies. Practice guidelines can also be developed by varied professional organizations both regionally and locally. Such that common medical issue may have clinical practice guideline can be developed separately by physician specialty and, Advance Nurse Practitioner specialty. Multiple clinical guidelines on
same or similar medical issue may be perplexing to a busy practitioner leading to more disengagement from adopting suggested guidelines.

**CDC Practice Guidelines**

The nation's premier health protection agency, CDC, holds public trust with a mission to save lives and protect people from health threats and epidemics. The agency fulfills its mission, through conducting research, data collection and disseminating health information that protects the public against expensive and dangerous health threats, both contagious and noncontagious. CDC guidelines are developed in response to potential or actual threat to the national public health. Operating under the U.S. Department of Health and Human Services, the CDC is a highly influential agency where stakeholders, payers, and policymakers, including medical boards and prescribers, are often swayed by its influence. In general, CDC Guideline are voluntary and nonbinding recommendations (CDC, 2016; Dowell et al., 2016). However, practical implications can affect prescribers treating patients (Baker, 2017). CDC’s recommendations may have far-reaching consequences, if adopted into state standards, that require legal compliance. Additionally, insurer use of the guidelines may create hardships for beneficiaries to obtain prescribed medications (Zur & Tolbert, 2018).

It has been clearly established that opioid related mortality has become a national threat to public of epidemic proportion. Medical practitioners prescribing practices and pharmaceutical availability has contributed, if not compounded this deadly epidemic. In March 2016, the CDC released the *Guidelines for Prescribing Opioids for Chronic Pain*. The CDC purposefully crafted the guidelines to improve the risks and benefits of opioid therapy for CNCP patients by enhancing the safety and effectiveness of management and decreasing the risks of opioid-use disorder and opioid-overdose-related deaths (CDC, 2016). The guidelines provide a total of 12
recommendations. Among the advisory statements are three guiding principles that frame the recommendations. First, opioid therapy should not be the initial suggested intervention for CNCP. Nonopioid interventions include physical therapy, cognitive-behavioral therapy, and nonopioid medications such as acetaminophen or nonsteroidal anti-inflammatory medications. The second principle aims to reduce the risk of opioid-use disorder and overdose. In this category, recommendations identify using the lowest effective dosage of opioid > 50 morphine milligram equivalent per day (MME/day) and titrating with caution to a maximum dosage of 90 MME/day. The third principle addresses prudent prescriber oversight and patient follow up. In this category, the CDC (2016) encouraged prescribers to incorporate a plan for risk-mitigation strategies such as avoiding concurrent benzodiazepine prescriptions, prescription drug monitoring programs, urine drug testing, and methadone referrals.

Practitioners can access many guidelines for opioid-safety prescribing, all with similar recommendations of using risk-assessment tools; physician–patient-informed signed contracts, monitoring strategies for aberrant behaviors by urine drug testing, pill counts, and prescription-drug monitoring programs (Kahan et al., 2011; Manchikanti, 2012, 2011). Prior to the April 2016 CDC Guidelines, no recommendations placed a ceiling for MME/day on dosages for prescriptive opioid analgesics (Duensing et al., 2016). The CDC Guideline created a great deal of discourse among pain advocacy groups and professional organizations regarding potential ramifications that may result from the severity of the restrictions on the prescribing liberties of practitioners (McMullen & Howie, 2011).

The influence of the CDC’s has made a direct and swift impact on Veterans Affairs and the Department of Defense, which have implemented the CDC Guideline into their systemwide opioid-management strategies (Brennan et al., 2016; Department of Veterans Affairs, 2017;
Gellad, Good, & Shuklin, 2017). Additionally, individual state legislators have followed suit, with approximately 28 states passing dosing limits on opioid prescriptions (Blackman, 2018). Last and most noteworthy, the Centers for Medicare and Medicaid Services (2018) enacted regulations, effective in 2019, that place a hard audit trigger on beneficiaries who reach cumulative MME daily doses of 90 MME, as established by CDC Guidelines. Also adopted from the CDC Guidelines, Medicare Part D will require additional authorizations in the case-review process for prescriptions exceeding 90 MME (Centers for Medicare and Medicaid Services, 2018).

After an extensive review of literature on the 2016 CDC opioid-prescribing guidelines, little literature described prescribers’ familiarity and knowledge of the content, or their attitudes on the benefits of individual patients’ pain management and overall control of the opioid epidemic. Several themes that arose relating to guideline adherence. There seemed to be vast educational gaps in provider knowledge. Providers may have been familiar with guidelines but did not have detailed understanding of the content. Additionally, the providers had conflicting recall of guidelines specific to organization, state, and association. This can be contributed due to lack of alignment across authoritative bodies that release guidelines. These influence provider nonadherence to best-practice guidelines, and cause lack of provider confidence, as well as low provider satisfaction in managing patients with CNCP. This is a very relevant topic that warrants further exploration to better understand the knowledge, attitudes, and practices of primary care practitioners and their intention to accept or reject recommendations in their primary practice settings. In researching the gap stemming from the lack of literature and information on 2016 CDC Guidelines, enlightening and meaningful results from this study contribute to practices that may shift opioid-prescribing practices.
Current Attitudes, Practices opioid prescribing and chronic pain management

Practitioners throughout United States have varied attitudes and approaches to treatment of chronic pain management and opioid prescribing. Wolfert et al. (2009) studied Wisconsin physicians’ knowledge, beliefs and attitudes toward opioid analgesic use and discovered that most physicians believed that it was acceptable medical practice to prescribe opioids for chronic cancer pain, but only half believed that prescribing opioid should be utilized for non-cancer patients. The study also revealed approximately, two-thirds of physicians were not concerned about being investigated for their opioid prescribing practices, but some feared of potential for investigation that led them to lower the dose prescribed, limit the number of refills for narcotics. Additionally, among those surveyed 40% of physicians incorrectly thought that both federal and state laws restricted physicians’ prescriptions to only a 30-day supply of narcotics. Furthermore, the study demonstrated that many physicians who prescribe opioids had a poor knowledge of prescribing requirements contained in federal and state-controlled substances regulations. While they recognized presence of guidelines, there was multiple sources of guidelines that practitioners noted but no single uniformly influential to their individual practice.

Challenges of Prescribers’ Knowledge and Beliefs

Jamison et al. (2014) surveyed primary care practitioners’ beliefs and attitudes of opioid prescribing and chronic-pain management. The year-long longitudinal study revealed practitioners had adequate opioid knowledge, but their knowledge of opioids was unrelated to attitudes on prescribing opioids. The authors studied a sample of 56 practitioners: physicians, nurse practitioners, and physician assistants from eight centers. Less than half of the practitioners (46%) worried about addiction but believed they were sufficiently trained in prescribing opioids. Furthermore 89% expressed concern about opioid misuse and 84% felt that managing CNCP was
stressful. Jamison et al. found differences in confidence levels between senior practitioners and junior practitioners. Junior providers expressed greater stress levels and decreased confidence in managing patients with CNCP and had greater concerns regarding opioid dependence than more senior providers ($p < .05$).

Ebbert et al. (2017) investigated associations of attitudes, beliefs, and practice styles among clinicians prescribing opioids. In a large academic medical center, the authors studied responses from 720 practicing primary care prescribers—65% physicians and 35% midlevel practitioners—to assess (a) clinicians’ confidence in managing patients with CNCP, (b) attitudes regarding opioids as an effective tool for the treatment of CNCP and their satisfaction with clinical care for CNCP, and (c) consistency in the clinical approach to opioid prescribing. Of the prescribers, 94% asserted the importance of a consistent approach to opioid prescribing. However, only 47% of prescribers were confident in their professional ability to care for patients with CNCP, and 82% expressed reluctance about prescribing opioids for CNCP. The researchers used the chi-square statistic to test relationships between categorical variables.

Clinicians who were familiar with the CDC (2016) guideline reported higher degrees of confidence in managing CNCP (74% vs. 61%, 95% CI = 1.09–1.35, chi square = 12.4, $p < .01$; Ebbert et al., 2017). Additionally, clinicians reporting familiarity with the CDC guideline were less likely to believe opioids were effective for CNCP (14% vs. 21%, 95% CI = 0.47–0.95, chi square = 5.2, $p = .02$). However, guideline familiarity did not align with provider reluctance to prescribe opioids to patients with CNCP (81% vs. 83%, RR = 0.98, 95% CI = 0.91–1.05, chi square = 0.38, $p = 0.54$). In the same study, Ebbert et al. evaluated practice styles and prescriber concerns based on familiarity with CDC guidelines. Of 961 participants, 74% disclosed they follow CDC recommendations, whereas providers who were aware of CDC Guideline were
twice as likely to report always or frequently screening their patients for depression (49% vs. 24%, RR = 2.05, 95% CI = 1.59–2.64, chi square = 39.1, p < 0.001). Additionally, in line with CDC recommendations, these providers were also 44% less likely to prescribe concomitant use of benzodiazepines with opioids (7% vs. 13%, RR = 0.56, 95% CI = 0.35–0.89, chi square = 6.1, p = 0.01). Lastly, among the 67% of clinicians who were aware of the 2016 CDC Guideline for CNCP, only 47% sought additional training to increase their knowledge of opioid treatment for CNCP. Prescribers were more likely to have enrolled in prescription drug-monitoring programs if they were familiar with a patient who required intervention for opioid abuse or overdose (68% vs. 51%; 95% CI = 1.14–1.52; chi square =11, p < 0.01; Ebbert et al., 2017).

A Canadian study of 710 family physicians discovered that 40% of practitioners correctly answered only two of nine opioid-related knowledge questions (Allen et al., 2013). Similarly, Wolfert et al. (2010) studied 216 Wisconsin-based primary care practitioners and found multilevel misconceptions about the prescribing of opioids. Additional knowledge deficits identified among prescribers include inappropriate continuation of opioids and inadequate monitoring of opioids (Allen et al., 2013).

A small study considered burnout in physicians who care for chronic-pain patients and revealed more than 60% physicians who treated chronic pain-patients reported emotional exhaustion (Nathan, 2009). In the same study, about 37.5% reported experiencing high levels of depersonalization and 19.3% reported a low sense of personal accomplishment. Increased physician strain can hinder efficient and effective patient care (Nathan, 2009). Strain occurs when job demands are high and decisional autonomy is low. Additionally, increased physician strain can block effective patient care. Although workers in many medical disciplines experience
strain, chronic strain resulting in burnout was highest in disciplines with low levels of personal control, poor support systems, and high job demands and expectations (Nathan, 2009).

Likewise, in a study of 61 practitioners, primary care prescribers reported low confidence and dissatisfaction in treating chronic-pain patients (Vijayaraghavan et al., 2012). The authors found significant gaps in practitioners’ knowledge of effective care to chronic pain patients. Most providers reported lack of satisfaction in treating CNCP with opioid therapy (Macerollo et al., 2014). Providers preferred to manage these patients in collaboration with a pain specialist (Macerollo et al., 2014).

Although guidelines seek to improve patient care by influencing clinical practice, researchers showed that adoption of information is generally ineffective (Bero et al., 1998). In systematic review of 109 studies, Bero et al. (1998) concluded that clinical-practice guidelines have a minimal effect on influencing behavioral change among practitioners. Not surprising, effective interventions include reminders, multifaceted interventions, and continued educational meetings. A recent study by McCalmont et al. (2018) investigated familiarity with CDC Guideline and continuing education with provider characteristics’ influence on compliance with opioid-prescribing practices. The researchers used a cross-sectional design with 417 prescribers in rural Oregon. McCalmont et al. concluded that higher hours of continuing education positively impacted provider confidence in pain management use of CDC guidelines.

While, chronic-pain management and opioid prescribing are well researched in the literature gaps exist specific to use of prescribing guidelines and best practice. Limited research exists describing the acceptability and utility of the 2016 release of the CDC guideline. To date, limited studies evaluated the value and effectiveness of the CDC opioid guideline. Additionally, research is needed to explore the facilitators and barriers that influence the implementation of
opioid prescribing guidelines. Lastly, while many studies have examined knowledge, attitudes, and beliefs regarding chronic pain they have not focused on midlevel practitioners. Given the increase in midlevel practitioners in the primary care model, it would be prudent to include the perspectives of nurse practitioners and physician assistants on chronic pain and guideline implementation.

**Gap in the Literature**

To date, limited studies evaluated the value and effectiveness of the CDC opioid guideline. Additional research is needed to explore the facilitators and barriers that influence the implementation of opioid prescribing guidelines. Lastly, many studies of provider knowledge, attitude, and beliefs of the management of chronic pain are exclusive of midlevel practitioners. Given the increase in midlevel practitioners in the primary care model, it would be prudent to include the perspectives of nurse practitioners and physician assistants on chronic pain and guideline implementation.

**Theory and Conceptual Framework**

Despite the dissemination of guidelines by authoritative agencies, successful clinical-guideline implementation, and adherence by medical practitioners to the suggested guidelines have had variable effect on practitioners’ behavioral changes (Rashidian et al., 2008). Clinical guidelines are not always easily accepted and implemented by practitioners. There is no singular theory that explains clinical guidelines adoption and adherence. The multifactorial components that influence practitioner’s choice of clinical guideline adoption can be explained through the lens of Diffusion of Innovation Theory by E.M Rodgers.

Diffusion of Innovations theory (DIT, Figure 1) offers a useful theoretical support for guideline adoption. Although utilized in the discipline of business and marketing, DIT provides
an insight for understanding complexities inherent in the process of adopting novel ideas and practices (Rogers, 1995). This theory suggests that the adoption of an innovation, in this case guidelines, involves interaction between (1) the individuals adopting the innovation and (2) the innovation itself. Rogers (1995) explains the presence of four key factors that influence the rate of adoption: (1) the adopter’s perception of the relative advantage of the innovation; (2) the compatibility of the innovation with current practices; (3) the perceived degree of difficulty in the implementation (4) and the visibility of outcomes resulting from adoption of the innovation.

![Diagram](image)

**Diffusion**

*Figure 1. Diffusion of Innovation (DIT) Theory, E.M. Rogers 1962.*

A second contributing conceptual framework that supports this study is the Knowledge, Attitude and Practices model. The KAP model proposes that practice is influenced by the two constructs of attitude and knowledge. The model identifies the knowledge construct through awareness and familiarity and the attitude construct through agreement, motivation and outcome expectancy that lead to practice. Knowledge, attitude, and practice studies fundamentally assume a linear association between knowledge, attitude, and behavioral change (Figure 2).
Figure 2. The Knowledge-Attitude-Practice Model (Bano et al., 2013)

Conceptual frameworks and theories are critical to understanding behavior patterns toward compliance with and adherence to guidelines. Fisher et al. (2016) analyzed a qualitative study built on Cabana’s original framework of knowledge, attitude, and behavior framework, dividing barriers to guideline implementation into subparts: knowledge (lack of awareness or familiarity), individual (lack of motivation), and external (guideline and patient related; Cabana et al., 1999).

