ADDRESSING PRESCRIPTION OPIOID MISUSE THROUGH THE INCREASED REPORTING OF PRESCRIPTION MONITORING PROGRAM (PDMP) DATA: AN INTEGRATIVE REVIEW

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Claudia Hannah Georgestone

Liberty University

Lynchburg, VA

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ABSTRACT

Opioid misuse relating to prescription pain killers have claimed the lives of many Americans, posing an escalating nationwide public health crisis. Prescription opioid overdose and death can impair an individual's functionality, destabilizes family, and impose a significant financial burden. In 2014, the U.S. had an estimated 36 million people ages 12 years and older who had used prescription opioids for non-medical reasons. In that same year, there were "28,647" (61%) of 47,055 prescription and non-prescription opioid overdose deaths, indicating an increase from previous years (Center for Disease Control (CDC, 2020). Several measures to address the opioid crisis have been implemented, but opioid overdose remains a problem. This integrative review explored diverse relevant literature addressing the opioid epidemic, focusing on the prescription drug monitoring program (PDMD), as having the potential to address this epidemic through the increased reporting of data. The PDMP is a national database that stores data from pharmacies and prescribers on controlled substances dispensed to patients, to safeguard opioid prescribing practice. Clinicians can use PDMPs to identify patients exhibiting risky behaviors indicating prescription drug addiction, overdose risk or diversion, and potential doctor shopping (Hawk et al., 2018). Vital data obtained from the PDMP must be reported to the health insurance companies, state licensing boards, law enforcement, local health departments, treatment centers, and other relevant entities to facilitate early interventions, and allocation of resources for quality care.

Keywords: prescription opioid misuse, opioid dependence, overdose deaths, prescription drug monitoring program (PDMP), safe prescribing practices.

Copyright Page

Dedication

This DNP scholarly project is dedicated to my late grandmother Hannah Cyrpian Shaw, who strongly believed in the fear of God, education, and women empowerment. She encouraged me to make the best of myself and advance to higher heights as best as I can, and I have not fallen short of her expectations. Unfortunately, she is not here to witness this greatest achievement, but I know that she is smiling down at me from heaven, saying “a job well done.”

Acknowledgments

First and foremost, I want to acknowledge the Almighty God, who has guided me through this process to accomplish my goal. I also want to thank all of my professors especially Dr. Sanders (project chair), Dr. Kennedy (practicum professor), Dr. Goodrich, and Dr. Kopis for their continuous encouragement and faith in me. A special thanks to Ms. Faith Sterling for her patience in accommodating my practicum experience. I also want to thank Dr. Conton and the staff of Raven Counselling for allowing me my practicum experience towards the completion of my DNP degree.

A special thanks go to my family, my husband, Denzil, and my three sons Dwayne, Dunstan, and Delphaneaux, my parents, Milford and Victoria, my siblings, in-laws, and co-workers, classmates, and friends for their patience, support, and accommodation throughout this DNP journey. I also want to thank the Snellville United Methodist Church Stephen Ministry and the sanctuary choir for their constant support and encouragement throughout this journey. To God Be the Glory.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

American Association of Colleges of Nursing (AACN)

American Psychology Association (APA)

Center for Disease Control (CDC)

Drug Enforcement Administration (DEA)

Doctor of Nursing Practice (DNP)

Emergency Department (ED)

Human Immunodeficiency Virus (HIV)

Institutional Review Board (IRB)

Licensed Clinical Social Worker (LCSW)

Medication-Assisted Treatment (MAT)

Meta-analysis (MA)

Neonatal Opioid Withdrawal Syndrome (NOWS)

Opioid Use Disorder (OUD)

Prescription Drug Monitoring Program (PDMP)

Randomized Controlled Trials (RCTs)

Systemic Review (SR)

SECTION ONE: FORMULATING THE REVIEW QUESTION

Introduction

The 1980s marked the era during which pain management with opioids was considered inadequate for cancer pain and postoperative patients, leading to the concept of pain as the fifth vital sign. Launched by the American Pain Society in 1995, this concept was used to evaluate and treat pain symptoms (Kelly et al., 2016). In 2000, the Joint Commission further incorporated this concept into their published standards for pain management. The focus was on pain management and less on regulatory guidelines on opioid prescriptions and its addictive effects. This led to the unintended consequences of the current opioid epidemic (Kelly et al., 2016).

Prescription opioid abuse, also referred to as opioid use disorder (OUD) is a leading cause of accidental deaths in the United States (U.S.), and escalating public health concern with a significant economic burden. A study by "Neville & Foley (2020)," revealed that in 2018, the opioid epidemic-related cost to the U.S was estimated at $631 billion. It is estimated that 822,000 people in the U.S. were treated for opioid misuse, leading to the implementation of public health initiatives to limit opioid abuse and provide interventions to individuals affected (Reinhart et al., 2018). Despite its negative effects, opioids have multiple benefits in treating cancer pain, chronic pain, surgical pain, and other medical conditions. However, prolonged use of opioids can lead to overuse, dependency, addiction, and deaths, creating a strong link to illicit drugs, such as fentanyl, and heroin because of its availability, affordability, and an intense high effect (McDonald et al., 2019). Consequently, the U.S. still faces challenges to adequately address the opioid crisis, compounded by less skilled providers, fewer treatment programs, and limited access to behavioral health services (Goedel et al., 2019). Several measures have been employed to combat the opioid crisis; however, misuse and overdose remain relatively high.

According to the Center for Disease Control and Prevention (CDC, 2020), the PDMP has a promising future as an interventional tool to improve opioid prescribing at the state level, improve clinical practice, decrease the use of multiple providers, and protect the at-risk patient from harm (CDC, 2020). Several challenges, however, have been identified with the use of the PDMP, such as inefficiency among prescribers, inconsistency and faulty prescribing practices, difficulty with ease of use, untransmitted data from the electronic medical record (EMR), and inadequate reporting of PDMP data have hindered the efficient use of the PDMP. In examining the clinical question "How can prescription opioid misuse be addressed through the increased reporting of prescription drug monitoring program (PDMP) data?" This integrative review explored literature with great significance to the topic of discussion.

Defining Concepts and Variables

There is no doubt that the opioid epidemic is a major public health crisis, and despite several strategies to combat it, the occurrence of opioid abuse, overdose, addiction, and opioid-related deaths is alarming. Addressing prescription opioid misuse through the increased reporting of PDMP data to health insurance companies, state health departments, law enforcement, licensing boards (CDC, 2020), and other relevant entities will facilitate early interventions for victims of opioid use disorder (OUD). This can also trigger the allocation of resources to train skilled providers and facilitate the availability and access to treatment facilities. However, there are complexities involved in addressing the prescription opioid crisis. Therefore, variables such as the contributory factors to opioid misuse, strategies to address opioid misuse, and the efficiency of the PDMP, must all be carefully examined to assess their impact on the topic of discussion in answering the clinical question.

Prescription Opioid Crisis

Prescription opioids are commonly used to treat both chronic and acute pain for better pain management and improved quality of pain care across the clinical settings. Among the most over-prescribed opioids are oxycodone, hydrocodone, and fentanyl, which have greatly contributed to the epidemic of prescription opioid misuse and deaths (Lyapustina et al., 2017). When appropriately used, prescription opioid therapy could be an important component of treatment (Yang et al., 2018); however, serious fatal and non-fatal consequences are associated with its misuse (Goedel et al., 2019). Approximately, 46 people die daily from a prescription opioid-related overdose, with the greatest use among ages 18 to 25 (CDC, 2020). The opioid crisis is believed to have occurred in three waves, starting with prescription opioids in 1999, followed by heroin usage in 2010, and then by the illicit manufacturing of synthetic opioids such as fentanyl, in 2013 (Neville & Foley, 2020).

Prescription opioids contribute to the increasing epidemic in the U.S, with more than 35% of opioid overdose-related deaths, in 2017 (CDC, 2020). Compared to non-Hispanic blacks and Hispanics, a significant increase in prescription opioid overdose rates was identified among individuals ages 65 years of age, and a higher overdose rate reported among non-Hispanic whites and American Indians or Alaskan Natives. The prescription overdose rate among men was 6.1 per 100,000 people, and the rate among women was 4.2 per 100,000 (CDC, 2020). There is also an increase in opioid misuse among pregnant women leading to increasing neonatal opioid withdrawal syndrome (NOWS) in newborns. Additionally, opioid misuse is associated with an increased risk of contracting the hepatitis C virus and human immunodeficiency virus (HIV) (Stuart et al., 2018).

Contributory Factors to the Prescription Opioid Crisis

The intent to adequately manage patients' pain in the 1980s led to the concept of pain as the fifth vital sign. The increased use of painkillers to address this notion had spiraled into the unintended consequence of the opioid crisis. Likewise, pharmaceutical advertising and prescription practices have greatly contributed to the prescription opioid crisis (Kelly et al., 2016). During late 1990 to 2000, pharmaceutical companies falsely advertised and marketed their products to the medical community and the public as being less addictive. Consequently, this increased prescribing of painkillers by healthcare providers gradually led to the widespread misuse of both prescription and non-prescription opioids. Unintentionally, prescribers partly contributed to this epidemic by unsafe prescribing, due to lack of access to a universal medical record system for verification, at that time.

This has resulted in uncoordinated care and diversion for misuse because patients with risky drug-seeking behaviors can obtain multiple prescriptions from different unknowing prescribers, in an illegal practice called "doctor shopping" (McDonald et al., 2019). Data analysis from a cross-sectional National Survey on Drug Use and Health (NSDUH), as reported by SAMSHA, (2016), discovered that from 2016 through 2017, 12% of prescription opioid users attested to misusing prescription opioids. It was discovered that 27% of these individuals exclusively misused their prescribed opioids, whereas 38% only misused prescription opioids without prescriptions, and 31% misused prescription and non-prescription opioids combined, leaving the remaining 4% as unclassified (SAMHSA, 2016). Opioid overuse and addiction affect each state differently, resulting in a wide variation of overdose death rates among states, making it a compounded problem. Opioid prescription guidelines also vary among states leading to inconsistencies and risky practices.