Scholars in many disciplines have addressed the issue of clinical-guideline compliance through various industry lenses. Disciplines that have contributed frameworks to adherence and compliance frameworks include sociology, psychology, engineering, organizational management, nursing medicine, and informatics (Gurses et al., 2009). After analysis of the contributions of various disciplines, Gurses et al. (2009) created a conceptual model to remedy guideline adherence with focused concentration on the following four major defining characteristics: clinician characteristics, system characteristics, guideline characteristics, and implementation characteristics. Cabana et al. (1999) are most recognized for identifying clinician-related characteristics, which include clinician knowledge due to lack of awareness of guidelines, clinician attitude related to lack of agreement with the guideline, and skepticism or lack of outcome expectancy. External barriers were the ambiguity of guidelines and practicality.

Cabana et al. (1999) identified three barriers toward guideline compliance related to clinicians’ characteristics: clinician knowledge, clinician attitude, and external factors (Figure 3).
First, the clinician-knowledge components may result from lack of familiarity with or lack of awareness of the guidelines. Second, clinician attitude may reflect lack of agreement with the specific guidelines or interpretation of the evidence and applicability to the patient. Lack of agreement also includes clinician perceptions that the recommended guideline is too restricting and impractical (Cabana et al., 1999). Additional attitudinal components are skepticism or lack of outcome expectancy that the suggested recommendation will lead to the desired outcome. Last, the attitudinal component includes lack of motivation or inertia of formerly cemented practice routines. The third element is the influence of external variables, where patient preference presents as a barrier, possibly accompanied by the presence of other environmental factors such as time constraints, lack of resources, and lack of reimbursements.

![Figure 3. Barriers to Physician Adherence to Practice Guidelines in Relation to Behavior Change (Cabana et al., 1999).](image)

Although other models and theories exist, no singular model or framework explains with absolute clarity the degree of practitioner compliance toward established guidelines. One reason
may be the complexity of the health care industry and the degree of complexity of clinical
guidelines involving multiple stakeholders and subspecialty disciplines. An example is the 2016
CDC opioid guidelines for CNCP management, directed specifically to primary care
practitioners. However, physicians are only one segment of professionals affected by these
guidelines. Primary care providers also include advanced practice nurses and physician
assistants. Additionally, affected by the 2016 CDC Guideline for CNCP management are
pharmacists, and health care insurers. Therefore, a framework necessary to address the 2016
CDC Guideline on chronic CNCP management ought to be more encompassing and use an
interdisciplinary approach that includes multiple lenses to evaluate factors affecting authoritative
guideline compliance. It is important to highlight that knowledge or attitude, is not necessarily a
strong predictor of behavior alone (Ajzen & Fishbein, 1977). Individualized experiences such as
years in clinical practice or exposure to regional population behaviors adds to practitioner biases
that may influence practice behaviors. Lastly, the addition or lack of continuing education in a
specific area of practice can heavily influence changes in practice behavior. A proposed hybrid
model is presented to support as a foundation of this study (Figure 4).

Figure 4. Conceptual Framework of the Study.
The pervasiveness of prescription opioids has clearly negatively impacted the health care industry. To combat the deleterious effects on society and the economy, the CDC (2016) has moved to disseminate guidelines and recommendations to rein in the opioid epidemic. Historically, guidelines have not been easily adopted into clinician practices, due to variety of barriers. To date, limited research studies investigated knowledge, attitude, and practices relating to the 2016 CDC guidelines. This gap in the literature renders this study relevant and timely. Using this framework, the study design will answer the following research questions.

**Research Questions**

1. What is the relationship between the amount of provider’s post licensure training relating to the area of chronic pain management (CPM) and
   a. The provider’s knowledge of the 2016 CDC Guideline.
   b. The provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.
   c. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

Research Hypothesis H1a: There is a statistically significant relationship between the amount of provider’s post licensure training in CPM and the provider’s knowledge of the current CDC Guideline.

Research Hypothesis H1b: There is a statistically significant relationship between the amount of provider’s post licensure training relating to area f CPM and the provider’s belief that that the current CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.
Research Hypothesis \( H_{1c} \): There is a statistically significant relationship between the amount of provider’s post licensure training in CPM and the provider’s belief that the implementation of the current CDC Guideline will produce improved outcomes in CPM.

2. What is the relationship between the amount of provider’s years’ experience and
   a. The provider’s knowledge of the 2016 CDC Guideline.
   b. The provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis.
   c. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.

Research Hypothesis \( H_{2a} \): There is a statistically significant relationship between the amount of providers’ years’ experience and provider’s knowledge of the current CDC Guideline.

Research Hypothesis \( H_{2b} \): There is a statistically significant relationship between the amount of provider’s years’ experience and the provider’s individual attitude that the current CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

Research Hypothesis \( H_{2c} \): There is a statistically significant relationship between the amount of provider’s years’ experience and the provider’s belief that the implementation of the current CDC Guideline will produce improved outcomes about CPM.

3. What is the relationship between the provider’s knowledge of the most current CDC Guideline and
   a. The provider’s belief that that the newest CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.
   b. The provider’s belief that the implementation of the most current CDC Guideline will produce improved outcomes in CPM.
Research Hypothesis $H_{3a}$: There is a statistically significant relationship between the provider’s knowledge of the newest CDC Guideline and the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

Research Hypothesis $H_{3b}$: There is a statistically significant relationship between the provider’s knowledge of the CDC Guideline and the provider’s belief that the implementation of the current CDC Guideline will produce improved outcomes in CPM.

4. What is the relationship between the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s belief that the implementation of the CDC Guideline will produce improved outcomes with regard to CPM?

   Research Hypothesis $H_4$: There is a statistically significant relationship between the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s belief that the implementation of the CDC Guideline will produce improved outcomes with regard to CPM.

5. Do either of following variables act as mediators between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice?

   a. The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM
   
   b. The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes in CPM.

Research Hypothesis $H_{5a}$: The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude
regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice.

Research Hypothesis H₃a: The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes with regard to CPM *acts as a mediator* between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice.
CHAPTER III
METHODOLOGY

A thorough consideration was given to utilizing an appropriate methodology to meet the aims of the study. Among the methods considered were qualitative methods, quantitative methods, and a mixed methodology. Quantitative methods best matched the aims of the study. The reasons for the quantitative methods are primarily directed from McCalmont’s research study utilizing the study tool, as this study replicates with established measurement of Likert scales. The quantitative methodology is less biased and objective measure to quantify behaviors, opinions, attitudes, and generalize from a larger population. Furthermore, the quantitative data is precise, reliable, and consistent, and repeatable. Among the factors to be considered in the quantitative study were an appropriate research design, developing a survey instrument that would allow for collection of sufficient data to calculate the study variables needed to answer the research questions, deciding which statistical tests would be most appropriate, and determining a target sample size that would produce sufficient power for the statistical analyses. The PI considered the best option to obtain a representative sample of participants to test the research hypotheses for the desired targeted population, given the time and resource constraints applicable to practicing providers who constituted the sample. Once these decisions were made, the PI directed the focus toward how to best conduct the study to ensure participants met eligibility requirements the surveys were administered with integrity and confidentially, and the data accrued from the surveys were complete and free of errors.

Research-Study Design

The design for this quantitative non-experimental cross-sectional design. The intentional choice to use a cross-sectional design rests with the advantage that it captures participant data at
a single point in time rather than at several consecutive times, as in longitudinal studies (Field, 2018). Another advantage to a cross-sectional study design is that it eliminates the chance that history or testing effects will distort influence on participants’ scores, as could happen with a longitudinal design (Portney & Watkins, 2009). The advantage to longitudinal studies is the ability to show patterns of a variable over time. However, longitudinal designs are time intensive as well as costly. Additionally, there is greater risk for participant attrition and require larger population samples. This study was cross-sectional because each medical provider participating in the study completed the survey instrument in a single sitting and only once. The entire data-collection phase of this study took place in a relatively short period of time (3 months), further minimizing the potential influence that the passage of time might have had on study results. The benefit of a cross-sectional study over longitudinal study design is that it allows researchers to compare many different variables at the same time.

The nature of this study was correlational. Correlational studies explore the relationships among two of more variables captured by the study (Portney & Watkins, 2009). This study clearly fits this definition, as the first three research questions aimed to measure the degree of associations among the following variables: providers’ amount of post licensure training during the past 3 years in CNCP management; the provider’s knowledge of the contents of the 2016 CDC guidelines; the providers’ belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis in relation to chronic-pain management; and their belief that the implementation of the current CDC Guideline would improve patient outcomes in chronic-pain management. A fifth research question addresses variable relationships, asking whether either of the two belief variables mentioned in the previous sentence acted as a mediator on the relationship between a
provider’s knowledge of the 2016 CDC guideline and their attitude toward implementing the recommendations in this guideline to their own practice.

**Sampling Procedure and Survey Implementation**

The target population for this study was physicians, physician assistants, and nurse practitioners located throughout the United States who treat and manage patients experiencing CNCP, who are aware of the 2016 CDC guidelines, and who hold prescriptive privileges including Schedule III medications, such as opioids. Exclusion criterion included physicians who had specialty training, physicians and practitioners in training and practitioners who responded as not having awareness of the 2016 opioid prescribing CDC guidelines. The rationale for the exclusion criteria for specialty trained physicians related directly to the guidelines intention of addressing generalist practitioners and not specialty practitioners. The second group that was excluded from the study of learner practitioners was due to lack of ability for decision making and prescriptive authority of narcotics. Lastly, providers who were unaware of the guidelines were excluded due to applicability of knowledge component of the guidelines would lead to skewed results.

The survey instrument was electronically disseminated through three national professional associations: the American Association of Nurse Practitioners, the American Association of Physician Assistants, and the Academy of Family Practice Physicians. These organizations made the survey tool available to their members for a specified window of time (3 months), either on their respective websites or by email invitation containing a link to the survey. The rationale behind this approach was to make the survey tool accessible to physicians, physician assistants, and nurse practitioners located throughout the United States. The professional associations tend to have a wide range of members with varying experience and
training in their respective fields. The goal was for the study to yield a nationally representative sample of Family practice physicians, physician assistants, and nurse practitioners who had various levels of post licensure training (ranging from none to many hours) in the area CNCP management. Prior to initiating and deploying the survey tool, the PI submitted and obtained approval for this study from the Seton Hall University Institutional Review Board (SHU-IRB; (see Appendix A).

**Determination of Target Sample Size**

Prior to commencing the data-collection phase of the study, the PI had to obtain an idea of the range of sample sizes needed for the analyses to produce sufficient levels of statistical power. The standard of sufficient statistical power employed for this purpose was $1 - \beta = .80$. To obtain these recommended sample sizes, a G*Power tool was run on an *a priori* basis, assuming an $\alpha$ level of 0.05 with small, medium, or large effect sizes (See Appendix B). As the PI used correlational tests Pearson’s $r$, to evaluate the first six research hypotheses, the statistic used to measure effect size for each test was the absolute value of the respective correlation coefficient (i.e., $|r|$ for Pearson, with values of 0.10, 0.30, and 0.50 used to represent small, medium, and large effect sizes, respectively (Cohen, 1988).

The PI also ran *a priori* G*Power analyses for the final research hypotheses, which involved mediational path analyses. Because the required sample sizes for the correlational components of these path analyses were already obtained from the G*Power performed for the first six research hypotheses, what remained was running the G*Power for the multiple regression components of the path analyses. These latter G*Power analyses assumed an $\alpha$ level of .05 and two predictor variables (i.e., the knowledge variable and the appropriate belief variable) along with small, medium, or large effect sizes. Based on the standards promulgated by
Cohen (1988) for regression models, the small, medium, and large effect sizes corresponded with the coefficient of determination ($R^2$) values of 0.01, 0.06, and 0.14, respectively. The recommended sample sizes produced by these various $a priori$ G*Power analyses (Table 1).

Table 1.
Recommended Sample Sizes

<table>
<thead>
<tr>
<th>Research hypotheses</th>
<th>Small effect size ($n$)</th>
<th>Medium effect size ($n$)</th>
<th>Large effect size ($n$)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>616</td>
<td>67</td>
<td>23</td>
</tr>
<tr>
<td>4a and 4b</td>
<td>957</td>
<td>143</td>
<td>63</td>
</tr>
</tbody>
</table>

The PI focused on the recommended sample sizes for Research Hypotheses 4a and 4b, as they were greater than the corresponding recommended sample sizes for the other six hypotheses. A minimum sample size of $n = 957$ would be required for sufficient power of $1 - \beta = 0.80$ if either of the multiple regressions run for Research Hypotheses 4a or 4b produced a small effect size that was statistically significant. In practice, however, it is more common for statistically significant results to have effect sizes in the medium to large range. Therefore, initially the researcher planned to obtain at least $n = 143$ eligible participants to complete the survey instrument for the study.

The survey tool contained eligibility questions designed to eliminate potential participants who were not part of the targeted population of the study, as well as safeguards designed to ensure that all items in the survey were answered properly before the survey could be submitted, the PI was not concerned that any of the survey data was received would have to be discarded due to ineligible participants, input errors, or incompleteness. The researcher planned to run G*Power on a post hoc basis after performing each statistical test to determine the attained
statistical power level for that test. If any of these power levels fell short of the $1 - \beta = 0.80$ standard, the researcher had planned to recruit additional participants and rerun the statistical analyses with these additional surveys such that the increased sample size would produce sufficient power.

**Survey Instrumentation**

The PI used an existing survey tool published in Journal of Opioid Management in original research by McCalmont et al., (2018). Lead author permission was obtained through electronic communication. The questionnaire did not fall under copywrite restriction; thus, request for copyright permission was obviated. The study included III sections. Section I was dedicated to demographics inquiries of age, profession, years in practice, ethnicity/race, practice type and practice region. Section II inquiry related to awareness of 2016 CDC guidelines. Section III Likert scaled statements relating to beliefs and attitudes of 2016 CDC opioid prescribing guidelines. The PI built upon this study by incorporating a section on factual recall of 2016 CDC opioid guideline recommendation, form of multiple-choice questions. This section was discussed at length with guidelines authorship team for accurate representation of CDC guidelines. The study was disseminated in an electronic format (see Appendix C), utilizing Survey Monkey platform. The decision to develop a computer-based survey tool was to allow for a wide dissemination of the survey to the targeted audience through the internet; to eliminate the need to secure physical locations, printed materials, and personnel to administer the survey to participants; and to reduce the incidence of ineligible or incomplete surveys, as the survey instrument itself contained safeguards to flag or prevent these problems. A computerized survey format also permitted the PI to download the survey data collected from the group of participants directly into an electronic medium (a Microsoft Excel® spreadsheet) for further compilation.
The PI designed the electronic survey-dissemination process to protect the confidentiality of participants, as email addresses were not accessible to the researcher. Further, the anonymity of participants were ensured due to the absence of any personal identifiers on the survey instrument, such as name, physical address, telephone number, names of any employers or schools attended, social security number, or Drug Enforcement Administration registration number. The initial disclosure statement in the solicitation letter sent with the survey tool clearly stated the voluntary nature of the survey and its low risk to the participants. The survey instrument consisted of the following five sections.

**Demographics**

Demographics of the survey included questions designed to obtain descriptive information about the medical-provider participant such as age, level of education, profession (physician, physician assistant, nurse practitioner), years of experience as a medical provider, the state where the provider currently practices, and the provider’s number of post licensure continuing medical education hours (CME) over the past 3 years in CNCP management. In addition, this section contained two eligibility questions: whether the participant was aware of the 2016 CDC guideline and whether the participant had a Drug Enforcement Administration registration number. Negative responses to either of these questions disqualified the participant from the study because the focus of the study was only on those providers who had awareness of the existence of the CDC guideline for prescribing opiates and those who were legally permitted to prescribe opiates.

The items in this section used to answer the research questions were the providers’ CME hours over the past 3 years in CNCP management and providers’ years of experience. Relating to the CME inquiry, participants selected from a drop-down menu denoting one of six ranges for
this variable: 0 (i.e., no training); 1–4 hours; 5–9 hours; 10–19 hours; 20–29 hours; and 30 hours or more. The rationale for using ranges to report this variable was related, in part, to the realization that the provider participant may not have been able to recall their exact number of hours of CNCP management training during the past 3 years but could select the appropriate range in which these earned hours of CME for pain management fell. The researcher also thought it important to include a “0 (no training)” category to distinguish those participants who had no recent CME in pain management. In developing this set of ranges, a concerted effort was made to include enough ranges to differentiate participants with only a little post licensure training in pain management from those who had moderate and significant amounts of CME training in this area. An additional relevant factor was that states’ requirements regarding the amounts of continuing education medical providers must receive in their areas of practice varied from very lax to significant.

**Knowledge of the 2016 CDC Guideline**

This section consisted of specific objective questions regarding the contents of the most current CDC opioid prescribing guideline. Each of the 12 questions in this section was multiple choice in nature with four potential answer choices (labeled A, B, C, and D) for each question. Participants’ composite scores in this section were the number of these questions answered correctly. The questions drew directly from the CDC website on the self-evaluation tool for opioid prescribing guidelines, with permission. [https://www.medscape.org/viewarticle/881589](https://www.medscape.org/viewarticle/881589). [https://emergency.cdc.gov/coca/calls/2018/callinfo_031318.asp](https://emergency.cdc.gov/coca/calls/2018/callinfo_031318.asp); Additionally, the researcher contacted the guideline authors who provided input on the final version used in this study.
**Study Variables**

To answer the research questions, the researcher compiled the following items from the survey instrument for each study participant: The variables evaluated in this study were four predictor variables and two outcome variables. Since, this study was not experimental design study, the need for control variables were obviated.

Predictor or Independent Variables:

1. The number of hours of post licensure training over the past 3 years in CNCP management.
2. The number of years in practice.
3. The composite score on knowledge of the 2016 CDC guideline (Knowledge).
4. The composite score on the belief that the 2016 CDC guideline would reduce the epidemic opioid crisis in relation to chronic-pain management (Belief).

Outcome or Dependent Variables:

1. The composite score on the attitude that the 2016 CDC guideline would produce improved outcomes in chronic-pain management (Individual Attitude).
2. The composite score on the participant’s attitude regarding the implementation of the 2016 CDC guideline recommendations concerning reducing the chronic epidemic opioid crisis in their own practice (Practice 1 and 2).

The number of hours of post licensure training, is an ordinal variable because the six possible choices for the range in which the participant’s hours of post licensure CNCP training over the past 3 years has a natural order. In contrast, the composite score on the knowledge of the CDC guideline is a ratio-level variable because this score is a true number (hence, differences between any two scores are meaningful) with a natural zero point (Field 2018).
Each of the latter four items on the list shown above are sums of Likert-style scores that are ordinal-level variables. Although some statisticians believe that a sum of Likert scores produces a composite variable that is ordinal (but not interval) in nature and hence to which researchers can only apply nonparametric statistical tests, other researchers have gained consensus and are comfortable applying parametric methods to these types of composite variables under certain conditions (Sullivan & Artino, 2013). These criteria include the following: using a minimum 5-point Likert-type scale for each individual survey item contributing to the composite variable, including at least five individual Likert-type scores to obtain the composite variable, and testing to see whether the composite variable is normally distributed (Grace-Martin, 2012). Sullivan and Artino also suggested a minimum sample size of at least five participants when performing statistical tests with this type of composite variable. Table 1 summarizes the assigned name, description, measurement level, method of calculation, and possible score range of each of these six variables.
Table 2

*Summary of Attributes of Variables Used in Analysis*

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement level</th>
<th>Method of calculation</th>
<th>Possible score range</th>
</tr>
</thead>
<tbody>
<tr>
<td>(CME)_HRS</td>
<td>Ordinal</td>
<td>Select appropriate range from 6 possible choices</td>
<td>Choices range from “0 (i.e., no training)” to “30 hours or more”</td>
</tr>
<tr>
<td>KNOWLEDGE</td>
<td>Ratio</td>
<td>Number of correctly answered questions on a 12-item objective multiple-choice test</td>
<td>0–12</td>
</tr>
<tr>
<td>OPIOID_BELIEF</td>
<td>Ordinal</td>
<td>Sum of scores on 6 9-point Likert-type scale items</td>
<td>6–30</td>
</tr>
<tr>
<td>ATTITUDE</td>
<td>Ordinal</td>
<td>Sum of scores on 10 9-point Likert-type scale items</td>
<td>10–50</td>
</tr>
<tr>
<td>PRACTICE 1 (REDUCE HARM)</td>
<td>Ordinal</td>
<td>Sum of scores on 6 9-point Likert-type scale items</td>
<td>6–30</td>
</tr>
<tr>
<td>PRACTICE 2 (Increase Modalities)</td>
<td>Ordinal</td>
<td>Sum of scores on 10 9-point Likert-type scale items</td>
<td>10–50</td>
</tr>
</tbody>
</table>

Note. CME = continuing medical education, CNCP = chronic non-cancer pain, CDC = Centers for Disease Control and Prevention.

**Belief That the 2016 CDC Guideline Would Reduce the Opioid Epidemic Crisis**

This section consisted of six statements about the provider’s perception regarding the effectiveness of the CDC Guideline in reducing the epidemic opioid crisis in relation to chronic-pain management. Responses to each of these statements was on a 9-point Likert-type scale (with
responses ranging from 1 = Strongly Agree to 9 = Strongly disagree). All statements in this section were positively worded; hence no reverse scoring was necessary.

The researcher adapted the statements from a survey instrument (specifically, Item 5 of that survey) used in the study by McCalmont et al. (2018), with written permission, which investigated the impact of the 2016 CDC Guideline on Oregon medical providers. The researcher obtained a composite score by summing individual Likert scores for the 10 items appearing in the section. The PI eliminated one statement appearing in the original McCalmont et al. survey because the statement was specific to the Oregon Health Plan, thus not relevant to the current study. The alpha, as found in the results chapter, demonstrate that this removal did not impact the reliability of the scale.

**Attitude Regarding the Implementation of the 2016 CDC Guideline Recommendations in the Provider’s Own Practice**

This section contained 16 statements about a provider’s attitude regarding the implementation of the recommendations promulgated by the 2016 CDC guideline in their own practice. The responses to each of these statements was on a 9-point Likert-style scale (with responses ranging from 1 = Strongly Agree to 9 = Strongly disagree). The researcher grouped these statements into two parts: A and B. Part A consisted of six statements, each addressing the CDC recommendations regarding reducing the chronic opioid crisis, whereas the ten statements in Part B focused on CDC recommendations for improving CNCP patient outcomes. The PI obtained statements appearing in Part A by rewording statements from the third section of the survey (which addressed the belief that the CDC guideline would reduce the chronic opioid crisis), so they apply to the particular practitioner and their patients rather than to the medical profession as a whole. In a similar fashion, for Part B, the PI followed the same steps regarding
the statements comprising the fourth section of the survey (focused on the CDC guideline’s impact on producing better patient outcomes), so they, too, would specifically address the attitudes of the medical provider in relation to their own practice.

Prior to developing this section of the survey instrument, the PI reviewed the method employed by Kernodle (1998) to derive an attitudinal variable from their survey data for use in their study, which also addressed the adaptation of sets of practice guidelines by medical providers. Kernodle’s method built on Fishbein’s and Ajzen’s (1975) definition of attitude, which states that a combination of an individual’s behavioral beliefs and their appraisal of the relevant outcomes associated with those beliefs, determines a person’s attitude. To calculate the value of their attitudinal variable, Kernodle took the product between the Likert-type score for each item in the behavioral-beliefs section of the survey and the Likert-type score for the corresponding item (i.e., the outcome evaluation for that behavioral belief) in the attitudinal section of the survey and summed the products.

Because Research Question 5 of this study investigates whether each of the two belief variables (derived in Sections III and IV of the survey instrument) acts as a mediator between the knowledge variable and the appropriate attitudinal variable (from either Part A or Part B of Section V of the survey), it is important that the belief variable and the corresponding attitudinal variable share no common elements in their derivations. Sharing common elements would result in a built-in correlation between these two variables, which would distort the outcome of the mediation path analysis. For this reason, the researcher did not apply the method described in the Kernodle (1998) study to derive composite scores for the attitudinal variables used in this study.
Validity and Reliability of the Survey Instrument

The researcher addressed the validity and reliability of the various sections (other than the demographics section) of the survey instrument prior to collecting the data. In constructing the multiple-choice questions on knowledge of the 2016 CDC guideline section, the PI created questions that covered the content of all 12 recommendations detailed in the 2016 CDC document itself. Additionally, the researcher believed this knowledge section would be highly reliable because the Cronbach’s alpha for this section of the survey tool in the McCalmont et al. (2018) study, which also addressed participants’ familiarity with the 2016 CDC Guideline (i.e., Item 8 of that survey), was $\alpha = .90$. Further, the authors of the original 2016 CDC opioid prescribing content guidelines evaluated the knowledge section for face validity. The authors of the guideline writing team reviewed the knowledge content at three separate time periods. The researcher eliminated three questions due to concerns of ambiguity of answer choices, after consultation with guideline authors. Reliability was tested using Cronbach alpha, as seen in Chapter 4.

Because the authors of the McCalmont et al. (2018) study did not discuss the issue of validity in relation to the sections of their survey (i.e., Items 5 and 17), which I adapted for use in the two belief sections of this study’s survey instrument, the PI relied on the method used by Kernodle (1998), in which the author solicited a group of experts in the field of behavioral characteristics related to guideline use and asked them to evaluate the validity of these sections of the survey. For reliability, the Kernodle study reported that the Cronbach’s alphas for the attitudinal sections of the survey tools designed to measure guideline compliance for four different medical practices ranged from $\alpha = 0.88$ to $\alpha = 0.96$. Despite some differences between the ways Kernodle calculated the composite value of the attitudinal variable and this study, the
researcher was confident that this section of my survey would also exhibit a high degree of internal consistency. Additionally, after deploying the survey instrument, the researcher conducted factor analysis on each of the sections discussed for validity appropriateness of constructs.

Once the study data accrued, the researcher evaluated the reliability of the knowledge section of the survey, along with the reliabilities of the two belief sections and Parts A and B of the attitudinal section by calculating separate Cronbach’s alphas for each of these sections and parts. The PI recognized, however, that Cronbach’s alpha is not an appropriate tool to evaluate count variables (Cronbach, 1980). Considering this limitation, the researcher performed a principal-axis factor analysis on each section to determine the main constructs (i.e., factors) underlying the items in that survey section. This generated a matrix displayed for each survey item corresponding to the factor loadings of the main constructs. An examination of the magnitudes of these factor loadings allowed me to determine which of these constructs had the greatest influence on each item. Using this, scales were created. As a final step, the PI calculated separate Cronbach’s alphas for the scales shown in the factor analysis. Because the overall alpha value for a given survey section is an inappropriate measure of internal consistency when that scale has several underlying constructs (Field, 2018), this latter set of alphas by subscale provided a more accurate assessment of that section’s reliability (Cronbach, 1951).

Data Compilation

At the conclusion of the data-collection period, the researcher compiled and downloaded the information from the completed surveys into a Microsoft Excel spreadsheet. A single master spreadsheet was organized, each row contained the survey data for a particular participant, and each column contained responses across all participants on a data item in the survey. The top row
of the spreadsheet contained the SurveyMonkey-generated names for each survey item. To prepare this data file so it could be used for statistical analyses, the researcher carried out the following manipulations:

- After reviewing the SurveyMonkey-generated names for each data item, the PI created and entered more descriptive names that adhered to SPSS-variable naming rules for these items.

- For the number of CMEs, the PI created a new variable using Excel formulas, assigning a number to each of the six possible categorical selections for this item. These assignments were as follows: 1 for “0 (no such training)”; 2 for “1–4 hours”; 3 for “5–9 hours”; 4 for “10–19 hours”; 5 for “20–29 hours”; and 6 for “30 hours or more.”

- The researcher calculated the composite score on the knowledge of the 2016 CDC guideline, and the composite Likert-style scores for the reduction in the epidemic-opioid-crisis belief variable, the improved-patient-outcomes belief variable, and the two practice attitudinal variables.

- Last, for some of the nominal-level demographic variables (such as level of education, profession, state of practice, and type of practice), the researcher assigned a variable with a numerical code to each possible category of that variable. The PI created a new variable for the profession item, where an assignment of number 1 for a physician, 2 for a physician assistant, and a 3 for a nurse practitioner.