Patient satisfaction-based incentives and their influence on prescribers' performance also contributed to faulty prescribing practices in fear of earning poor ratings (Carrico et al., 2018). Additionally, emergency department physicians feel pressured to prescribe opioid analgesics to avoid administrative and regulatory interrogations. The high emphasis placed on patient satisfaction scores hinders prescribers' pain management strategies of drug-seeking patients, leading to increased and unnecessary prescriptions (Kelly et al., 2016). Consequently, increased opioid prescriptions contributed to increased opioid addiction (Young et al., 2018).

Strategies to Address the Opioid Crisis

Strategies to address the opioid crisis have been initiated at the local, state, and federal levels. The opioid crisis has been declared a public health emergency by the Trump administration. Policymakers are, therefore, working on a range of strategies, including pharmacological and psychosocial regimens, access to treatment and rehabilitation services, and the effective use of the prescription drug monitoring programs (PDMP). In March 2018, a federal spending bill including a $3.3 billion increase in funding was passed by Congress to support opioid prevention, treatment regimen, and law enforcement activities for state and local governments (America Nurses Association (ANA), 2018). Under the Obama administration, the 21st Century Cures Act of $1 billion was passed to assist states against the opioid epidemic. This funding supported increased access to treatment, increased treatment needs, and reduced opioid-related overdose deaths (ANA, 2018).

Strategies to address the prescription opioid crisis include medication-assisted therapy (MAT) with drugs such as naloxone to reverse overdose effects and methadone to reduce cravings and withdrawals (Lagisetty et al., 2017). In addition to MAT, psychosocial therapy can also be implemented as an intervention for opioid misuse (Jefferies, 2018). Alternative therapies

such as behavioral interventions and education must be offered to clients about the dangers of opioid misuse, and rehabilitation services provided for individuals struggling with opioid addiction (Coffin, et al., 2017). Prescribers should conduct thorough assessment and screening of clients to identify contributory factors to opioid abuse, and hindrances to abstinence. Furthermore, mental health status should be assessed and documented for the provision of safe, quality care (Neville & Foley, 2020).

The drug take-back programs are initiatives to raise awareness on the safe disposal and return of unused prescriptions to limit the number of unused narcotics in the community. Some locations, such as the fire station or police department have trained coaches who can assess individuals and direct them to seek help. The success of this initiative to control opioid overdose and diversion, remain unknown. Patients are also taught the proper disposal of unused narcotics at home. However, most claimed they have not been properly taught, and usually leave unused prescriptions around the house or are disposed of in the trash can, creating a risk for diversion, (Bonnie et al., 2017). Prevention, however, is the most important strategy to address the opioid crisis, and educating healthcare providers, patients, and family, and the entire community about the dangers of opioid misuse and addiction is crucial (Turner et al., 2019).

The ANA is in collaboration with more than 40 groups of providers, committed to increasing opioid prescriber training, and improve access to treatment. Three major areas were also targeted which are: opioid prescribing practices, expanded use of naloxone, and expansion of medication-assisted treatment to reduce opioid misuse and overdoses (ANA, 2018). Collaboratively, the ANA is working with its constituents and state nurses' associations to have more registered advanced practice nurse (APRN) prescribers and raise awareness about the significance of the Prescription Drug Monitoring Programs (PDMPs).

The Prescription Drug Monitoring Program (PDMP)

The PDMP is a national database for screening patients exhibiting risky behaviors suggesting prescription drug addiction, overdose risk or diversion, and potential doctor shopping. It provides information on the type of medication prescribed, the reason for the prescription, the prescriber, and the location and time it was dispensed (Wilson, et al., 2020). When the PDMP data indicates potential opioid misuse, clinicians should verify data to rule out errors, conduct a urine test to confirm misuse, and consider this an opportune time to educate, and discuss concerns with their patients. Non-opioids alternatives should be considered and discussed with patients to decrease opioid prescribing and their potential harm. Such an encounter should enhance patient engagement and education, rather than terminate the provider/client relationship (Turner et al., 2019). Prescribers should carefully monitor prescribing and dispensing guidelines and facilitate life-saving addiction interventions.

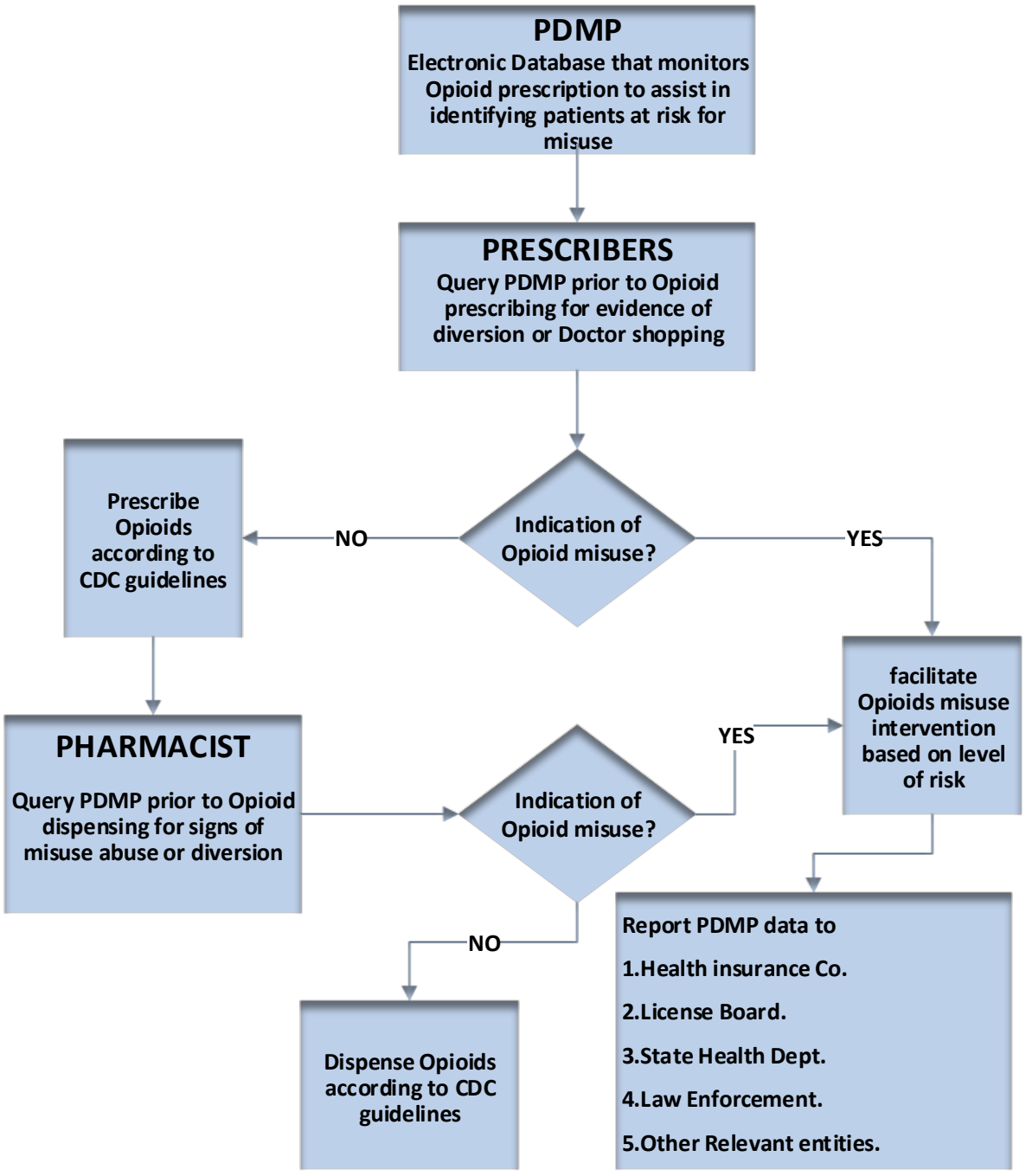
Providers can use PDMP data to increase reporting of opioid misuse to health insurance companies, licensing boards, state health departments, law enforcement, and other relevant agencies (CDC, 2020), to facilitate appropriate interventions. For instance, clients with three or more visits to several providers in a week should be flagged as doctor shopping and identified as high risk for opioid misuse. Once PDMP data have been verified and errors ruled out, this information should be reported to the appropriate authorities for timely interventions. In addition to facilitating prompt interventions to individuals with OUD, increased reporting of the PDMP data will raise awareness about the magnitude of the prescription opioid crisis, and stimulate the assemblage of resources for the development of more treatment centers and skilled care providers.

Prescribers must query the Prescription Drug Monitoring Program (PDMP) before prescribing Schedule II, III, and IV controlled substances and electronically transmit all prescriptions (McDonald et al., 2019). These strategies will help to monitor the use of e-prescribing as an effective tool to control the supply of opioids. Additionally, the PDMP data must be accessed by licensing boards for possible investigation of misconduct involving controlled substances. Accessibility of the PDMP data by law enforcement will develop and warrant investigations but the enforcement of controlled substance laws is the responsibility of the federal, state, and local sectors (McGinty, et al., 2018).

According to Bonnie et al., (2017) recommendations to improve the use of PDMP data for surveillance and intervention have resulted in collaborative efforts between the U.S. Department of Health and Human Services, and state organizations that administer PDMPs. The plan is to conduct or sponsor research on the utilization of PDMP data to maximize patient safety. Careful monitoring of these data will focus on policy and other controlled substance interventions on opioid prescribing, and the impact of prescriber guidelines. Information obtained will determine health service planning on discrepancies in medications dispensed for OUD treatment, and for use in clinical care to facilitate clinical decision making and enhance communication between the patient and provider.

PDMP is currently available in all 50 states. There are discrepancies, however, in its use among prescribers and individual states. Some of the barriers to the use of the PDMP are lack of physician training, difficulty with ease of use, and non-transferable data from the electronic medical records (EMR) (Finnell et al., 2017). According to the CDC, several upgrades are being made to the PDMP by individual states to improve accessibility and ease of use (CDC, 2020). An illustration of the PDMP framework is displayed below in figure 1.

Figure 1. PDMP Framework



Rationale for Conducting the Review

The rationale for conducting this integrative review is to explore the effectiveness of the PDMP to address the opioid crisis through its efficient use by prescribers. Prescribers can then increase the reporting of the opioid misuse data to the appropriate authorities for early interventions. A thorough scoping and synthesis of published articles relating to the topic of discussion allowed this writer to extract evidence-based recommendations for interventions such as increased prescriber education in the use of the PDMP for improved prescribing practices and reduced patient harm. Furthermore, this writer identified the need for improved practice strategies such as implementing guidelines on the consistent use of the PDMP among prescribers and in the different states for safe, and uniformity of care. This writer further identified the need for enhanced policy development relating to the PDMP, and indicators for further research on its role as an evidence-based initiative to address opioid misuse.

Purpose

This integrative review intends to explore literature with great significance on the effectiveness of the PDMP in identifying patients at risk for opioid misuse and increase the reporting of these data to the appropriate authorities to provide opportunities for timely intervention (Norwood & Wright, 2016). Lack of physician training, difficulty with ease of use, untransferable data from the EMR, and inadequate reporting of PDMP data have all been identified as barriers to the efficient use of the PDMP (Finnell et al., 2017). This indicates the need for prescribers' education and training on the effective use of the PDMP. Additionally, through education and enforcement prescribers must comply with opioid prescribing guidelines for evidence-based practice (Raheemullah et al., 2020). All states should implement standardized guidelines and direct their PDMPs to proactively analyze data to identify possible misconduct

and criminal activities, to increase reporting to the appropriate entities (Norwood & Wright, 2016).

The Review Question

The Review question is "How can prescription opioid misuse be addressed through the increased reporting of prescription drug monitoring program (PDMP) data?" This integrative review intends to explore literature with great significance to this clinical question.

Formulate Inclusion and Exclusion Criteria

The studies included in this project were restricted to English only, full-text, peer-review articles published from 2015 to 2020, involving participants ages 18 and older. Studies were included if the interventions and outcomes related to the PDMP or similar tools, and other interventions for comparison of outcomes. Studies with a population focus on registered opioid prescribers, pharmacists, and settings involved in pain management such as the Emergency Department were included. Studies that also met the inclusion criteria are those relating to patient and provider education, on opioid misuse, OUD, and safe prescribing for improved outcomes. Studies on prescription opioid legislation also met the inclusion criteria.

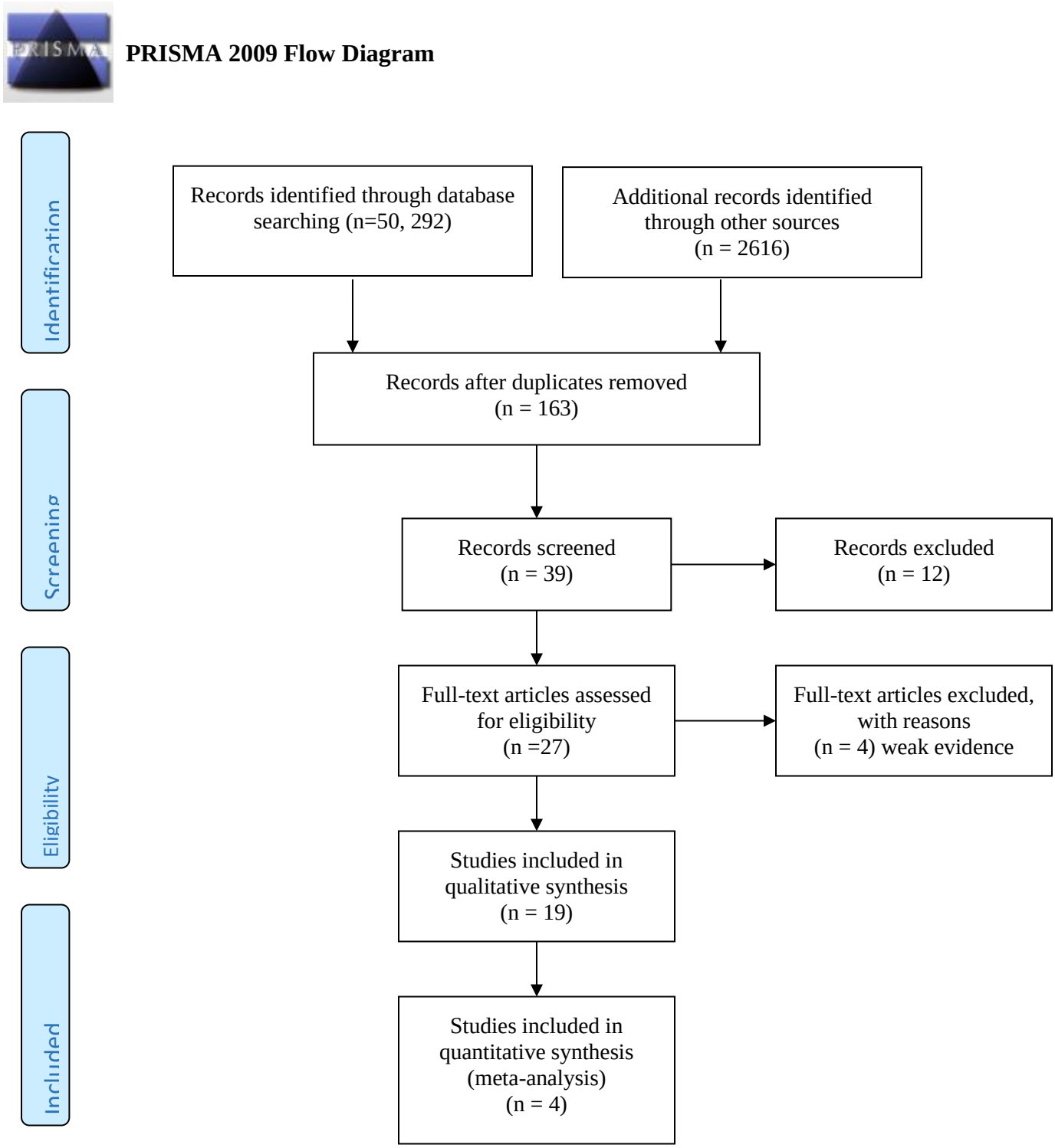
Considering the magnitude of the opioid crisis, the initial search using "opioid abuse" returned 50, 292 articles, followed by the search term "PDMP" which returned 2,616 articles. Modifying the search term to "prescription opioid abuse treatment" returned 163 articles. The PRISMA flow sheet process of identification, screening, eligibility, and inclusion was followed to select appropriate articles for this integrative review. The articles were reduced to 39 after duplicates were removed and exclusion criteria applied to studies that focused on illicit drug use, and prescription opioid use in palliative and hospice care, and psychiatric medicine. After

stringent scrutiny, 23 (n=23) articles met the criteria for this integrative review because of their strong relevance to opioid misuse, treatment measures, and the PDMP. Nineteen (n=19) of these articles are qualitative studies and the remaining four (n=4) are quantitative studies of meta-analysis. Data was arranged under the three main categories including the contributory factors of the opioid crisis, strategies to address the opioid crisis, and the PDMP, based on each study's focus. Additionally, information from other relevant sources including the CDC, the SAMHSA, and the ANA was obtained for pertinent information on the topic discussed. Included literature is further displayed in table 1, the inclusion and exclusion table, the PRISMA flow sheet in figure 2 and appendix B, and the Melnyk table of evidence matrix in appendix A., detailing the study type, samples, authors, and results.

Table 1. Inclusion and Exclusion.

Inclusion Criteria	Exclusion Criteria
English only Peer-reviewed full-text articles from 2015-2020	Foreign articles Articles published before 2015
Aged 18 years and older exhibiting signs of opioid misuse or OUD	Duplicates
Registered opioid prescribers, and pharmacists	Illicit drug use
Pain management settings such as the ED, pain clinics.	The prescription opioid in palliative and hospice care
Prescription opioid misuse, doctor shopping, and diversion	Psychiatry medicine
Opioid prevention, interventions, guidelines, and legislation	
PDMP or similar opioid misuse risk tool	
Patient and provider education	
Safe prescribing practices	

Figure 2. The PRISMA flowsheet diagram



Conceptual Framework

Cooper's Theoretical Framework, was the chosen framework for this project, it was developed in 1988 to classify literature reviews and meta-analysis. This framework helps readers assess study quality and the relevance to the research question (Hopia et al., 2016). Cooper's theoretical framework focuses on practitioners as its intended audience to influence practice change (Hopia et al., 2016). Practice change can be facilitated through the assessment of Cooper's five stages of the framework that guide the review design to improve knowledge and clinical practice.

The first stage is problem identification, which makes certain that the research question and purpose are clearly defined (Hopia et al., 2016). The research question being addressed is, "How can prescription opioid misuse be addressed through the increased reporting of prescription drug monitoring program (PDMP) data?" The prescription opioid crisis is a known problem in the U.S. occurring over decades, but more challenging is employing effective strategies to address this epidemic. The use of PDMP has been identified as having the potential of being effective in reducing opioid misuse. However, there are mixed reviews about its effectiveness, due to inconsistencies and inefficiency in its utilization among prescribers and different states. The integrative review sought to determine the effectiveness of the PDMP in identifying patients at risk for opioid misuse and increase the reporting of these data to the appropriate authorities to provide opportunities for intervention (Norwood & Wright, 2016).