Safeguards were created in the survey instrument to prevent the completion of the survey by an ineligible potential participant and to ensure participants completed all items before submitting the survey. Hence, there was no reason to clean the data by eliminating ineligible or
incomplete surveys. Once these steps were complete, the data was uploaded to IBM SPSS to perform the statistical analyses.

**Descriptive and Inferential Statistical Analyses**

After collecting, compiling, and uploading survey data to SPSS, the PI ran various descriptive and inferential statistical analyses on the data.

**Descriptive Analyses**

The descriptive analyses involved producing several tabular and graphical exhibits to obtain a better understanding of the characteristics of the medical providers included in the sample. Several exhibits provided information on the demographics of the sample such as age, level of education, profession (physician, physician assistant, or nurse practitioner), years of experience, geographic state of practice, type of practice, and the number of hours of CME training during the past 3 years in CNCP management. Additionally, the researcher produced tables and graphs summarizing participants’ responses for the remaining sections of the survey tool. These tables and graphs included exhibits summarizing key sample metrics (such as the mean, median, and standard deviation) for the composite scores calculated for each of these variables.

**Inferential Analyses**

Appropriate Inferential statistical tests were performed to test research hypotheses corresponding to each of the subparts of the five research questions. A summary of the inferential statistical tests chosen to evaluate each of the research hypotheses is detailed below. Each summary lists the study variables applicable to the given research hypothesis, the name(s) of the statistical test(s) conducted to evaluate that hypothesis, and a brief discussion of why the selected tests were appropriate.
**Research Hypothesis 1a**

*Variable 1.* Number of hours of CME training during the past 3 years in CNCP management (CME_HRS)—Ordinal level

*Variable 2.* Composite score on the knowledge of the 2016 CDC guideline (Knowledge)—Ratio level

Research Hypothesis 1a states that a statistically significant relationship exists between the two variables listed above. The statistical test applied was Pearson’s correlation $r$. Researchers use Pearson’s correlation to find a linear relationship between two variables (Field, 2018).

**Research Hypothesis 1b**

*Variable 1.* Number of hours of CME training during the past 3 years in CNCP management (CME_HRS)—Ordinal level

*Variable 2.* Composite score on the providers’ belief that the *2016 CDC guideline would reduce the epidemic opioid crisis* in relation to CNCP management (BELIEF)—Ordinal level

Research Hypothesis 1b states that a statistically significant relationship exists between the two variables listed above. The statistical test applied was Pearson’s correlation $r$. Researchers use Pearson’s correlation to find a linear relationship between two variables.

**Research Hypothesis 1c**

*Variable 1.* Number of hours of CME during the past 3 years in CNCP management (CME_HRS)—Ordinal level

*Variable 2.* Composite score on the providers’ belief that the implementation of the *2016 CDC guideline would produce improved patient outcomes* with regard to CNCP management
Research Hypothesis 1c states that a statistically significant relationship exists between the two variables listed above. The statistical test applied was Pearson’s correlation $r$. Pearson’s correlation is used to find a linear relationship between two variables.

Research Hypothesis 2a states that a statistically significant relationship exists between the two variables listed above. Because the _BELIEF variable is a sum of Likert-type scale variables, Sullivan and Artino (2013) and Grace-Martin (2012) suggested that if certain conditions are satisfied, this composite-score variable can be treated as an interval-level variable when running statistical tests, allowing the use of a parametric test. These conditions follow: a minimum of a 5-point Likert-type scale for each item included in the composite score, at least five individual Likert-type scale items comprising the composite score, a sample size of at least $n = 5$, and a distribution of the composite score variable that is approximately normal. The PI selected the Pearson’s $r$ correlation as the parametric test for this research hypothesis because it is appropriate for measuring an association when both variables are either interval level or ratio level. The researcher ran the Pearson’s $r$ correlation test on a two tailed basis to be consistent with the wording of the research hypothesis.
**Research Hypothesis 2b**

*Variable 1.* Composite score on the knowledge of the 2016 CDC Guideline (KNOWLEDGE)—Ratio level

*Variable 2.* Composite score on the belief that the 2016 CDC Guideline would produce improved patient outcomes with regard to CNCP management (OUTCOME_BELIEF)—Ordinal level

Research Hypothesis 2b states that a positive relationship exists between the two variables listed above. The researcher selected Pearson’s $r$ correlation as the parametric test for this research hypothesis because it is appropriate for measuring an association when both variables are either interval level or ratio level. The researcher ran the Pearson’s $r$ correlation test on a right-tailed basis to be consistent with the wording of the research hypothesis.

**Research Hypothesis 3**

*Variable 1.* Composite score on the belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis in relation to CNCP management (Opioid Belief)—Ordinal level

*Variable 2.* Composite score on the belief that the 2016 CDC Guideline would produce improved patient outcomes regarding CNCP management (BELIEF)—Ordinal level

The PI selected the Pearson’s $r$ correlation as the parametric test for this research hypothesis because it is appropriate for measuring an association when both variables are either interval level or ratio level. I ran the Pearson’s $r$ correlation test on a right-tailed basis to be consistent with the wording of the research hypothesis.
**Research Hypothesis 4a**

*Independent variable.* Composite score on the knowledge of the 2016 CDC guideline (Knowledge, CME training, Belief Scale, Individual Attitude Scale).

*Dependent variable.* Composite score on the participant’s attitude toward implementing the CDC guideline recommendations concerning reducing the chronic opioid crisis in their own practice (Practice Scale I – Harm Reduction); (Practice Scale II - Non-Opioid Modalities)

*Intervening variable.* Composite score on the belief that the 2016 CDC guideline would reduce the epidemic opioid crisis in relation to CNCP management (Opioid Belief)—Ordinal level

**Statistical tests.** Mediation path analysis—Parametric

To determine whether the intervening variable was acting as a mediator between the independent and dependent variables, the PI proposed a path analysis. Figure 5 presents a schematic diagram of this path analysis. The significance of utilizing this method is to help explain more clearly hypothesized patterns of directional and nondirectional relationships among a set of observed (measured) and unobserved (latent) variables (MacCallum & Austin, 2000). The purpose of the model, in the most common form of SEM, is to account for variation and covariation of the measured variables (MVs). With that in mind, a path diagram or a pictorial presentation was constructed as shown below to test relationships between dependent variables and multiple independent variables. Path analysis is useful because, unlike other techniques, it provides a focused view of relationships among all the independent variables. This results in a model showing directional mechanisms through which independent variables produce both direct and indirect effects on a dependent variable. A measured variable (MV) is a variable that is directly measured whereas a latent variable (LV) is a construct that is not directly measured.
Direct effect is a directional relation between two variables, e.g., independent, and dependent variables. Indirect effect is the effect of an independent variable on a dependent variable through one or more intervening or mediating variables. While there are various programs that can be used in this analysis, the researcher chose to utilize SPSS supported AMOS software for the analysis.

Figure 5 presents a schematic diagram of this path analysis.

![Path Model Diagram]

**Figure 5. Path Analysis for Research Hypothesis 4a**

In Figure 5 represents the various paths that are included in the structural equation model. The a represents the path between the knowledge and individual attitude scale variables, whereas b represents the relationship between the opioid belief and both practice variables. Path c is the relationships between the knowledge and practice variables. Assuming a, b, and c are all statistically significant, the opioid belief variable can be considered a mediator between the knowledge and the two practice variables. To determine whether opioid belief is a mediator between the knowledge and the two practice variables, one must show that the inclusion of the
opioid belief variable as a predictor in the multiple regression model causes the significant relationship between the knowledge and opioid attitude variables to become either nonsignificant or to have a large reduction in magnitude (Baron & Kenny, 1986).

Research Hypothesis 4b

**Independent variable.** Composite score on the knowledge of the 2016 CDC guideline (Knowledge)—Ratio level

**Dependent variable.** Composite score on the participant’s attitude toward implementing the CDC guideline recommendations concerning improved patient outcomes in their practice (Attitude)—Ordinal level

**Intervening variable.** Composite score on the belief that the 2016 CDC guideline will produce improved patient outcomes in relation to CNCP management (Belief)—Ordinal level

**Statistical tests.** Mediation path analysis—Parametric

To determine whether the intervening variable was acting as a mediator between the independent and dependent variables, the researcher performed a path analysis. Figure 5 presents a schematic diagram of this path analysis.

For each of the first six research hypotheses promulgated in this study, an assumption about the relationship between a pair of variables was proposed. None of these six hypotheses, however, asserts causation between the variables or attempts to say that the value of one variable can be used to predict the value of another variable. Therefore, PI used correlational tests—including Pearson’s $r$ to assess the reasonableness of these hypotheses.
CHAPTER IV.
RESULTS

This chapter presents the results of the survey and further validates the survey tool for construct validity and reliability.

Sample Characteristics

The total sample size was 143 primary care practitioners, as demonstrated by post hoc power analysis conducted the G*Power. The age range varied from 25 to 69 years of age reflecting resident eligible practitioners to semiretired practitioners. The sample revealed age groups divided into nine categories. Most participants were in the 35–39 age (n=34, 22% of the sample). The age groups of 30–34, 40–44, and 45–49 represented approximately near equal percentages of the sample size, 15.72%, 18.87%, and 15.73%, respectively (See Table 3). These demographic data indicate that most participants were young early practitioners, and the minority of participants fell in the preretirement age category.

Regarding the CME-training portion of the study, the results indicated most participants (43.5%) reported CME completion between 5 and 9 hours in the past 3 years. The next highest frequency was 31.5% with 1–4 hours of CME completion. Post licensure training, in relation to CME completion, is mandatory for licensure renewal; however, no uniform mandate exists for CME dedicated to chronic-pain management.

For the portion of the demographics relating to highest level of education, the majority of participants (102, 64%) of the sample had attained a master’s degree; 31% had obtained a professional degree of medical doctorate (MD). The findings indicated that majority of the sample comprised midlevel practitioners, as a master’s degree would provide the minimal entry to practice.
Table 3.
*Participant Demographics*

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>25–29</td>
<td>12</td>
<td>7.55</td>
</tr>
<tr>
<td>30–34</td>
<td>25</td>
<td>15.72</td>
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<td>35–39</td>
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<td>40–44</td>
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<td>18.87</td>
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<td>45–49</td>
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<td>50–54</td>
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<td>7.55</td>
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<td>60–64</td>
<td>11</td>
<td>6.92</td>
</tr>
<tr>
<td>65–69</td>
<td>5</td>
<td>3.14</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>CME Training</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 hours</td>
<td>5</td>
<td>3.10</td>
</tr>
<tr>
<td>1–4 hours</td>
<td>50</td>
<td>31.45</td>
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<tr>
<td>5–9 hours</td>
<td>66</td>
<td>41.51</td>
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<tr>
<td>10–19 hours</td>
<td>38</td>
<td>23.90</td>
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</table>

<table>
<thead>
<tr>
<th>Education</th>
<th>Master’s Degree</th>
<th>102</th>
<th>64.15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Doctorate Degree (EdD, PhD, PsyD)</td>
<td>8</td>
<td>5.03</td>
</tr>
<tr>
<td></td>
<td>Professional Degree (MD, DDS)</td>
<td>49</td>
<td>30.82</td>
</tr>
</tbody>
</table>

| Profession | Physician      | 47  | 29.56 |
|           | Physician Assistant (PA) | 57  | 35.85 |
|           | Nurse Practitioner (NP)   | 55  | 34.59 |

Table 3 Cont.
Years of experience 2 10  6.29
3 19  11.95
4 15  9.43
5 17  10.69
6 16  10.06
7 13  8.18
8 9  5.66
9 12  7.55
10 12  7.55
11 4  2.52
12 1  0.63
13 1  0.63
14 2  1.26
15 1  0.63
18 2  1.26
19 3  1.89
20 6  3.77
22 3  1.89
23 2  1.26
24 1  0.63
26 1  0.63
27 2  1.26
28 3  1.89
30 1  0.63
31 1  0.63
33 1  0.63
37 1  0.63

Note. N = 143, CME = continuing medical education.

Exploring the professional status of respondents, participants had a near-equal distribution among the three professions practicing primary care. Physicians represented 29.56% of the sample, nurse practitioners represented 34.59%, and physician assistants represented slightly higher at 35.85%. Participants’ years of experience varied greatly from a minimum of 2
years’ experience and a maximum of 37 years. Participants with more than 10 years of experience accounted for 30% of the sample.

Regarding geographic representation of participants, because the PI disseminated this survey through Listservs of three national professional organizations, respondents represented a wide number of states. The CDC divides geography of the 50 states and the District of Columbia into 10 regions, loosely based on Department of Health and Human Services regions. The intention was to strengthen the consistency and quality of the guidance, communications, and technical assistance provided to states to improve coordination. Each region comprises four to seven states. Of the total of 143 responders, the highest number (44, 27.68%) were from the southeastern region or Region 4, which includes Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. Table 4 provides the regions and number of responders from that region.
Table 4
Responses by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>State</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region 1</td>
<td>Connecticut, Massachusetts, New Hampshire, Rhode Island, Vermont</td>
<td>18</td>
<td>11.31</td>
</tr>
<tr>
<td>Region 2</td>
<td>New Jersey, New York</td>
<td>9</td>
<td>5.66</td>
</tr>
<tr>
<td>Region 3</td>
<td>Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia</td>
<td>12</td>
<td>7.54</td>
</tr>
<tr>
<td>Region 4</td>
<td>Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee</td>
<td>44</td>
<td>27.68</td>
</tr>
<tr>
<td>Region 5</td>
<td>Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin</td>
<td>18</td>
<td>11.32</td>
</tr>
<tr>
<td>Region 6</td>
<td>Arkansas, Louisiana, New Mexico, Oklahoma, Texas</td>
<td>8</td>
<td>5.04</td>
</tr>
<tr>
<td>Region 7</td>
<td>Iowa, Kansas, Missouri, Nebraska</td>
<td>9</td>
<td>5.67</td>
</tr>
<tr>
<td>Region 8</td>
<td>Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming</td>
<td>13</td>
<td>8.18</td>
</tr>
<tr>
<td>Region 9</td>
<td>Arizona, California, Hawaii, Nevada</td>
<td>15</td>
<td>9.43</td>
</tr>
<tr>
<td>Region 10</td>
<td>Alaska, Idaho, Oregon, Washington</td>
<td>12</td>
<td>8.17</td>
</tr>
</tbody>
</table>

Instrument Validation

Validity of an instrument is the degree to which it measures what it is supposed to measure (Field, 2018). The team of authors on the CDC writing committee subjected the instruments used in this study to face validity. To further test the construct validity of the instrument, the researcher ran factor analysis for the two practice scales, the attitude scale, and belief scale (Field, 2018). Factor analysis explores the relationship of multiple observed variables have similar patterns of responses because they are all associated with a latent variable (Field, 2018). Latent variables are variables that researchers do not directly observe but rather infer
them from other variables. Factor loading indicate the extent of relevance or relationship of variables in explaining a construct. As a rule of thumb, a 0.7 or higher factor loading represents that the factor extracts sufficient variance from that variable (Field, 2018).