The second stage of Cooper's framework is conducting searches to obtain applicable information on the topic of discussion. A comprehensive database search was conducted from renowned sources of only English written articles dated between 2015 to 2020. The searches returned several studies and using the PRISMA flow sheet, inclusion and exclusion criteria were

applied to studies of strong relevance to the topic discussed. Table 1 displayed the inclusion and exclusion criteria. These primary sources were then scoped to gain insight into the effectiveness of the PDMP in increasing prescribers' awareness, reduce over-prescription, identify opioid misuse, and increase reporting of drug-seeking behaviors for prompt interventions (McDonald et al., 2019). A detailed data search information can be found under the comprehensive data search strategy heading.

The third stage involved data evaluation during which data obtained were scrutinized for quality, authenticity, and relevance to the clinical question, and only data of strong relevance were included in this review. Using the Melnyk table of evidence, data were evaluated ranging from level I to level VII based on the methodological quality of their design, validity, and relevance to the topic addressed and application in the clinical setting. Evaluated data was also displayed on the data analysis table in table 2, the PRISMA flowsheet in figure 2, and Melnyk's table of evidence levels I through VII in Appendix A, to determine the quality of the literature and applicability to the topic discussed (Melnyk & Fineout-Overholt, 2019).

Stage four involves data analysis during which included studies were accessed, examined, and critiqued to explore their relevance in addressing the clinical question. Data analysis permits the ordering, coding, categorizing, and summarizing of data from the primary literature source into a comprehensive conclusion about the research topic (Whittemore & Knafl, 2005). In data analysis, the goal is to conduct a detailed and unbiased interpretation of the primary source through continuous comparisons to convert the extracted data into structured categories and themes (Whittemore & Knafl, 2005). The chosen themes for this integrative review are, the contributory factors to the opioid crisis, strategies to address the opioid crisis, and the prescription drug monitoring program. Studies' outcomes and statistical analysis were also

examined for applicability in practice. Data were further displayed in the data analysis table in table 2.

The fifth and final stage is the presentation stage, involving a comprehensive display of findings in addressing the clinical questions. This stage depicted the prospect of the PDMP and described the implications for practice, policy, and research, including limitations, and gaps in practice. Data is further displayed in a table format in the literature matrix in Appendix A, for comparison and conclusion of findings.

SECTION TWO: COMPREHENSIVE AND SYSTEMATIC SEARCH

Search Organization and Reporting Strategies

Using the Boolean phrase search method, searches were conducted for "prescription opioids OR narcotics AND pain killers," prescription opioid abuse OR prescription opioid misuse," "opioid addiction OR opioid use disorder," "opioid epidemic OR opioid crisis," "prescription drug monitoring program (PDMP)", OR "prescription opioid abuse treatment." Multiple databases were searched for relevant literature on the topic of discussion using Ebscohost, Medline, CINAHL Plus, Eric, Health source (nursing academic edition), Psychological and behavioral sciences search engines. Advanced searches were conducted on Proquest central, with the help of the librarian for full-text peer-reviewed, English written articles dated between 2015 to 2020.

Terminology

Boolean Phrase, permits the use of conjunctions such as "AND, OR" when conducting searches to limit or broaden the search results to relevant articles on the desired topic. Databases are an electronic collection of orderly stored information that could be easily accessed

through a computer. Advanced Search facilitates complex searches for relevant sources.

SECTION THREE: MANAGING THE COLLECTED DATA

The collected data underwent stringent scrutiny for inclusion in this project, after a thorough literature search from renowned databases listed under Search Organization and Reporting Strategies. The PRISMA flow sheet displayed the process involved in the inclusion and exclusion criteria and data were further categorized according to the study focus considering their similarities and differences in addressing the clinical question. A comprehensive display of data is illustrated in the Melnyk table of evidence in Appendix A, ranging from levels I-VII, according to the methods, designs, validity, and evidence of the studies to give readers a clear insight into the topic discussed. Detailed data collection and management can be found under the inclusion and exclusion criteria heading. Graphic display of data is found in the PRISMA flowsheet in figure 2, and the data analysis table in table 2.

SECTION FOUR: QUALITY APPRAISAL

Studies by Adewumi et al., (2018), Jefferies (2018), Lagisetty et al., (2017), and Yang et al., (2018) are level 1 studies based on Melnyk level of evidence. These four studies are systemic review articles involving randomized control trials (RCTs) that are considered the gold standard for providing high-quality evidence on diverse aspects on the topic of discussion.

The five level II RCTs included in this integrative review were different studies by Goedel et al., (2019), Hawk et al., (2018), Neven et al., (2016), Coffin et al., (2017), and Turner et al., (2019), because of their methodology, validity, and applicability to safe practices and improved patient outcomes.

Two level III articles of quasi-experimental designs by Delcher et al., (2016) and McDonald et al., (2019) were identified. Both studies were included in this integrative review because they provide moderate to strong evidence on the PDMP in reducing opioid-related deaths and increasing the vigilance of prescribers to identify drug risky behaviors in patients. Six level IV articles included in this scholarly project were studies from Finnell et al., (2017), Kohlbeck et al., (2018), Raheemullah et al., (2020), Strand et al., (2019), Wilson, et al., (2020) and Young et al., (2018). The study designs included two pilot studies, one prospective study, and one mixed study design of surveys, focus groups, and a pre- and post-test interventional study. These studies revealed some evidence of a practice change in providers' prescription practices and compliance and identified PDMP as a valuable screening tool to help address opioid misuse. Information from these studies may stimulate further research on the effectiveness of PDMP to address opioid misuse through increased reporting of data.

Five level V studies, considered for use in this scholarly project were studies from Kelly et al., (2016), Lyapustina et al., (2017), McGinty et al., (2018), Norwood & Wright, (2016), and Rhodes et al., (2019). These studies exhibited diverse research designs ranging from cross-sectional studies, the systemic review of literature, mixed study designs, and surveys. Mild to moderate evidence was revealed on the barriers to PDMP, and factors influencing the opioid epidemic. The studies also raised awareness about the inconsistencies and gap in practice involving PDMP utilization for safe prescribing, and implementation laws for consistency. Relevant information was furnished but further research for strong evidence is necessary for the future of the PDMP. A study by Rhodes et al., (2019), found no strong evidence of the PDMP in reducing opioid-related harms but there are indications to guide safe prescribing practices. This

study can instigate future in-depth research into the capability, utilization, barriers, and effectiveness of the PDMP in addressing opioid misuse.

The only level VI survey study by Carrico et al., (2018), examined the impact of incentives and organizational guidelines on opioid prescribing. Despite its low level of evidence, useful information was furnished to influence safe opioid prescribing policies and practices and promote professionalism. A detailed description of each article is displayed in a table of evidence in Appendix A, according to the Melnyk framework (Melnyk & Fineout-Overholt, 2019). This gives readers an insight into the role of the PDMP in addressing opioid misuse, challenges to its utilization, and indications for future research. Studies by Bonnie et al., (2017), Neville & Foley, (2020), and Reinhart et al., (2018), were referenced in this integrative review but were not inclusive of the 23 studies.

Sources of Bias

The findings reported in this Integrative Review are subject to several limitations. The studies were restricted to publications from 2015 to 2020, and pertinent data before 2015 may have been omitted. Only English-written, peer-reviewed articles were selected omitting international studies that may have provided useful information on the opioid epidemic. The potential for bias and confounding exists due to the non-randomized design of some included studies, and other factors that may have influenced the outcomes. For example, the studies by Delcher et al., (2015), Norwood & Wright, (2016), and Raheemullah et al., (2020) have the potential for sampling bias because the researches were conducted in single settings; therefore, the results cannot be generalized. Furthermore, the varying study designs posed challenges in comparing results, resulting in bias and lack of rigor, making conclusion-drawing vague or inconclusive. Another limitation was the varying definitions of opioid abuse and misuse among

studies, and the type of prescription opioids investigated also vary resulting in inconsistency and study outcomes.

Appraisal Tools (Literature Matrix)

Melnyk's level of evidence matrix was used as a tool to assess the quality of the studies. The study levels ranged from levels I (strongest evidence) to VII (weakest evidence), according to the methodological quality of their design, validity, and applicability to the topic of discussion (Melnyk & Fineout-Overholt, 2019). This display gives readers insight into the role of the PDMP in addressing opioid misuse, challenges to its utilization, and indications for future research. A graphic display of data is found in Appendix A. The 27-item PRISMA checklist and a four-phase flowsheet were used as the tool to evaluate the topic of interest by outlining the flow of information through the different phases of the systemic literature review, and organized the number of records identified, guided the inclusion of quality literature and stated the reasons for exclusions (Tricco et al., 2018). An illustration of the PRISMA flowsheet is in figure 2.

Applicability of Results

In addition to the narrative, results for this review were presented through tables, flow diagrams and concept maps to give readers a descriptive meaning of the project. The flow diagrams and concept maps organized data in sequential order by themes or categories for readers to easily identify the relationships between studies and their relevance to the clinical question. Data arranged in table format allowed readers to identify the similarities and differences between the studies and the studies' outcomes and their relevance to the topic of discussion. The compilation of an integrative review is a very daunting task as it required exploration and data extraction from different study designs and methods to fully understand the

topic discussed and its applicability to practice. Additionally, gaps identified in this project can influence knowledge acquisition, policymaking, and trigger further research.