The PI ran a series of EFAs with a varimax (orthogonal) rotation and a cut off 1.25 for eigenvalue to align with the component. An eigenvalue is a measure of how much of the variance of the observed variables the factor explains. For a factor to be considered loading cleanly, it needs to have loaded at least .13 higher on a factor. Table 5 displays factor loading that could load freely. All but one question located cleanly for the first factor for the belief variables. For individual attitudes, several also loaded on the first factor as well as one of the second factors and one on the fourth factor. For individual attitudes, several also loaded on the first factor as well as one of the second factors and one on the fourth factor. For Practice I (Harm Reduction), six items loaded on Factor 2, two items loaded on Factor 3, and one item on Factor 4. Three questions did not load cleanly on any factor.

The PI then forced a three-factor solution to see if different results emerged (see Table 6). In the forced three-factor solution, the belief scale remained the same with all but one statement loading cleanly on Factor 1: Belief Statement 6. All but three individual attitudes loaded cleanly on Factor 1; Attitudes Items 6 and 1 loaded on Factor 3, and 9 did not load cleanly at all. Practice Statements 1–6 and 16 loaded on Factor 3; Practice Statements 8–15 loaded on Factor 2, and Practice Statement 7 did not load cleanly.

Recognizing that these factors did not load cleanly when all the variables were included together, the PI chose to run several different factor analyses to investigate how each scale item loaded when they were not with the other scale. The following analysis attempts to examine factor loadings separately.
Table 5

*Free Loading Exploratory Factor Analysis*

<table>
<thead>
<tr>
<th></th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief 1</td>
<td>0.807</td>
<td>0.388</td>
<td>0.125</td>
<td>-0.064</td>
</tr>
<tr>
<td>Belief 2</td>
<td>0.818</td>
<td>0.373</td>
<td>0.116</td>
<td>-0.007</td>
</tr>
<tr>
<td>Belief 3</td>
<td>0.802</td>
<td>0.402</td>
<td>0.178</td>
<td>0.084</td>
</tr>
<tr>
<td>Belief 4</td>
<td>0.748</td>
<td>0.428</td>
<td>0.181</td>
<td>0.074</td>
</tr>
<tr>
<td>Belief 5</td>
<td>0.709</td>
<td>0.456</td>
<td>0.233</td>
<td>0.105</td>
</tr>
<tr>
<td>Belief 6</td>
<td>0.506</td>
<td>0.523</td>
<td>0.003</td>
<td>0.332</td>
</tr>
<tr>
<td>Individual attitudes 1</td>
<td>0.399</td>
<td>0.357</td>
<td>0.193</td>
<td>-0.342</td>
</tr>
<tr>
<td>Individual attitudes 2</td>
<td>0.804</td>
<td>0.202</td>
<td>0.277</td>
<td>-0.067</td>
</tr>
<tr>
<td>Individual attitudes 3</td>
<td>0.794</td>
<td>0.137</td>
<td>0.369</td>
<td>-0.037</td>
</tr>
<tr>
<td>Individual attitudes 4</td>
<td>0.745</td>
<td>0.012</td>
<td>0.228</td>
<td>-0.250</td>
</tr>
<tr>
<td>Individual attitudes 5</td>
<td>0.742</td>
<td>0.128</td>
<td>0.447</td>
<td>0.052</td>
</tr>
<tr>
<td>Individual attitudes 6</td>
<td>0.405</td>
<td>0.279</td>
<td>0.231</td>
<td>0.593</td>
</tr>
<tr>
<td>Individual attitudes 7</td>
<td>0.722</td>
<td>0.130</td>
<td>0.479</td>
<td>0.047</td>
</tr>
<tr>
<td>Individual attitudes 8</td>
<td>0.711</td>
<td>0.015</td>
<td>0.414</td>
<td>-0.067</td>
</tr>
<tr>
<td>Individual attitudes 9</td>
<td>0.451</td>
<td>0.186</td>
<td>0.544</td>
<td>0.054</td>
</tr>
<tr>
<td>Individual attitudes 10</td>
<td>-0.180</td>
<td>0.153</td>
<td>0.171</td>
<td>0.760</td>
</tr>
<tr>
<td>Practices 1</td>
<td>0.394</td>
<td>0.727</td>
<td>0.262</td>
<td>0.128</td>
</tr>
<tr>
<td>Practices 2</td>
<td>0.379</td>
<td>0.759</td>
<td>0.320</td>
<td>0.127</td>
</tr>
<tr>
<td>Practices 3</td>
<td>0.200</td>
<td>0.781</td>
<td>0.376</td>
<td>0.075</td>
</tr>
<tr>
<td>Practices 4</td>
<td>0.253</td>
<td>0.729</td>
<td>0.440</td>
<td>0.105</td>
</tr>
<tr>
<td>Practices 5</td>
<td>0.168</td>
<td>0.764</td>
<td>0.343</td>
<td>0.176</td>
</tr>
<tr>
<td>Practices 6</td>
<td>0.149</td>
<td>0.688</td>
<td>0.273</td>
<td>0.217</td>
</tr>
<tr>
<td>Practices 7</td>
<td>0.316</td>
<td>0.313</td>
<td>0.339</td>
<td>-0.367</td>
</tr>
<tr>
<td>Practices 8</td>
<td>0.206</td>
<td>0.444</td>
<td>0.611</td>
<td>0.269</td>
</tr>
<tr>
<td>Practices 9</td>
<td>0.280</td>
<td>0.450</td>
<td>0.691</td>
<td>0.113</td>
</tr>
</tbody>
</table>
Table 5 continued

| Practices 10 | 0.298 | 0.543 | 0.585 | 0.175 |
| Practices 11 | 0.212 | 0.484 | 0.679 | 0.073 |
| Practices 12 | 0.261 | 0.345 | 0.685 | 0.092 |
| Practices 13 | 0.212 | 0.385 | 0.702 | 0.109 |
| Practices 14 | 0.311 | 0.139 | 0.746 | 0.018 |
| Practices 15 | 0.247 | 0.179 | 0.673 | 0.017 |
| Practices 16 | -0.057 | 0.320 | 0.104 | 0.730 |

Note. a. Rotation converged in 10 iterations.

Table 6

*Forced 3-Factor Exploratory Factor Analysis*

<table>
<thead>
<tr>
<th></th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief 1</td>
<td>0.848</td>
<td>0.170</td>
<td>0.262</td>
</tr>
<tr>
<td>Belief 2</td>
<td>0.846</td>
<td>0.150</td>
<td>0.289</td>
</tr>
<tr>
<td>Belief 3</td>
<td>0.816</td>
<td>0.203</td>
<td>0.369</td>
</tr>
<tr>
<td>Belief 4</td>
<td>0.768</td>
<td>0.213</td>
<td>0.380</td>
</tr>
<tr>
<td>Belief 5</td>
<td>0.728</td>
<td>0.265</td>
<td>0.419</td>
</tr>
<tr>
<td>Belief 6</td>
<td>0.501</td>
<td>0.027</td>
<td>0.622</td>
</tr>
<tr>
<td>Individual attitudes 1</td>
<td>0.500</td>
<td>0.282</td>
<td>0.043</td>
</tr>
<tr>
<td>Individual attitudes 2</td>
<td>0.816</td>
<td>0.287</td>
<td>0.116</td>
</tr>
<tr>
<td>Individual attitudes 3</td>
<td>0.790</td>
<td>0.363</td>
<td>0.084</td>
</tr>
<tr>
<td>Individual attitudes 4</td>
<td>0.768</td>
<td>0.236</td>
<td>-0.148</td>
</tr>
<tr>
<td>Individual attitudes 5</td>
<td>0.719</td>
<td>0.427</td>
<td>0.133</td>
</tr>
<tr>
<td>Individual attitudes 6</td>
<td>0.313</td>
<td>0.176</td>
<td>0.604</td>
</tr>
<tr>
<td>Individual attitudes 7</td>
<td>0.701</td>
<td>0.460</td>
<td>0.130</td>
</tr>
<tr>
<td>Individual attitudes 8</td>
<td>0.697</td>
<td>0.394</td>
<td>-0.030</td>
</tr>
<tr>
<td>Individual attitudes 9</td>
<td>0.443</td>
<td>0.540</td>
<td>0.168</td>
</tr>
<tr>
<td>Individual attitudes 10</td>
<td>-0.303</td>
<td>0.092</td>
<td>0.609</td>
</tr>
</tbody>
</table>
Table 6 Continued

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Attitudes 1</td>
<td>0.455</td>
<td>0.345</td>
<td>0.629</td>
</tr>
<tr>
<td>Practice 2</td>
<td>0.444</td>
<td>0.407</td>
<td>0.650</td>
</tr>
<tr>
<td>Practice 3</td>
<td>0.282</td>
<td>0.478</td>
<td>0.626</td>
</tr>
<tr>
<td>Practice 4</td>
<td>0.319</td>
<td>0.527</td>
<td>0.607</td>
</tr>
<tr>
<td>Practice 5</td>
<td>0.230</td>
<td>0.431</td>
<td>0.681</td>
</tr>
<tr>
<td>Practice 6</td>
<td>0.195</td>
<td>0.345</td>
<td>0.653</td>
</tr>
<tr>
<td>Practice 7</td>
<td>0.415</td>
<td>0.423</td>
<td>-0.013</td>
</tr>
<tr>
<td>Practice 8</td>
<td>0.198</td>
<td>0.625</td>
<td>0.496</td>
</tr>
<tr>
<td>Practice 9</td>
<td>0.300</td>
<td>0.724</td>
<td>0.397</td>
</tr>
<tr>
<td>Practice 10</td>
<td>0.321</td>
<td>0.627</td>
<td>0.511</td>
</tr>
<tr>
<td>Practice 11</td>
<td>0.246</td>
<td>0.725</td>
<td>0.394</td>
</tr>
<tr>
<td>Practice 12</td>
<td>0.271</td>
<td>0.704</td>
<td>0.304</td>
</tr>
<tr>
<td>Practice 13</td>
<td>0.225</td>
<td>0.727</td>
<td>0.344</td>
</tr>
<tr>
<td>Practice 14</td>
<td>0.304</td>
<td>0.739</td>
<td>0.100</td>
</tr>
<tr>
<td>Practice 15</td>
<td>0.249</td>
<td>0.676</td>
<td>0.130</td>
</tr>
<tr>
<td>Practice 16</td>
<td>-0.153</td>
<td>0.055</td>
<td>0.719</td>
</tr>
</tbody>
</table>

Note. a. Rotation converged in 7 iterations.

Belief Scale

The PI ran an EFA to explore if all six question items would load on a single factor cleanly. The results of the EFA showed Belief did load on a single factor (see Table 7). The total variance explained was 70%, which is a strong correlation across variables. The reliability statistics of the Cronbach’s alpha coefficient 0.944 signaled a strong correlation across variables. A Cronbach’s alpha coefficient of 0.7 or higher signifies high internal consistency.

EFA Results for Belief. The researcher ran an EFA to test whether all components were significant predictors of Belief. As shown in Table 7 Item 6, although still a significant predictor, is weaker than the other five variables. An EFA was run with just the five items and, as shown in
Figure 6, all items are strong predictors. Therefore, it was decided to eliminate Item 6 and have five-item Belief scales, as demonstrated in Table 8.

Table 7.  
*EFA With 6 Items in Belief and corresponding Eigen Values*

<table>
<thead>
<tr>
<th>Component</th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief 1</td>
<td>0.907</td>
<td>0.897</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief 2</td>
<td>0.922</td>
<td>1.013</td>
<td>0.056</td>
<td>0.923 ***</td>
</tr>
<tr>
<td>Belief 3</td>
<td>0.945</td>
<td>1.102</td>
<td>0.057</td>
<td>0.948 ***</td>
</tr>
<tr>
<td>Belief 4</td>
<td>0.909</td>
<td>0.956</td>
<td>0.059</td>
<td>0.887 ***</td>
</tr>
<tr>
<td>Belief 5</td>
<td>0.914</td>
<td>1.044</td>
<td>0.066</td>
<td>0.877 ***</td>
</tr>
<tr>
<td>Belief 6</td>
<td>0.732</td>
<td>0.841</td>
<td>0.091</td>
<td>0.654 ***</td>
</tr>
</tbody>
</table>

*Figure 6. Exploratory Factor Analysis with Five Items on the Belief Scale*
Table 8.
*Exploratory Factor Analysis Standardized Regression Weights: Belief*

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief 1</td>
<td>1</td>
<td></td>
<td>0.902</td>
<td></td>
</tr>
<tr>
<td>Belief 2</td>
<td>1.013</td>
<td>0.055</td>
<td>0.929</td>
<td>***</td>
</tr>
<tr>
<td>Belief 3</td>
<td>1.094</td>
<td>0.056</td>
<td>0.947</td>
<td>***</td>
</tr>
<tr>
<td>Belief 4</td>
<td>0.947</td>
<td>0.058</td>
<td>0.883</td>
<td>***</td>
</tr>
<tr>
<td>Belief 5</td>
<td>1.029</td>
<td>0.066</td>
<td>0.869</td>
<td>***</td>
</tr>
</tbody>
</table>

**Individual Attitudes Scales**

For the Individual Attitude scale, the researcher ran an EFA and found a two-factor solution. The PI further explored for the elimination of potential variables to create a better scale. The first factor accounted for 54.8% of the variance and the second accounted for 14.3% of the variance. For the two-factor loading, the Cronbach’s $\alpha = 0.869$ signified a very strong correlation. In a more detailed examination to improve the scale, a trial removal of Attitudes Item 10 resulted in the items converging around a single factor. The researcher constructed the Cronbach’s alpha $\alpha = 0.909$ and thus the variable with just Items 1–9 (see Table 9).

The PI ran an EFA to see how well the nine items predicted the latent variable of the Individual Attitudes Scale. All variables were significant at the $p < 0.001$ level. Thus, the Individual Attitude Scale was constructed with nine items (see Figure 7).
Table 9.

*Eigen Values for Items in Individual Attitudes Scale*

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual attitudes 1</td>
<td>0.574</td>
<td>-0.074</td>
</tr>
<tr>
<td>Individual attitudes 2</td>
<td>0.884</td>
<td>0.059</td>
</tr>
<tr>
<td>Individual attitudes 3</td>
<td>0.907</td>
<td>0.087</td>
</tr>
<tr>
<td>Individual attitudes 4</td>
<td>0.810</td>
<td>-0.234</td>
</tr>
<tr>
<td>Individual attitudes 5</td>
<td>0.881</td>
<td>0.170</td>
</tr>
<tr>
<td>Individual attitudes 6</td>
<td>0.418</td>
<td>0.729</td>
</tr>
<tr>
<td>Individual attitudes 7</td>
<td>0.846</td>
<td>0.230</td>
</tr>
<tr>
<td>Individual attitudes 8</td>
<td>0.815</td>
<td>0.037</td>
</tr>
<tr>
<td>Individual attitudes 9</td>
<td>0.663</td>
<td>0.245</td>
</tr>
<tr>
<td>Individual attitudes 10</td>
<td>-0.197</td>
<td>0.873</td>
</tr>
</tbody>
</table>

Note. N = 143.

*Figure 7. Individual Attitude Scale*
Practice

The PI ran an EFA to test how Practices aligned. Items loaded on two factors. The first accounted for 58.7% of the variance and the second accounted for 8.9% of the variance. Four questions did not cleanly load on either. It was decided to break this into two scales, the first with Questions 1–11 and 16 (Practice Scale 1), and the second Questions 8–15 (Practice Scale 2).

After splitting the scales, both scales loaded on a single factor. Practice Scale 1 accounted for 62% of the variance and had a Cronbach’s α = 0.906. Practice Scale 2 accounted for 68% of the variance and had a Cronbach’s α = 0.931 (see Table 10).

Table 10

*Eigen Values for Items in Individual Attitudes Scale*

<table>
<thead>
<tr>
<th>Practice</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice 1</td>
<td>0.772</td>
<td>0.350</td>
</tr>
<tr>
<td>Practice 2</td>
<td>0.782</td>
<td>0.421</td>
</tr>
<tr>
<td>Practice 3</td>
<td>0.792</td>
<td>0.378</td>
</tr>
<tr>
<td>Practice 4</td>
<td>0.759</td>
<td>0.458</td>
</tr>
<tr>
<td>Practice 5</td>
<td>0.787</td>
<td>0.345</td>
</tr>
<tr>
<td>Practice 6</td>
<td>0.703</td>
<td>0.289</td>
</tr>
<tr>
<td>Practice 7</td>
<td>0.073</td>
<td>0.628</td>
</tr>
<tr>
<td>Practice 8</td>
<td>0.586</td>
<td>0.552</td>
</tr>
<tr>
<td>Practice 9</td>
<td>0.563</td>
<td>0.664</td>
</tr>
<tr>
<td>Practice 10</td>
<td>0.664</td>
<td>0.569</td>
</tr>
<tr>
<td>Practice 11</td>
<td>0.566</td>
<td>0.636</td>
</tr>
<tr>
<td>Practice 12</td>
<td>0.476</td>
<td>0.630</td>
</tr>
<tr>
<td>Practice 13</td>
<td>0.478</td>
<td>0.659</td>
</tr>
<tr>
<td>Practice 14</td>
<td>0.204</td>
<td>0.803</td>
</tr>
<tr>
<td>Practice 15</td>
<td>0.159</td>
<td>0.769</td>
</tr>
<tr>
<td>Practice 16</td>
<td>0.705</td>
<td>-0.226</td>
</tr>
</tbody>
</table>

Note. N = 143.
**Practice Scale 1: Harm Reduction.** All factors were significant for the Practice Scale 1 (see Table 11). Figure 8 shows the factor analysis using AMOS software. The circle represents the latent variable; rectangles represent measure variables standardized regression (Betas) weights indicated on the corresponding arrows, which indicate the strength of factor loading.

Table 11

*Exploratory Factor Analysis Standardized Regression Weights: Practice Scale 1*

<table>
<thead>
<tr>
<th>Practice</th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice 2 &lt;--- PA1</td>
<td>1.084</td>
<td>0.065</td>
<td>0.928</td>
<td>***</td>
</tr>
<tr>
<td>Practice 3 &lt;--- PA1</td>
<td>1.006</td>
<td>0.065</td>
<td>0.898</td>
<td>***</td>
</tr>
<tr>
<td>Practice 4 &lt;--- PA1</td>
<td>1.049</td>
<td>0.072</td>
<td>0.869</td>
<td>***</td>
</tr>
<tr>
<td>Practice 5 &lt;--- PA1</td>
<td>0.909</td>
<td>0.066</td>
<td>0.848</td>
<td>***</td>
</tr>
<tr>
<td>Practice 6 &lt;--- PA1</td>
<td>0.807</td>
<td>0.08</td>
<td>0.705</td>
<td>***</td>
</tr>
<tr>
<td>Practice 7 &lt;--- PA1</td>
<td>0.376</td>
<td>0.079</td>
<td>0.387</td>
<td>***</td>
</tr>
<tr>
<td>Practice 16 &lt;--- PA1</td>
<td>0.402</td>
<td>0.086</td>
<td>0.38</td>
<td>***</td>
</tr>
<tr>
<td>Practice 1 &lt;--- PA1</td>
<td>1</td>
<td></td>
<td>0.875</td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 143.
**Practice Scale 2.** All factors were significant for Practice Scale 2 Other Modalities (see Table 12). Figure 6 shows factor analysis using analysis of SPSS AMOS software. The circle represents latent variables and rectangles represent observable variables standardized regression (betas). Weights are indicated with the corresponding arrows, which indicate the strength of factor loading (Figure 9).
Table 12

Exploratory Factor Analysis Standardized Regression Weights: Practice Scale 2

<table>
<thead>
<tr>
<th>Practice</th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice 8</td>
<td>1</td>
<td></td>
<td>0.797</td>
<td></td>
</tr>
<tr>
<td>Practice 9</td>
<td>0.961</td>
<td>0.077</td>
<td>0.89</td>
<td>***</td>
</tr>
<tr>
<td>Practice 10</td>
<td>0.954</td>
<td>0.078</td>
<td>0.879</td>
<td>***</td>
</tr>
<tr>
<td>Practice 11</td>
<td>0.955</td>
<td>0.081</td>
<td>0.854</td>
<td>***</td>
</tr>
<tr>
<td>Practice 12</td>
<td>0.889</td>
<td>0.084</td>
<td>0.786</td>
<td>***</td>
</tr>
<tr>
<td>Practice 13</td>
<td>0.889</td>
<td>0.082</td>
<td>0.801</td>
<td>***</td>
</tr>
<tr>
<td>Practice 14</td>
<td>0.84</td>
<td>0.091</td>
<td>0.712</td>
<td>***</td>
</tr>
<tr>
<td>Practice 15</td>
<td>0.666</td>
<td>0.085</td>
<td>0.623</td>
<td>***</td>
</tr>
</tbody>
</table>

Note. N = 143.

Figure 9. Practice Scale 2 Other Modalities Exploratory Factor Analysis
Descriptive Statistics

Table 13 represents descriptive statistics for the constructed scales. Practice Scale II scale represents efforts to increase use of alternate nonopioid modalities. Ranges for skewness used in the analysis were -3 to 3 and ranges for kurtosis were -1 to 1. All scales were normally distributed, as neither skewness nor kurtosis was out of range of normal distributions.

Table 13

Descriptive Statistics Analysis

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Min</th>
<th>Max</th>
<th>Skewness Statistic</th>
<th>Kurtosis Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Std. error</td>
<td>Std. error</td>
</tr>
<tr>
<td>Knowledge</td>
<td>77.55</td>
<td>12.90</td>
<td>30.00</td>
<td>100.00</td>
<td>-0.83</td>
<td>0.20</td>
</tr>
<tr>
<td>Belief Scale</td>
<td>5.20</td>
<td>1.44</td>
<td>1.80</td>
<td>8.40</td>
<td>-0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>Individual Attitude Scale</td>
<td>4.74</td>
<td>0.93</td>
<td>2.11</td>
<td>7.11</td>
<td>-0.42</td>
<td>0.20</td>
</tr>
<tr>
<td>Practice 1 Reduce Harm</td>
<td>6.35</td>
<td>1.07</td>
<td>3.25</td>
<td>9.00</td>
<td>0.09</td>
<td>0.20</td>
</tr>
<tr>
<td>Practice 2 Other modalities</td>
<td>5.33</td>
<td>1.04</td>
<td>3.13</td>
<td>8.63</td>
<td>0.29</td>
<td>0.20</td>
</tr>
</tbody>
</table>

Inferential Statistics

The PI conducted bivariate analysis in SPSS for Research Questions 1–4.

Years of Experience Impact on Knowledge, Belief, and Attitude

Research Q 1. What is the relationship between the amount of providers’ years of experience and (a) provider’s knowledge of the 2016 CDC Guideline, (b) provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis, and (c)
provider’s attitude toward the implementation of the 2016 CDC Guideline will produce improved outcomes with regard to CPM?

H1a: There is a positive relationship between the provider’s years’ experience and the provider’s knowledge of the current CDC Guideline.

A statistically significant bivariate relationship emerged between years of experience and knowledge ($r = -0.217, p = 0.09$). As years of experience increased, knowledge decreased (see Table 15).

**Table 15**

*Bivariate Analysis*

<table>
<thead>
<tr>
<th>Block</th>
<th>CME</th>
<th>Knowledge Belief Scale</th>
<th>Individual Attitude Scale</th>
<th>Practice 1 Reduce Harm</th>
<th>Practice 2 Other Modalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Training</td>
<td>$r$ 0.129</td>
<td>-.217**</td>
<td>-.657**</td>
<td>-.583**</td>
<td>-.392**</td>
</tr>
<tr>
<td></td>
<td>$p$ 0.126</td>
<td>0.009</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>CME</td>
<td>$r$ .204*</td>
<td>0.075</td>
<td>0.099</td>
<td>.174*</td>
<td>0.148</td>
</tr>
<tr>
<td></td>
<td>$p$ 0.014</td>
<td>0.372</td>
<td>0.241</td>
<td>0.038</td>
<td>0.078</td>
</tr>
<tr>
<td>Knowledge</td>
<td>$r$ .294**</td>
<td>.372**</td>
<td>.289**</td>
<td>.284**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p$ 0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Belief Scale</td>
<td>$r$ .831**</td>
<td>.659**</td>
<td>.631**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p$ 0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Attitude Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p$ 0.000</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice Reduce Harm</td>
<td>$r$ .620**</td>
<td>.700**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$p$ 0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. CME = continuing medical education.
H1b: There is a positive relationship between the provider’s years’ experience and the provider’s attitude that that the 2016 CDC guideline will reduce the epidemic opioid crisis in relation to CPM.

A statistically significant relationship emerged between a provider’s years of experience and the provider’s attitude that the 2016 CDC Guideline would reduce the epidemic opioid crisis in relation to CME \( (r = -0.657, p < 0.001) \). As years of experience increased, a provider’s belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis decreased.

H1c: There is a positive relationship between the provider’s years’ experience and the provider’s belief that the implementation of the current CDC Guideline will produce improved patient outcomes about CPM.

A statistically significant relationship emerged between a provider’s years of experience and the provider’s belief that the implementation of the 2016 CDC Guideline would produce improved patient outcomes in CPM \( (r = -.583, p < 0.001) \). As years of experience increased, a provider’s belief that the implementation of the 2016 CDC guideline would produce improved patient outcomes about CPM decreased.

**CME Training Impact on Knowledge, Belief, and Individual Attitude**

Research Question 2. What is the relationship between the amount of provider’s post licensure training (CME) in the area of CPM and (a) provider’s knowledge of the 2016 CDC Guideline, (b) provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis, and (c) provider’s attitude that the implementation of the 2016 CDC Guideline will produce improved outcomes with regard to CPM?

H2a: There is a positive relationship between the amount of provider’s CME in the area of CPM and the provider’s knowledge of the 2016 CDC Guideline.
A statistically significant bivariate relationship emerged between a provider’s CME hours in CPM and the provider’s knowledge of the 2016 CDC Guideline ($r = 0.204$, $p = 0.059$). As a provider’s post licensure training hours increased, knowledge of 2016 CDC Guideline increased. 

$H_{2b}$: There is a positive relationship between the amount of provider’s CME in the area of CPM and the provider’s belief that that the current CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

No statistically significant bivariate relationship arose between a provider’s CME hours in the area of CPM and the provider’s belief that that the current CDC Guideline would reduce the epidemic opioid crisis in relation to CPM ($r = 0.075$, $p = 0.372$). As a provider’s post licensure training hours increased, they experienced no change in knowledge of the 2016 CDC guidelines.

$H_{2c}$: There is a positive relationship between the amount of provider’s CME in the area of CPM and the provider’s attitude that the implementation of the current CDC Guideline will produce improved patient outcomes.

No statistically significant relationship arose between the amount of a provider’s CME hours in the area of CPM and the provider’s attitude that the implementation of the 2016 CDC Guideline would produce improved patient outcomes ($r = 0.099$, $p > 0.05$). As a provider’s post licensure training hours increased, no change occurred in the provider’s attitude that the implementation would improve patient outcomes.

**Knowledge Impact on Belief and Attitude**

Research Q3. What is the relationship between the provider’s knowledge of the 2016 CDC Guideline and (a) the provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and (b) The provider’s attitude that the
implementation of the most current CDC Guideline will produce improved outcomes with regard to CPM?

H2a: There is a positive relationship between the provider’s knowledge of the 2016 CDC Guideline and the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis.

A statistically significant bivariate relationship emerged between knowledge and a provider’s belief that the guidelines would reduce the opioid crisis \((r = 0.294, p < 0.001)\). As a provider’s knowledge of the guidelines increases, a commensurate increase arose that the guidelines would reduce the opioid crisis.

H2b: There is a positive relationship between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude that the implementation of the guideline will produce improved patient outcomes.

A significant bivariate relationship emerged between knowledge of the guidelines and attitude in that implementation of the guidelines would improve patient outcomes \((r = 0.372, p < 0.001)\). As provider’s content knowledge of the guidelines increased, the provider’s individual attitudes regarding implementation of the guidelines also increased.