Reporting Guidelines

The Integrative Review based on the PRISMA guideline was the chosen method for this scholarly project. The PRISMA guideline promotes quality and transparency in reporting systemic reviews (Toronto & Remington, 2020). According to Whitmore and Knafl, (2005), an integrative review specifically summarizes previous empirical or theoretical literature to furnish a thorough understanding of a specific occurrence or healthcare issue. Integrative reviews can aid in the development of nursing science, instigate research, influence practice, and policy-making initiatives. Considered the broadest type of research review methods, integrative reviews uniquely accommodate the simultaneous inclusion of experimental and non-experimental research to provide a thorough understanding of the issue at hand which can subsequently impact evidence-based practice in nursing and healthcare (Whitmore & Knafl, 2005).

An integrative review is considered a review of reviews because of its extensive approach and capability to capture the complexity of various perspectives, cultivates a comprehensive understanding of the topic of interest by presenting the science which then leads to theory development (Hopia et al., 2016). Following the five-step process of an integrative review, the project emphasized the problem to be studied, completely defined the literature search, evaluated the data, analyzed the data, and interpreted and presented the conclusion (Hopia et al., 2016).

SECTION FIVE: DATA ANALYSIS AND SYNTHESIS

Data Analysis Methods

In examining the clinical question, data were analyzed according to Whitmoore and Knafl (2005), method of coding, categorizing, ordering, and summarizing, to enhance the rigor of the diverse methodologies of the qualitative studies included. Coding allowed data to be defined, categorized, analyzed, compared, synthesized, and displayed in a data analysis table in table 2. The literature was analyzed according to categories and themes such as the contributory factors to the opioid crisis, strategies to address the opioid crisis, and the prescription drug monitoring program (PDMP). Relevant literature to each of these categories was diligently scoped and compared multiple times to obtain important data examining the similarities and differences in addressing the clinical question.

The contributory factors to the opioid crisis category obtained data from different studies that highlighted themes such as pain management, over-prescriptions, faulty practices, patient surveys, and incentives. In examining the relevant literature, Adewumi et al., (2018), explored factors such as higher doses and unsafe prescribing by practitioners and suggested that prescribers should discuss safe doses with their clients. The study by Yang et al., (2018), shared similar sentiments about caution on morphine dosages in adult and pediatric patients and highlighted opioid misuse risk in prescribing. Lyapustina et al., (2017), explored the impact of the ED as a contributor to opioid misuse, and reviewed control strategies, whereas Neven et al., (2016) focused on strategies to decrease opioid-related ED visits. Carrico et al., (2018), and Kelly et al., (2016) reviewed the impact of prescribers' incentives on opioid prescriptions, and the influence of patient satisfaction scores on prescription practices, respectively.

Under the category, “Strategies to address the opioid crisis,” themes such as diverse therapy interventions, education, and legislation were highlighted in the treatment of OUD. Studies by Lagisetty et al., (2017), examined the benefits of Medication-Assisted Treatment (MAT), Jefferies (2018) addressed psychotherapy in conjunction with (MAT) as being beneficial and Coffin et al., (2017) discussed the therapeutics of behavioral interventions. Goedel et al., (2019), stressed the benefits of peer support, and Turner et al., (2019) emphasized the importance of patient education. Other studies by Raheemullah et al., (2020), and Young et al., (2018), discussed the improvement of opioid prescribing practices among prescribers through education and training. Strand et al., (2019) and McGinty et al., (2018), focused on the implementation of opioid misuse risk tool, and the enforcement of consistent and safe opioid prescribing laws.

In the final category of data analysis, themes such as national database, opioid misuse risk, prescribers’ attitudes, and safe prescribing were notable. Increase reporting of data from the prescription drug monitoring program (PDMP) to address opioid misuse, is the focus of the clinical question. Literature under this theme explored the benefits and disadvantages of the PDMP, the barrier to its use, prescribers' attitude towards its use, and the future of the PDMP in addressing opioid misuse. Studies by Finnell et al., (2017), Hawk et al., (2018), Kohlbeck et al., (2018), McDonald et al., (2019), Norwood & Wright, (2016), focused on increasing prescribers' knowledge and the efficient use of the PDMP. Delcher at al., (2016), and Wilson et al., (2019), assessed the impact of PDMP and similar screening tools on opioid misuse. Rhodes et al., (2019), found no strong evidence that the PDMP reduced opioid-related harms, but cautioned physicians’ opioid prescribing habits.

This literature was critically analyzed and constantly compared to identify similarities and differences, taking into account the study methodologies, purpose, sample sizes, risk of bias,

and other variables that impacted their validity in answering the clinical question. Table 2. displays a summary of the data analysis. Analysis of data is also found in the five stages of Cooper's theoretical framework of problem identification, literature search, data evaluation, data analysis, and presentation. A comparison chart is found under each subcategory in the synthesis of results.

Table 2. Data Analysis

Categories	Themes	Supporting Articles	
Contributory factors to the opioid crisis	Pain management Over-prescription Faulty practices Patient surveys, and incentives	Adewumi et al., (2018), Carrico et al., (2018), Kelly et al., (2016), Lyapustina et al., (2017).	4
Strategies to address the opioid crisis	Diverse therapy interventions, Education, Legislation	Goedel et al., (2019), Jefferies, S. (2018), Lagisetty, et al., (2017), McGinty et al., (2018), Coffin, et al., (2017), Raheemullah et al., (2020), Strand et al., (2019), Turner et al., (2019), Yang et al., (2018), Young et al., (2018).	10
The Prescription drug monitoring program (PDMP)	National database Opioid misuse risks Prescribers attitudes Safe prescribing Barriers	Delcher et al., (2015), Finnell et al., (2017), Hawk et al., (2018), Kohlbeck et al., (2018), McDonald et al., (2019), Neven et al., (2016), Norwood & Wright, (2016), Rhodes et al., (2019), Wilson, et al., (2020).	9

Synthesis of Results

In answering the clinical question, three major categories have been analyzed including, Contributory factors to the opioid crisis, Strategies to address the opioid crisis, and the prescription drug monitoring program (PDMP).

The Contributory Factors to the Opioid Crisis

Four studies in this integrative review have identified several factors that contributed to the opioid crisis. Through a systematic review and meta-analysis of RCTs, Adewumi et al., (2018) examined seven studies out of 1332 to associate an increased risk of unintended opioid overdose with 20-50 morphine milligram equivalents (MME)/day, and an increased risk of fatalities with higher doses of 50 MME/day or higher. The study recommended that providers should discuss safe opioid dosages with their patients when prescribing. Findings from this study partially addressed the clinical question, in promoting efficiency in opioid prescribing and patient safety. “The study quality was assessed using the Newcastle–Ottawa Scale (NOS), and a random-effect model was used to summarize the results using relative risk (greater than 50 MME/day, $p < 0.001$; greater than 100 MME/day: $p < 0.001$;)” (Adewumi et al., 2018, p. 105).

In a systemic review of peer-reviewed articles, Lyapustina et al., (2017) conducted a similar study on opioid prescriptions but unlike Adewumi et al., (2018) the study focused on the ED as a contributor to prescription opioid misuse and diversion. “The results revealed that approximately 10% of the prescription for opioids issued in the ED are indicative of inappropriate prescribing, and an estimated 42% of opioids are at increased risk of misuse, and 10% of diverted opioids originated from an ED prescription. Importantly, 1.8% of prescription

opioid-related deaths are linked to the ED" Lyapustina et al., (2017). Further research is needed but based on current literature an urgent need for interventions in the ED is required to reduce overprescribing, prescription opioid misuse, and diversion. This study provided strong evidence on increasing awareness among prescribers on safe opioid prescribing and adherence to safe prescribing guidelines.

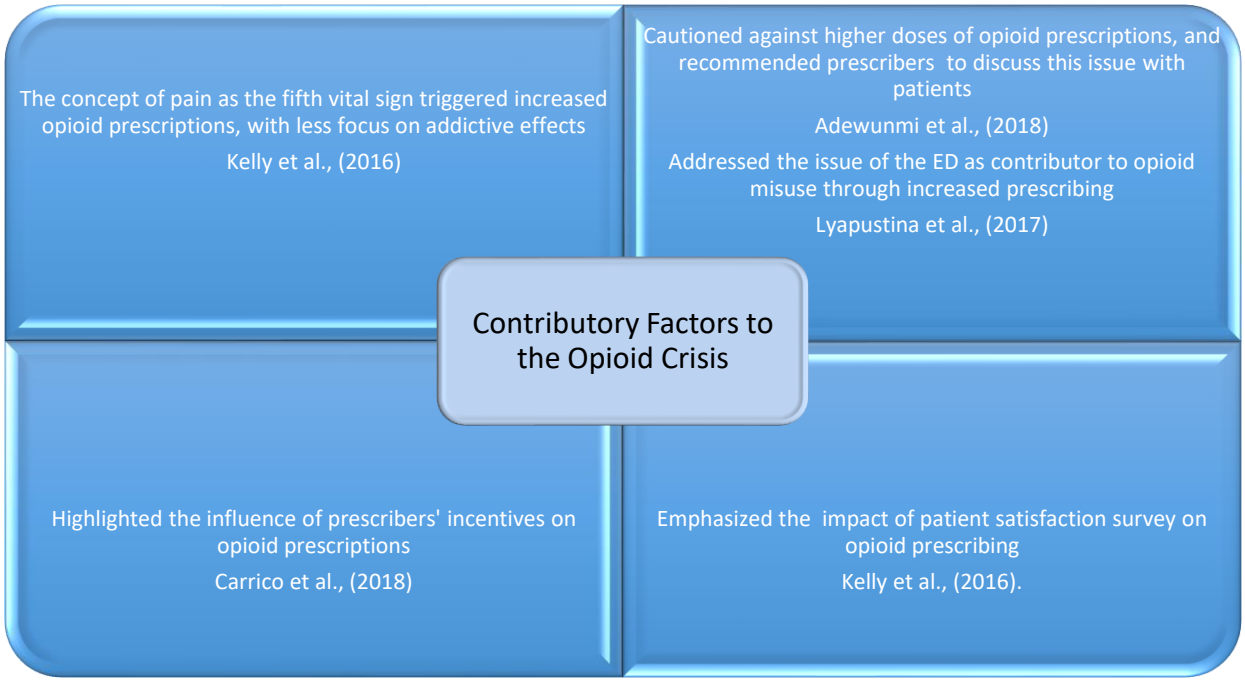
Comparing the studies of Adewunmi et al., (2018) and Lyapustina et al., (2017), both focus on the safety of opioid prescribing practices. Adewunmi et al., (2018), was specific to the prescribing practices of morphine doses, whereas, Lyapustina et al., (2017) was more generalized with concerns about the ED being a contributor to prescription opioid misuse, diversion, and deaths, particularly with drugs such as oxycodone and hydrocodone. These findings can serve as educational resources to caution against opioid over-prescriptions.