**Belief Impact on Individual Attitude**

Research Q 4. What is the relationship between the provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s attitude of the implementation of the CDC Guideline will produce improved outcomes with regard to CPM?
H₃: There is a positive relationship between the provider’s belief that the CDC Guideline will reduce the epidemic opioid crisis and provider’s attitude that the implementation of the 2016 guidelines will produce improved outcomes about CPM.

A statistically significant bivariate relationship emerged between belief and individual attitude ($r = 0.831$, $p < 0.001$). Aligned with an increase on the belief scale, a provider’s individual attitude scale score increased regarding implementation of the guidelines to improve patient outcomes.

Path Analysis

Structural equation modeling is a statistical analysis method that uses a multivariate approach to analyze structural relationships. Structural equation modeling includes factor analysis and multiple regression analysis, incorporating measured variables and latent constructs.

Knowledge—Belief- Practice

Research Q 5. Do either of the following variables act as mediators between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline in their own practice?

a) The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.

b) The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes with regard to CPM.

H₄a The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in their own practice.
Knowledge—IA-Practice

$H_{4b}$ The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes in CPM acts as a mediator between a provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in their own practice.

The proposed model in the methodology section included all the main variables plus practice years, CME, and doctor or physician assistant. After running the proposed model, I discovered that goodness of fit results did not align with a good fit model. I reevaluated the model to make the model stronger. The results of this initial run appear in Table 14.
Table 14
Path Results

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge ===&gt; Training</td>
<td>-0.369</td>
<td>0.139</td>
<td>-0.217</td>
<td>.008</td>
</tr>
<tr>
<td>Belief Scale ===&gt; Knowledge</td>
<td>0.018</td>
<td>0.007</td>
<td>0.159</td>
<td>.012</td>
</tr>
<tr>
<td>IA Scale ===&gt; Knowledge</td>
<td>0.019</td>
<td>0.005</td>
<td>0.258</td>
<td>***</td>
</tr>
<tr>
<td>IA Scale ===&gt; Training</td>
<td>-0.064</td>
<td>0.008</td>
<td>-0.527</td>
<td>***</td>
</tr>
<tr>
<td>Belief Scale ===&gt; Training</td>
<td>-0.118</td>
<td>0.012</td>
<td>-0.623</td>
<td>***</td>
</tr>
<tr>
<td>Harm ===&gt; Knowledge</td>
<td>0.005</td>
<td>0.005</td>
<td>0.06</td>
<td>.374</td>
</tr>
<tr>
<td>Modalities ===&gt; Knowledge</td>
<td>0.001</td>
<td>0.005</td>
<td>0.014</td>
<td>.831</td>
</tr>
<tr>
<td>Harm ===&gt; Belief Scale</td>
<td>0.343</td>
<td>0.082</td>
<td>0.473</td>
<td>***</td>
</tr>
<tr>
<td>Modalities ===&gt; IA Scale</td>
<td>0.621</td>
<td>0.123</td>
<td>0.558</td>
<td>***</td>
</tr>
<tr>
<td>Modalities ===&gt; Belief Scale</td>
<td>0.111</td>
<td>0.078</td>
<td>0.155</td>
<td>.153</td>
</tr>
<tr>
<td>Harm ===&gt; IA Scale</td>
<td>0.206</td>
<td>0.131</td>
<td>0.183</td>
<td>.115</td>
</tr>
<tr>
<td>Harm ===&gt; CME</td>
<td>0.138</td>
<td>0.082</td>
<td>0.107</td>
<td>.091</td>
</tr>
<tr>
<td>Modalities ===&gt; CME</td>
<td>0.103</td>
<td>0.077</td>
<td>0.081</td>
<td>.179</td>
</tr>
<tr>
<td>Harm ===&gt; Doctor</td>
<td>-0.115</td>
<td>0.166</td>
<td>-0.051</td>
<td>.489</td>
</tr>
<tr>
<td>Modalities ===&gt; Doctor</td>
<td>-0.006</td>
<td>0.157</td>
<td>-0.003</td>
<td>.968</td>
</tr>
<tr>
<td>Harm ===&gt; PA</td>
<td>-0.038</td>
<td>0.157</td>
<td>-0.017</td>
<td>.809</td>
</tr>
<tr>
<td>Modalities ===&gt; PA</td>
<td>0.071</td>
<td>0.148</td>
<td>0.033</td>
<td>.634</td>
</tr>
</tbody>
</table>

Note. IA = Individual Attitude, CME = continuing medical education, PA = physician assistant.

To improve the model, the following steps were performed based on the suggestions from AMOS about improving the model: Using the modification indices, the researcher connected Error 1 (e1) to Error 4 (e4) and ran the model again. Goodness of fit results were still unsatisfactory, such that $X^2$ was 177.78, $p < 0.001$, root mean square error of approximation (RMSEA) was 0.363, and confirmatory fit index (CFI) was 0.720. Modification indices also indicated that elimination of the nonsignificant variables might the improve overall fit.
The model had several nonsignificant variables. A stepwise approach to eliminating nonsignificant variables of physician assistants, doctor, and CME impacted the model fit. Model statistics resulted in $X^2 (2) = 1.948, p = 0.378$, RMSEA = .00. This outcome might be explained due to the $X^2$ being less than the degrees of freedom in the model, which is 2. Any further manipulation in the model would yield a significant $X^2$ and an RMSEA would have a high value. Therefore, this was the best model achievable.

**Direct Results**

Knowledge was a significant predictor of the Belief Scale, Beta = 0.16, $p = 0.002$. As the knowledge variable increased, the belief variable also increased. Knowledge was a significant predictor of the individual attitude scale, Beta = 0.26, $p < 0.001$. As knowledge increased, scores on the individual attitude scale increased. Knowledge did not directly predict either of the practice variables (Practice Scale I or Practice Scale II).

Belief was a significant predictor of Practice Scale I (harm reduction), Beta = 0.47, $p < 0.001$. As a provider’s belief increased, their Practice Scale (harm reduction) increased. However, belief was not a predictor for Practice Scale II (using nonopioid modalities). Individual attitude was a significant predictor of harm reduction, Beta = 0.20, $p = 0.008$. As individual attitude increased, practicing attitudes of harm reduction also increased.

Individual attitudes were a significant predictor of Practice Scale in using nonopioid modalities, Beta = 0.56, $p < 0.001$. As individual attitude increased, a provider’s practice of using nonopioid modalities also increased. Knowledge effects were completely mediating through individual attitude and belief. This makes a clear illustration that knowledge alone does not signal practice behavior. The subjective construct of belief and respective attitude influence the manner which provider practices. This may have impact on rejection or acceptance of given
knowledge and consequent utilization of guidelines. As practitioners are individuals with strong beliefs and personal experiences, they represent positive or negative attitudes despite learned knowledge which impact practice. Indirect effect on harm was Beta = 0.126 and its indirect effects on Modalities was Beta = 0.169. See Table 15 and Figure 10.

Table 15

*Received Path Model Direct Results*

<table>
<thead>
<tr>
<th>DV</th>
<th>IV</th>
<th>B</th>
<th>S.E.</th>
<th>Beta</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belief Scale</td>
<td>Knowledge</td>
<td>0.018</td>
<td>0.007</td>
<td>0.159</td>
<td>.012</td>
</tr>
<tr>
<td>Belief Scale</td>
<td>Training</td>
<td>-0.118</td>
<td>0.012</td>
<td>-0.623</td>
<td>***</td>
</tr>
<tr>
<td>Harm</td>
<td>Knowledge</td>
<td>0.006</td>
<td>0.006</td>
<td>0.076</td>
<td>.252</td>
</tr>
<tr>
<td>Harm</td>
<td>Belief Scale</td>
<td>0.347</td>
<td>0.083</td>
<td>0.469</td>
<td>***</td>
</tr>
<tr>
<td>Harm</td>
<td>IA Scale</td>
<td>0.232</td>
<td>0.132</td>
<td>0.201</td>
<td>.08</td>
</tr>
<tr>
<td>IA Scale</td>
<td>Knowledge</td>
<td>0.019</td>
<td>0.005</td>
<td>0.258</td>
<td>***</td>
</tr>
<tr>
<td>IA Scale</td>
<td>Training</td>
<td>-0.064</td>
<td>0.008</td>
<td>-0.527</td>
<td>***</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Training</td>
<td>-0.369</td>
<td>0.139</td>
<td>-0.217</td>
<td>.008</td>
</tr>
<tr>
<td>Modalities</td>
<td>Knowledge</td>
<td>0.002</td>
<td>0.005</td>
<td>0.03</td>
<td>.641</td>
</tr>
<tr>
<td>Modalities</td>
<td>IA Scale</td>
<td>0.626</td>
<td>0.124</td>
<td>0.556</td>
<td>***</td>
</tr>
<tr>
<td>Modalities</td>
<td>Belief Scale</td>
<td>0.116</td>
<td>0.078</td>
<td>0.16</td>
<td>.135</td>
</tr>
</tbody>
</table>

Note. DV = dependent variable, IV = independent variable, IA = Individual Attitude.
Figure 10. Final Path Model

Statistical Analysis for Each Quantitative Research Question

Summary

Table 16 presents a summary of findings for this project. Of the 11-hypothesis given, only four were found lead to a failure to reject the null hypothesis.

Table 16.

Summary of Hypothesis Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Reject</th>
<th>Fail to Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a: There is no statistically significant relationship between the amount of provider’s post-licensure training in the area of CPM and the provider’s knowledge of the 2016 CDC Guideline.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H1b: There is no statistically significant relationship between the amount of provider’s post-licensure training in the area of CPM and the provider’s belief that that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>H₁e: There is no statistically significant relationship between the amount of provider’s post-licensure training in the area of CPM and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H₂a: There is no statistically significant relationship between the amount of provider’s years’ experience and provider’s knowledge of the 2016 CDC Guideline.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₂b: There is no statistically significant relationship between the amount of provider’s years’ experience and the provider’s individual attitude that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to chronic pain management.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₂c: There is no statistically significant relationship between the amount of provider’s years’ experience and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in the area of CPM.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₃a: There is no statistically significant relationship between the provider’s knowledge of the 2016 CDC guidelines and the provider’s belief that the CDC Guidelines will reduce the epidemic opioid crisis in relation to CPM.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₃b: There is no statistically significant relationship between the provider’s knowledge of the 2016 CDC Guidelines and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes in CPM.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₄: There is no statistically significant relationship between the provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM and the provider’s belief that the implementation of the 2016 CDC Guideline will produce improved outcomes.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₅a: The provider’s belief that the 2016 CDC Guideline will reduce the epidemic opioid crisis in relation to CPM acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>H₅b: The provider’s belief that the implementation of the 2016 CDC Guideline will produce improved patient outcomes in CMP acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline recommendations in his or her own practice.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Discussion

The CDC released the Guideline for Prescribing Opioids for Chronic Pain in 2016. The CDC Guideline recommendations revealed much confusion and resistance from patient-advocacy groups and medical providers. To date, the guidelines remain unrevised and few peer-reviewed publications describe factors that impede the engagement of primary care providers in fully using these guidelines. The purpose of this analysis was to assess foundational constructs of knowledge, beliefs, and attitudes in the CDC opioid prescribing guidelines. Understanding perspectives from a primary care provider lens may help demystify the hesitancy in incorporating the guidelines in their respective practices.

Key Findings

CME Training Impact on Knowledge, Belief, and Individual Attitude

This study assessed the relationship between primary care providers’ knowledge, beliefs, attitudes, and practices with specific recommendations made by CDC’s 2016 opioid prescribing clinical guidelines. It would be logical to expect a strong positive correlation between these variables and practice behaviors. However, not all variables proved to have a positive impact on outcome variables of practice. Davis and Taylor-Vaisey (1997) concluded CME activities are the basis on which gains in knowledge lead physicians to improve their practices and thereby deliver improved patient outcomes. However, majority of physicians failed to embrace the guidelines, leaving a gap between the reality of practice and the ideal practice. Study findings similarly showed a statistically significant positive bivariate relationship between providers’ CME hours in the area of CPM and providers’ knowledge of the 2016 CDC Guideline ($r = .204, p < 0.014$).
However, the correlation is a weak one, signaling a lesser likelihood of adherence to 2016 CDC Guideline for opioid prescribing. Study results also showed no statistically significant relationship between provider’s CME hours in area of CPM and the provider’s belief that the current CDC Guideline will reduce the epidemic opioid crisis in relation to CPM ($r = 0.075, p > 0.05$). As belief constructs closely interlink with attitude constructs, this study also showed consistently that no statistically significant relationship exists between the number of a provider’s CME hours in the area of CPM and the provider’s attitude that the implementation of the 2016 CDC Guideline would produce improved patient outcomes ($r = 0.099, p > 0.05$).

This study did not differentiate between specific guidelines relating to opioid management and other types of CME relating to generic pain management. To date, only two states require sizable CME hours specific to opioid prescribing—California and Kentucky (12 credit hours)—but the remaining states have minimal to no required hours relating to opioid prescribing guidelines. In this study, 61 of 143 participants, or 43%, reported 5–9 hours of CME achieved in the past 3 years. Another 31 (22%) of participants reported 10–19 hours of CME completed in the past 3 years. Last, only 5, or 3.5%, of participants reported minimal continuing medical education in CPM. It is plausible that study participants conflated the answer of CME hours with other CMEs not specific to opioid prescribing.

McMalmot’s (2018) study divided the sample into three CME groups: minimal (0–3) hours, moderate (4–10) hours, and high (≥11) CME hours of training. The three CME groups aligned increased use of CDC opioid recommended practices (29.4, 34.2, 38.8, respectively; $p = 0.001$; scale 0–50) and confidence in pain management (5.5, 5.9, 6.9, respectively; $p < 0.001$, scale 0–9). McMalmot concluded higher hours of continuing education positively impacted a
provider’s confidence in pain management use of the CDC Guideline. I did not analyze the variable of provider confidence in this study.

**Years of Experience Impact on Knowledge, Belief, and Attitude**

Limited literature examined a correlation between years of experience in practice and practice outcomes. Benner (1984) defined experience as time in practice and self-reflection that allows past leanings to be refined in real-time circumstances. Dryefus and Dryefus (1980) developed the concept of a novice with less than 3 years’ experience, thereafter, rising to an expert status with greater than 10 years of experience. The team elaborated that novice professionals rely highly on rules and guidelines and as they mature to the level of expert, adhere less to regimented rules and make more intuition-based decisions. This paradigm applied to the medical profession would suggest that increased years in clinical experience should enhance knowledge and thus clinical outcomes. Choudhry et al. (2005) conducted a meta-analysis of 62 empirical studies investigating the relationship between clinical experience and performance. The study reported 32 of 62 (52%) evaluations showed decreasing performance with increasing years in practice for all outcomes assessed. The researchers concluded that physicians with greater years in practice and older physicians have less factual knowledge and were less likely to adhere to standards of care or adopt newer guidelines. Similarly, this study showed a statistically significant negative bivariate relationship between years of experience and knowledge ($r = -0.217, p < 0.05$). This inverse relationship means as medical practitioners have increased years of experience, they have decreased knowledge of the 2016 CDC opioid practice guidelines.

Additionally, a statistically significant negative relationship emerged between a provider’s years of experience and the provider’s belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis in relation to CPM ($r = -0.657, p < 0.001$). Last, a statistically
significant negative relationship emerged between a provider’s years of experience and the provider’s attitude that the implementation of the 2016 CDC Guideline would produce improved patient outcomes in CPM \( (r = -0.583, p < 0.001) \).

Unlike in physics and chemistry, medicine is a dynamic applied science. Like any dynamic process, it requires learning, growth, and adaptation. Although years of experience is a highly regarded and respected attribute, it should not discourage new learning and engagement in current trends in quality measures to improve practice.

**Knowledge Impact on Belief and Attitude**

Knowledge is understanding or comprehension of information or facts through education. Knowledge is regarded as an objective and cognitive construct (Pajares & Thompson, 1992). Belief is a more subjective, experience-based, often implicit construct. Often, belief is affective in nature (Thompson, 1992). More strongly held beliefs are more central, and weaker beliefs are more “peripheral” (Green, 1971). The more central or the stronger a belief, the less it is susceptible to change and thus impacts attitudinal behaviors. This study addressed the relationship between a provider’s knowledge of the 2016 CDC Guideline and the provider’s belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis in relation to CPM and, by extension, the provider’s attitude that the implementation of the 2016 CDC Guideline would produce improved outcomes regarding CPM. The analysis revealed a statistically significant positive bivariate relationship between knowledge and a provider’s belief that the guidelines would reduce the opioid crisis \( (r = 0.294, p < 0.001) \). Thus, as knowledge scores increased, a corresponding increase arose in the belief variable that the guidelines would positively impact the opioid crisis by reducing the epidemic. Additionally, a statistically significant positive relationship emerged between knowledge of the guidelines and attitude that
implementation of the guidelines will improve patient outcomes ($r = 0.372, p < 0.001$). It follows that a strong or centrally held belief will have an equally strong parallel impact on attitudinal constructs and, in this case, attitude that the use of the guidelines would improve each individual patient’s outcome.

No comparative study in the literature examined knowledge and its impact on belief that guidelines would influence the reduction of the opioid epidemic, nor did any study investigate attitudinal impact between knowledge and improved patient outcomes. In a prospective longitudinal study, Jamison et al. (2014) surveyed 56 primary care practitioners on their beliefs and attitudes about opioid prescribing and CPM and concluded that younger providers were less knowledgeable about opioids, but opioid knowledge did not relate to concerns about opioid prescription practices. The Jamison et al. study predated the 2016 CDC opioid prescribing guidelines and was limited to a small sample size. Pearson et al. (2017) investigated provider confidence levels in prescribing opioids to noncancer patients. Providers in that study (60.8%) were not confident of their ability to manage chronic pain and their levels of confidence 1 year after targeted intervention did not significantly improve (44.7%, $p > 0.05$). Many primary care providers continued to lack confidence in managing pain patients and reported reluctance to prescribe opioids for CNCP. This study supports knowledge impact on Practice Scales, as the providers’ belief of confidence decreases their attitude toward prescribing practice decreases despite increase in infused knowledge of intervention.

In examining the relationship between a provider’s belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis and a provider’s attitude on the implementation of the CDC Guideline would produce improved patient outcomes, this study revealed a statistically strong significant and positive bivariate relationship between belief and individual attitude on
improved patient outcomes ($r = 0.831, p < 0.001$). As an increase arose in the belief scale, an increase arose on the individual attitude scale regarding using the guidelines to improve patient outcomes. As discussed earlier, the stronger a belief, the more the believer is resistant to change, impacting the provider’s attitudinal behaviors.

**Mediating Variables**

Path analysis is a form of multiple regression statistical analysis that researchers use to evaluate causal models by examining relationships between a dependent variable and two or more independent variables. In this study, the PI found that belief has a mediating effect between knowledge of the guidelines and providers’ Practice Scales. A provider’s belief that the 2016 CDC Guideline would reduce the epidemic opioid crisis in CPM acted as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline in their own practice. The provider’s belief that the implementation of the 2016 CDC Guideline would improve outcomes of patients with CPM acts as a mediator between the provider’s knowledge of the 2016 CDC Guideline and the provider’s attitude regarding the implementation of the 2016 CDC Guideline in their own practice. Therefore, the researcher failed to reject the null hypothesis because it hypothesized that knowledge impacts on practice would be mediated by individual attitude and belief, supported by path analysis. Last, although belief clearly mediated between knowledge and practice, attitude did not mediate practice. This outcome leads to a thought-provoking conundrum that may lead to exploration of granularity in attitudes in future studies.

**Limitations of the Study**

As with majority of studies, the design of the current study is subject to limitations. The following are major limitations of this study that could be addressed in future research.
1. Due to the contemporary nature of this study, exploring novel guidelines on opioid prescribing, from a review of the literature, limited published research described practitioner perspectives on the subject. Thus, the ability to identify a gap in the literature and develop research questions was challenging.

2. This study focused on self-reported data on the 2016 publication of the CDC Guideline for opioid prescribing. Self-reported data rarely can be independently verified (Price & Murnan 2004). The data collection was completed in its entirety in 2019; thus, respondents may have had diminished recall of the specific guidelines or may have been confused with more recent guidelines, such as state guidelines, organizational guidelines, or even standards of care. Additionally, the measurement of practice variable was not defined with standardized protocol. That is self-reported practice variable may or may not reflect a gold standard, as uniformity among practice is variable.

3. The sample was not randomized. A convenience sample is an inexpensive way to ensure sufficient number for nonprobability samples; therefore, the population may have been underrepresented (Portney & Watkins, 2009).

4. The study was conducted through a web-based online survey to ensure anonymity and confidentiality. However, it is unknown how many members may have missed capture due to limited to access to email or the internet.

5. The study design was limited to quantitative methods. Although using Likert-type scales can provide an idea about how strongly a participant feels about a statement, this study did not include a qualitative portion, where open-ended or leading
questions might provide more in-depth responses, reflecting participants’ actual feelings rather than being restricted by categories.

6. The design of this study was cross-sectional and, as a result, it was not possible to determine causality. A longitudinal approach would provide more comprehensive understanding of the subject matter and the corresponding relationship. However, due to time constraints, this was not possible.

7. Selection bias: The data accrued from three professional organizations: American Association of Nurse Practitioners, the American Association of Physician Assistants, and the Academy of Family Practice Physicians. Organizational membership is not a mandatory practice requirement. Therefore, the results or findings from this study may not be generalized to practitioners who have chosen not to maintain active membership to their prospective organization.

**Clinical Relevance**

Pain is a complex phenomenon and thus the problem has no single solution. General practitioners have minimal preparation to manage complex pain-related issues without appropriate guidelines. The limited number of specialists trained to manage challenging pain patients places a great level of stress on primary care providers. A need exists for uniformity and standardization in opioid prescribing practices. It is equally important that guidelines are in alignment at the federal, state, and organizational levels. Overprescribing opioids has partly contributed to opioid-related overdoses and fatalities. CDC’s mission to protect public health places this authoritative body at the highest persuasive position to develop guidelines for prescribing opioids. It is not sufficient for providers to become familiar with the 2016 CDC
opioid-prescribing guidelines; they must retain the critical knowledge of the guidelines and use the guidelines routinely. State boards of licensing should consider formal learning modules and certificates of attestation for those with passing knowledge scores. Such learning modules could be considered a prerequisite to obtaining and renewing Drug Enforcement Administration registration. Physicians, as lead patient-safety advocates, should champion adoption of prescribing guidelines and thus lead the movement for safe prescribing practices for their colleagues and midlevel providers.

**Future Research**

Although this study adds to the existing body of knowledge regarding the 2016 CDC Guideline relating to opioid prescribing for primary care providers, it also generates several research questions to be explored for future research. The PI did not address characteristics of clinical guidelines in this study. Other researchers documented that guidelines inherently accompany barriers such as ease of use, trialability, and complexity (Cabana et al., 1999); these barriers are known reasons for guideline adoption and compliance. Incorporating guideline characteristics into the survey tool may also enhance study results and may further highlight concerns from providers who adopt or reject clinical practice guidelines relating to opioid prescribing practices. Moreover, future researchers can expand exploration of practitioner characteristics of time, resources, or organizational support as well as constraints.

Although this study found no statistical difference in practitioner type and the implementation of clinical guidelines; it may be prudent to study midlevel populations separately to gain a better understanding of midlevel practices that may be untethered by scope-of-practice restrictions. The knowledge component showed low knowledge scores on the 2016 CDC guidelines; it would be revealing to further explore practitioner type and knowledge. For
example, is there a difference in knowledge of midlevel practitioners engaged in urban practice areas or areas of high opioid use versus midlevel practitioners in suburban or rural practice settings. The sample for this study was sourced through membership in professional organizations; expanding sample eligibility through recruitment of licensure boards may improve generalizability of the results. Lastly, adding a qualitative portion to the survey tool may provide more insightful understanding of participants’ hesitation in embracing 2016 CDC opioid prescribing guidelines.

**Conclusion**

This study provides useful insights into factors that influence primary care clinician intentions to adopt opioid prescription practices for chronic pain patients. Addressing factors such as knowledge, attitudes, and beliefs can assist in encouraging implementation strategies to positively affect primary care practitioners’ prescriptive behaviors. In this study, knowledge was a significant predictor of belief and attitude regarding the value of 2016 CDC opioid prescribing guidelines. However, increased knowledge did not directly predict practice intention to use the guidelines to reduce patient harm or use nonopioid practices, as recommended by the guidelines. Increased CME hours was a significant predictor of knowledge scores, belief, and attitudes. This outcome suggests that to influence the practice of primary care physicians, it would be useful to provide more educational activities and frequent reinforcement. In examining mediating variables, knowledge effects were completely mediated by attitudes and beliefs. Future investigation into the affective factors that influence motivation to integrate current practice guidelines may demystify the reasons for resistance to guideline adoption.
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Appendix A:

IRB Approval

PROPOSAL HEARING SIGN OFF SHEET

DOCTORAL CANDIDATES NAME: Maria Adamian

PROJECT TITLE: “Medical Providers’ Knowledge and Belief in the Effectiveness of the Centers for Disease Control’s most current Guideline for Prescribing Opioids for Chronic Pain”

PROPOSAL HEARING DATE: May 21, 2019

I HAVE PARTICIPATED IN THE ABOVE NOTED PROPOSAL HEARING AND MY SIGNATURE PROVIDES SUPPORT OF THE PROPOSED METHODOLOGY.

DISSERT. COMMITTEE MEMBER CHAIR: Ning J. Zhang

COMMITTEE MEMBER SIGNATURE:

DISSERT. COMMITTEE MEMBER: Terrence F. Cahill

COMMITTEE MEMBER SIGNATURE:

DISSERT. COMMITTEE MEMBER: Genevieve Pinto Zipp

COMMITTEE MEMBER SIGNATURE: [Signature]

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What great minds can do.
Appendix B:

Letter of solicitation and Implied Consent

Dear Colleague,

My name is Maria Adamian. I would like to invite you to participate in a research study (Medical providers’ Knowledge and Belief in the Effectiveness of the Centers for Disease Control and Prevention’s 2016 Guideline for Prescribing Opioids for Chronic Pain). I am a doctoral student at the department of Interprofessional Health Sciences and Health Administration, in the School of Health and Medical Sciences, Seton Hall University. I am conducting this research as partial fulfillment of my PhD degree in Health Sciences.

What is the purpose of the study?

This study will explore Medical Providers’ Knowledge and Belief in the Effectiveness of the Centers for Disease Control and Prevention’s 2016 Guideline for Prescribing Opioids for Chronic Pain. In the climate of opioid crisis and escalated public health threat of increasing opioid related mortality, this timely study will investigate factors that may influence practitioners’ attitudes towards prescribing guidelines from federal agency. The factors that will be explored are knowledge, attitude among primary care practitioners and their relationship to daily practices.

Is participation voluntary?

Your participation in this study is entirely voluntary and anonymous. You may withdraw from the study at any time without any penalty.

Clicking on the link below signifies your consent to participate in this study.

https://www.surveymonkey.com/r/TGJZXHJ

How will the study date be handled?

All data from this study will remain confidential. All data will be stored in password protected USB memory stick locked in a physical secure box. No other personnel will have access to the USB content, and no data will be available electronically.

Is there any risk or any benefits to partaking in the study?
There is no risk in completing the study questionnaire. 
There is no direct benefit to the participant in completing the study. However, the results will provide enlightenment relating to provider intention to adopt 2016 CDC opioid prescribing guidelines.

**Is there compensation for participation?**

There is no compensation for participation in the research study.

**What is the expected time commitment to complete the study?**

An anticipated 15-20 minutes to complete the study.

**How can I learn more information on the study?**

As principal investigator, I may be contacted at any time for further discussion relating to the study at [Maria.Adamian@Shu.edu](mailto:Maria.Adamian@Shu.edu) or (201)249-4151. Additionally, you may contact Seton Hall IRB at email [irb@shu.edu](mailto:irb@shu.edu) or phone (973) 313-6314.
Appendix B:

Power Analysis
Critical $\chi^2 = 7.81473$
Appendix C:

IRB Approval

Notice of Institutional Review Board Records

June 29, 2020

Study Title: Medical Providers’ Knowledge and Belief in the Effectiveness of the Centers for Disease Control and Prevention’s 2016 Guideline for Prescribing Opioids for Chronic Pain
Principal Investigator: Maria Adamian

Mrs. Adamian,

This memo serves as official notice that your study entitled, “Medical Providers’ Knowledge and Belief in the Effectiveness of the Centers for Disease Control and Prevention’s 2016 Guideline for Prescribing Opioids for Chronic Pain” was initially reviewed and approved by the Research Ethics Committee of the Seton Hall University Institutional Review Board under the exempt review category on June 26, 2019. The study expires on June 26, 2020 and will be closed after the submission and review of a final study report.

Thank you,

Michael F. LaFountaine, EdD, ATC, FACSM
Director, Seton Hall University Institutional Review Board