A survey study on 1404 family physicians in a Colorado practice was conducted by Carrico et al., (2018) and a descriptive study on 141 ED physicians by Kelly et al., (2016) gave insights into some of the pressure experienced by providers through incentives or by economic or regulatory factors imposed on them that influence their prescribing practices. Results from Carrico et al., (2018) "revealed that thirty-six percent (n = 14) of physicians who received incentives by patient satisfaction reported a slight influence on their opioid prescribing practices compared to 12% (n = 8) of physicians who did not receive incentives (P = .004). Pearson's χ^2 tests with 2-sided asymptotic significance were used to make comparisons" (Carrico et al., 2018). This study provided important information, for the review of proper guidelines on prescribers' incentives and their influence on prescribing standards, and the impact of patient satisfaction scores on prescribers' integrity and prescribing practices, and administrative guidelines.

Kelly et al., (2016), revealed that 40% of responding participants or their co-workers have been formally disciplined for failure to prescribe opioids. The majority of respondents felt pressured to write prescriptions to avoid administrative interrogations from dissatisfied patients regarding inadequate pain management. Failure to prescribe opioids in such circumstances can hinder reimbursement, and negatively impact Joint Commission scores. Additionally, participants reported a lack of clarity from all governing levels regarding the management protocol for patients suspected of "doctor shopping." Further research is needed to identify appropriate interventions to bridge the gaps identified in this study in training, regulation, and administrative healthcare practices for the appropriate management of patients with "drug-seeking" behaviors. Chi-square statistics were used to determine the differences between participants, $P < 0.05$ (Kelly et al., 2016). Useful information was garnered from this study to increase knowledge on safe prescribing practices among providers. Both studies raised important points on the influence of physician incentives and patient satisfaction scores, which warrants investigation of these practices to implement proper safety and prescribing guidelines.

Studies in this category did not fully answer the clinical question, they mostly focused on the prescribing practices which are important components for safe practices but the increased reporting of the opioid misuse data obtained from the PDMP is the focus of the clinical question. A visual summary of results is displayed in a chart format in figure 3. Further investigation is therefore warranted into the efficient use of the PDMP in reporting data to address the opioid crisis.

Figure 3. Contributory Factors to the Opioid Crisis



Strategies to address the opioid crisis

Addressing the opioid crisis involved collaborative efforts and diverse strategies to answer the research question. Studies by Jefferies, (2018), Lagisetty et al., (2017) and Coffin et al., (2017) used systematic review and meta-analysis of RCTs, and a pilot study of RCTs to explore the effectiveness of diverse therapies to address opioid use disorder (OUD) in the health care environment. In a systematic review and meta-analysis of thirty-five interventions including ten RCTs and 25 quasi-experiments, Lagisetty et al., (2017), further recommended Medication-Assisted Treatment (MAT) interventions to identify programs and processes associated with improved patient outcomes, to guide future policy implementation in the primary care settings. Comparable to Lagisetty et al., (2018), conducting a combination of fifteen systematic reviews and meta-analyses of RCTs, Jefferies (2018) emphasized the use of psychotherapy in conjunction with MAT as an effective intervention for opioid use disorder (OUD).

Similarly, Coffin et al., (2017) conducted a pilot single-blinded RCT on 63 participants ages 18-65 with a history of OUD and overdose. The pilot study further examined behavioral interventions to augment naloxone distribution to reduce opioid overdose. These studies provide valid information on diverse therapies of MAT, psychotherapy, and behavioral interventions in the treatment of opioid use disorder. However, varying interventions used by Jefferies (2018) affected the strength of the study outcomes. Likewise, the potential for bias and confounding exists with the study by Lagisetty et al., (2017) since all of the studies were not randomized designs. Participants in the study by Coffin et al., (2017) were less likely to experience an overdose, 87% of participants were pleased with the amount of help they received as part of the study.

Compared to Jefferies, (2018) and Coffin et al., (2017) regarding non-pharmacological interventions, Goedel et al., (2019) used a parallel design to study 650 high-risk adult patients for opioid overdose problems presenting to the ED. The participants were randomly assigned 1:1 to receive a behavioral intervention from either a certified peer recovery support specialist or a licensed clinical social worker (LCSW) to reduce the frequency of their ED visits, and recurrent opioid overdose. Findings from this study have the potential to create evidence for peer recovery support services as an effective intervention for fatal and non-fatal opioid abuse which can aid in addressing the impact of opioid misuse. This study also facilitated unlimited access to data-sharing between key entities such as hospitals, behavioral healthcare facilities, and researchers on overdose-related morbidity and mortality.

Turner et al., (2019), shared a similar notion with Goedel et al., (2019) to address opioid misuse through a government-led, patient education program using an RCT design. This fostered communication between patients and providers about their opioid use and explored alternative pain treatments. This also led to a reduction in inappropriate prescriptions of sedative-hypnotic and non-steroidal anti-inflammatory drugs (NSAID). Results from this trial served as a guide for future use in the community and can be applied to current practice to promote patient education. Some limitations include missing information on the storage of certain medications. Possible selection bias due to the faulty participant identification process. Codeine and tramadol were not included as opioids and can be considered safe, which can potentially lead to over-prescription and overdose. “The *T*-test compared the means of normally distributed variables and a *p*-value of < 0.05 considered statistically significant” (Turner et al., 2019).

Using a pre-and post-test interventional study design, Raheemullah et al., (2020) conducted an educational program to assess opioid-prescribing practices and pain management

skills of residents without faculty presence. An improvement in residents' confidence in detecting and managing addiction and improved prescribing practices and adherence to CDC recommendations were observed. Limitations of this study involved only one university setting, and the year of the residents was not disclosed. Therefore, outcomes, cannot be generalized, which required similar studies to be conducted at other universities for comparison. In answering the clinical question, providers' education and efficiency are crucial to guide safe practices, identify misuse, and initiate timely interventions.

Studies by Strand et al., (2019), and Yang et al., (2018) examined opioid misuse risk and assessed the effectiveness and side effects of opioids. In a pilot study, Strand et al., (2019), examined the implementation and evaluation of an opioid misuse risk prevention toolkit among community pharmacists to screen for opioid misuse behavior in patients receiving opioid prescriptions. Results revealed a strong preference for this tool by the community pharmacists to facilitate education and early interventions. Twenty-six percent of individuals receiving opioid prescriptions showed some risk of misuse and 30% were at risk of an accidental overdose. Selection bias is possible due to the convenience sampling of patient-participants. This study has the potential for both recall bias and response bias due to the self-reported tool, and the furnishing of inaccurate responses from patients. Improving prescribers' education can result in improved outcomes.

In a systemic review of RCTs, Yang et al., (2018) explored the effectiveness and side effects of opioids both in adult and pediatric burn patients, to guide practitioners in pain management. Results revealed that topical morphine application alleviates burn-related pain and anxiety, and opioid-related side effects also decreased over time. Limited sample size hindered evidence for the beneficial effect of opioids, and only one drug was studied. Further RCTs with

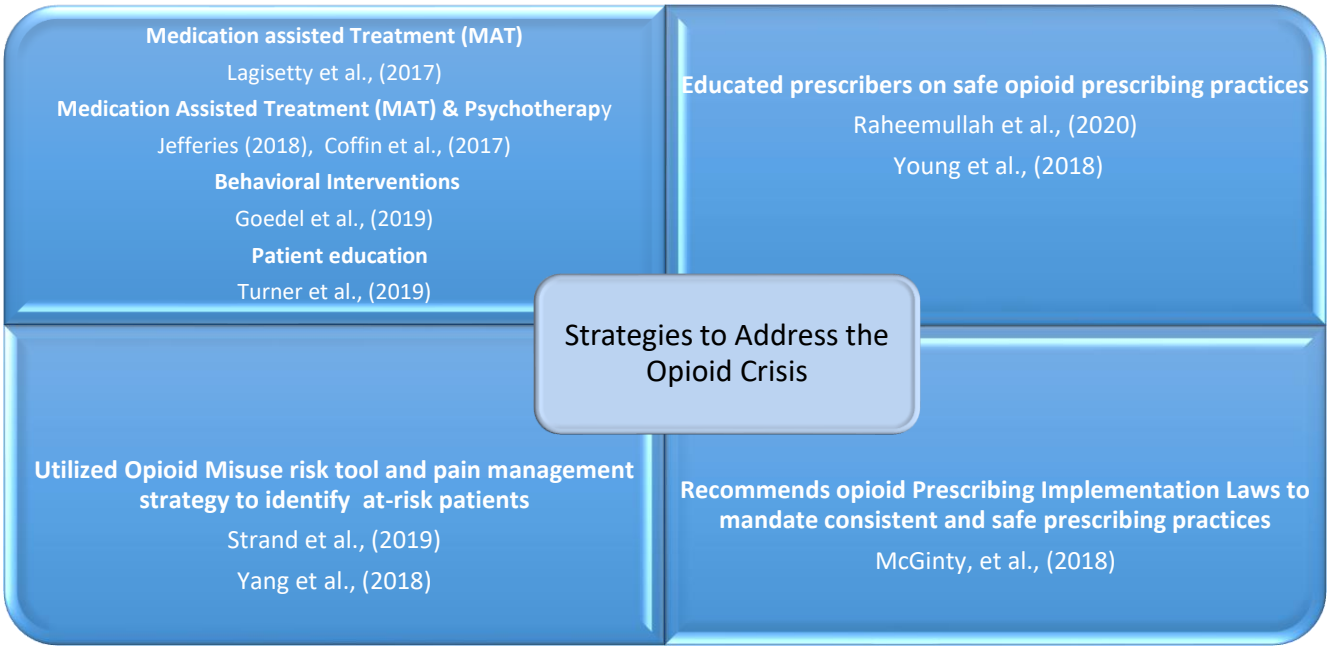
improved sample sizes are needed to strengthen this study. The Cochrane risk-of-bias method was used to assess the overall quality of the included studies. The study lacked statistical methods for data analysis, therefore, all results were narratively analyzed. This study can caution prescribers on the potential side effects of morphine and possibly other opioids despite their benefits in alleviating pain and anxiety. Therefore, prescribers' education on the safety of opioid prescribing is important.

As part of a quality improvement project, a pilot study designed by Young et al., (2018) was conducted to limit opioid prescribing in urgent care settings, that manage acute pain. Results showed an immediate decline in the average number of opioid prescriptions written per provider per week during the study. A Paired t-test was used to assess the statistical significance of changes in opioid prescribing, ($P < 0.05$). A disadvantage of this study is that prescribers can resume unsafe prescribing practices at the end of the study. Most important, however, is that provider awareness, education, and safe prescribing guidelines are essential.

Regarding safe prescribing guidelines, McGinty et al., (2018) conducted a mixed-methods study to evaluate the implementation, enforcement, and outcomes of the U.S. laws on restricting high-risk opioid prescribing and non-opioid treatments for chronic non-cancer pain. Limitations included inconsistencies in law implementation and enforcement among states which led to diverse outcomes. Data inaccuracy from IQVIA resulted in data collection bias, and there was no differentiation between pain treatments as clinical or non-clinical. Strict implementation and adherence to state laws are required, warranting further research. Information obtained from this study can help address the inconsistencies in opioid practices among providers and states. The studies under this category examined various strategies employed to address the opioid crisis, some with improved outcomes, and others with inconsistencies. These studies shared

similar notions as the clinical question to address opioid misuse, however, none were specific on reporting PDMP data to address opioid misuse. This indicated a need for further studies on prescribers' education on the increased reporting of PDMP data. A graphic summary of the results is displayed in figure 4.

Figure 4. Strategies to Address the Prescription Opioid Crisis



The Prescription Drug Monitoring Program (PDMP)

Efforts to address the opioid crisis included the implementation of the PDMP for safe prescribing and reduction in patient harm. The focus of this project is to address the clinical question on the efficient use of the PDMP to increase the reporting of opioid misuse. Nine articles were identified to explore the effectiveness of PDMP in addressing opioid misuse. A quasi-experiment conducted by Delcher et al., (2015) on 120 monthly observations and the number of oxycodone-related deaths indicated that PDMP ($p=0.008$) had a significant impact on decreasing oxycodone-related deaths ($p=0.002$) after it was implemented system-wide, in the state of Florida. This is the first study to indicate that a state PDMP is effective in reducing oxycodone-caused mortality. The test used for oxycodone-related mortality was the ARIMA (0,1,1).

Limitations of this study are, it was only conducted in the state of Florida and the study outcome might not apply to other states. Furthermore, possible changes to drug treatment access were not evaluated which might have resulted in the oxycodone decline at the time of the study. Additionally, there was a possible misclassification of the primary cause of death involving multiple drugs. Extending this study to other states is recommended for detailed drug-specific analyses to determine the effectiveness of PDMPs (Delcher et al., 2015). Despite this is an isolated study, the result showed a prospective future for the PDMP which addressed the clinical question of using the PDMP to help address opioid misuse.

Using a pre- and post-test interventional design, Finnell et al., (2017), emphasized the role of continuing medical education for clinicians, to increase enrollment in prescription drug monitoring programs. There was a significant increase in clinicians' use of the PDMP after education ($P = 0.06$) and a great improvement in clinician knowledge in identifying addiction

characteristics that are indicative of opioid diversion or abuse. The use of PDMP ($P < 0.001$) was also acknowledged as an effective tool. Limitations of this study revealed that increased clinician knowledge and the likelihood of using the PDMP did not improve clinicians' enrollment in the state's PDMPs. Despite the outlook for PDMP is promising, additional research is needed on barriers to its enrollment and utilization (Finnell et al., 2017). This study addressed the clinical question regarding increasing providers' knowledge and the efficient use of the PDMP to identify opioid misuse behavior among patients.

A similar multi-step study consisting of a survey, a focus group, and a pre-and post-test educational intervention study, conducted by Kohlbeck et al., (2018), shared similar interest as Finnell et al., (2017), in addressing clinician knowledge, attitudes, and behavior around opioid prescribing. The result revealed an increase in providers' knowledge about the PDMP, which subsequently fostered a practice change ($P < 0.05$). However, there is a possible recall and response bias due to the self-reporting of surveys. Both studies highlighted the importance of education in changing practice behaviors and facilitated the efficient use of PDMP.

Hawk et al., (2018), McDonald et al., (2019), Norwood & Wright, (2016), and Rhodes et al., (2019), focused their studies on the consistent and effective use of the PDMP to increase providers' awareness on opioid misuse behavior and adopt consistent use of the PDMP to prevent further patient harm. Hawk et al., (2018), conducted an RCT to evaluate a previous year PDMP opioid prescriptions and self-reported opioid use among an ED patient with OUD. Results from the state's PDMP data indicated that 36% of patients had at least one opioid prescribed, and even patients with non-medical prescription opioid were able to obtain some amount of PDMP opioid prescriptions. Clear guidelines are lacking on how the PDMP data should be interpreted for individual patients. This then warrants the need for evidence-based guidelines on the

integration of PDMP data into clinical practice and decision making as PDMP utilization mandates become standardized (Hawk et al., 2018). This study revealed that PDMP data was used to identify questionable prescribing practices to address opioid misuse, to adequately answer the clinical question, these data must be reported to the proper authorities for further interventions. Further research is therefore required on the efficient and consistent use of the PDMP in increased data reporting.

McDonald et al., (2019) used a controlled trial to test the effectiveness of unsolicited reporting by a PDMP to lessen the inappropriate acquisition of opioids. Results indicated a 13 % decrease in the likelihood of continued prescribing practices among providers who received unsolicited notices than providers who were not notified. An ordinary least squares regression was used to estimate notification effects. The limitation of this study is an inaccurate method of matching the prescriptions to individuals, that possibly resulted in bias, and confounded the true measure of the prescription activities. Effective use of the PDMP would involve requiring all physicians and other prescribers to query PDMP data before prescribing controlled drugs.

Norwood & Wright, (2016) used a cross-sectional study design to promote the consistent use of PDMP, by identifying barriers to its use, and increased awareness about prescription drug abuse. Multiple logistic regressions were used to examine the relationship between using INSPECT (a version of PDMP) and the provider's level of concern with prescription opioid abuse in the community. The results revealed that outpatient pharmacists were ten times more likely to report using the INSPECT if they were overly concerned with prescription drug abuse as opposed to those who were not. They were also 18 times more likely to frequently use INSPECT than those who were not. The study recommended that healthcare professionals should explore ways to remove barriers to using INSPECT and raise awareness within the

pharmacy community about prescription drug abuse to promote consistent use of the PDMP (Norwood & Wright, 2016). Limitations to this study are, it was conducted in only one state, therefore generalizations cannot be made. There is a need for similar studies to be conducted in multiple settings to compare outcomes. Furthermore, low survey response rates can result in a possible bias. The consistent use of the PDMP will lead to improved outcomes in addressing the opioid crisis per the clinical question.

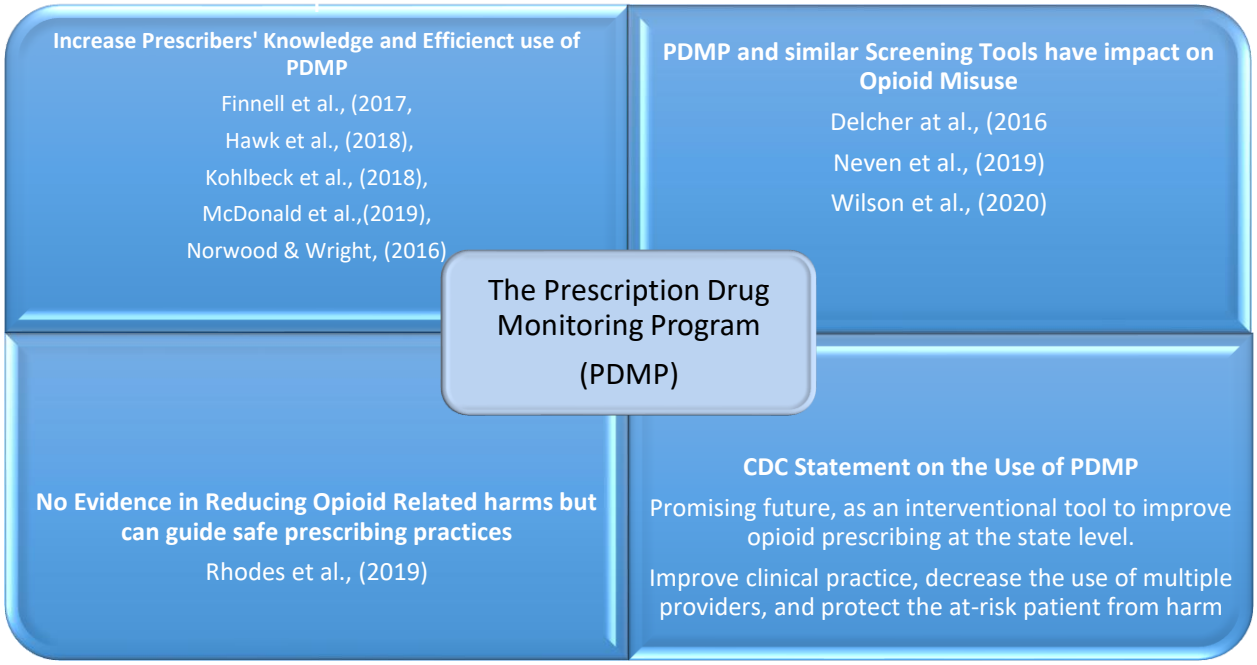
Neven et al., (2016) and Wilson, et al., (2020) explored tools such as the care coordination information system, Current Opioid Misuse Measure (COMM), and PDMP to identify opioid misuse and diversion, decrease unnecessary ED visits, and controlled substance prescriptions. Neven et al., (2019) conducted an RCT of a citywide emergency department care coordination program to reduce prescription opioid-related Emergency Department Visits. The study was effective in reducing ED visits and controlled substance prescriptions. Chi-squared and *t*-tests were used to assess the success of the randomization procedure. A decrease in ED visit was noted among all study participants during the 12-month study observation duration by approximately 4% per month. This care coordination information system should be extended to other hospitals to allow appropriate treatment of patients suspected of “doctor shopping” to provide them with follow-up care coordination for the required treatment. Limitations of this study are patients may stop coming to the ED and obtain prescriptions elsewhere or explore other means of obtaining opioids. Additionally, only one state was studied which may not be a representation of other states. Similar studies should be conducted in other areas to compare outcomes. This study partially addressed the clinical question concerning the use of the PDMP to identify opioid misuse to initiate appropriate interventions.

In a prospective study, Wilson et al., (2020), compared the PDMP and the Current Opioid Misuse Measure (COMM), a commonly recommended screening tool to detect drug-aberrant behaviors in opioid patients in the ED. The results revealed that both PDMP and the COMM did not improve the detection of drug-aberrant behaviors. The PDMP, however, omitted many patients with documented drug-risky behaviors in the electronic medical record (EMR), therefore, it should not be used independently to determine the appropriateness of a particular opioid prescription. This study revealed some of the barriers to the PDMP such as the omission of important patient data. This can trigger strategies for improvement through further research and continuous development of the PDMP.

Rhodes et al., (2019) conducted a systematic review on 22 studies (49 PDMPs), and the results showed no evidence to strongly support the overall effectiveness of PDMPs in reducing opioid-related consequences and harms. However, the PDMP acted as a reminder to physicians to use caution when prescribing opioids. Using the PDMP as a precautionary measure for opioid prescriptions is encouraging. The clinical question, however, is not fully addressed but provided useful information to trigger further research in the improvement and effectiveness of the PDMP through increased reporting of data.

The studies in this category did not adequately answer the clinical questions, but most of them acknowledged the PDMP as promising in addressing opioid misuse and guiding safe practice. Some studies identified barriers to the PDMP; others failed to establish a correlation between the PDMP and reduced opioid-related outcomes. These mixed results can facilitate future research on improving the PDMP and increase prescribers' knowledge in reporting of PDMP data. Figure 5 displays a graphic summary of the results.

Figure 5. The Prescription Drug Monitoring Program (PDMP).



Ethical Considerations

No human subject participants were involved since the project design was an integrative review of the literature; obtaining consent was, therefore, not required. The Institutional Review Board's (IRB) approval was not needed but under the direction of the project chair, research and ethical guidelines were followed according to the Liberty University protocol. Copies of the Collaborative Institutional Training Initiative (CITI) Certificates and the exemption email from the IRB are provided in the appendix to validate competency in the integrative review process.

TIMELINE

Due to the current status of the COVID-19 pandemic, the original scholarly project design was changed from a pre-and post-test educational intervention to an integrative review. Proposal sections one through three was submitted on April 28, 2020, for the program chair's review. On May 1, 2020, the project chair and this writer discussed the proposal via telephone, and required documents were emailed to this writer to continue working on the proposal development. Another submission was made to the program chair on May 2, 2020, and feedback was received requiring modifications. A modified version of the proposal was submitted on May 22, 2020, and feedback was received from the chair on May 26, 2020, requiring minor editing, with a recommendation to proceed with IRB application. The IRB application was submitted on May 27, 2020, and a response was received on May 29, 2020, stating that the scholarly project required no IRB approval since no human subjects are involved in the research.

A signed acceptance of the proposal for the Integrative Review was received on June 2, 2020, via email from the project chair. The first draft of the scholarly project was submitted to the project chair on June 10, 2020. Feedback from the project chair was received on June 12,

2020, recommending some modifications to the scholarly project, and resources provided to guide project completion. August 3, 2020, a modified version of the scholarly project was submitted to the project chair, and feedback was received on August 6, 2020, to proceed to project defense after editing from an editor. The final edited manuscript was submitted to the project chair on August 17, with a proposed defense date of August 24.

SECTION SIX: DISCUSSION

This integrated review of 23 diverse research studies contributed to the growing body of synthesis focused on prescription opioids as a public health crisis and the various strategies to combat it, including the PDMP. The information obtained could be considered for evidence-based implementation because of its relevance to the opioid crisis and management strategy. Additionally, an insight into opioid abuse and its management was explored which can foster behavioral changes in providers' prescribing practices, patients' drug-seeking behaviors, and compliance with opioid abuse therapies.

Multiple contributory factors to the opioid crisis have been identified, therefore effective strategies should be employed to address this epidemic. Information retrieved from the literature review indicated a significant need in providers' adherence to safe opioid prescribing, and knowledge gaps in the effective utilization of the PDMP to increase reporting of opioid misuse to the appropriate authorities. The PDMP is believed to have a promising future, at the state level as an interventional tool to improve opioid prescribing, improve clinical practice, decrease the use of multiple providers, and protect the at-risk patient from harm (CDC, 2020). However, mixed reviews about the PDMP still exist on its effectiveness to address the opioid crisis, which warrants further research (Rhodes et al., 2019). Furthermore, policy changes must be implemented to ensure that all states work under uniform opioid prescribing guidelines for safe

and consistent care (McGinty, et al., 2018). This study also contributed to the existing literature on the facilitators and barriers of the PDMP. Information obtained from this project can provide educational resources to educate providers on opioid prescribing practices, patient education, alternative pain therapies, and increased awareness about the PDMP to resolve barriers to its use.

Before conducting this integrative review, this author had the privilege to interview an emergency department (ED) physician and a walk-in clinic physician, and two Advanced Practice Registered Nurses (APRNs). Each of these individuals acknowledged using the PDMP to verify narcotic prescriptions but none of them had reported its data to the appropriate authorities for further interventions. Their responses to suspected opioid-seeking patients are denial of prescription refills and immediate dismissal from the clinical environment, and the involvement of law enforcement if patients became agitated. Subsequently, there is a significant need to increase prescribers' knowledge on the effective utilization of the PDMP to guide safe prescribing and reduce patient harm (Finnell et al., (2017), through increased reporting. Barriers to PDMP such as ease of use, untransferable data from the EMR should be addressed to facilitate interoperability.

Implications for Practice/ Future Work

The population of focus in this integrative review is opioid prescribers and dispensers, which may include physicians, nurse practitioners, physician assistants, midwives, and all other licensed opioid prescribers, and pharmacists. In their daily practice, providers care for patients with diverse healthcare needs, with the most common problem being pain management. The efficient use of the PDMP will promote safe opioid prescribing practices and increase the reporting of at-risk patients for prompt interventions. Some providers acknowledged that they have knowledge about the PDMP but have not been trained on its proper usage (Radomski et al.,

2018). Prescribers must be educated on the efficient use of the PDMP to guide safe prescription practices.

The knowledge obtained from this integrative review will benefit prescribers in settings such as the emergency departments (ED), which sees an influx of diverse patients including those on prescription opioids. A study conducted by Lyapustina et al., (2017) identified the ED as a contributory factor to opioid misuse and abuse, therefore, studies from this integrative review will be valuable in educating ED prescribers on safe opioid prescription to influence practice change. Other areas of practice such as urgent care, pain clinics, walk-in clinics, health departments, and doctors' offices, and pharmacies will also benefit from information relating to the topic of discussion to increase knowledge and efficient use of the PDMP to guide safe opioid prescribing and dispensing practices.

Results from this integrative review may trigger the development of resources such as the availability of treatment facilities and trained skilled providers to care for patients with OUD. Prompt identification of at-risk patients for opioid abuse should facilitate therapeutic communication between provider and client, and not terminate the provider-client relationship. Increased patient education about the addictive effects of opioids can lead to the exploration of alternative therapies. Early identification and increased reporting of opioid misuse will facilitate prompt interventions to prevent overdose and untimely deaths. Data from this review can serve as a reminder to prescribers on their ethical and moral duty to do no harm and reinforce adherence to the CDC opioid prescribing guidelines. Furthermore, uniformity of opioid prescriptions and utilization of PDMP across all states will maintain consistency in safe practice and reduce "doctor shopping" and other forms of opioid diversion, addiction, and untimely deaths.

Dissemination

In determining the best way to disseminate the information, the purpose of the project must be analyzed, the target audience considered, and the expected outcomes reviewed. Information can also be disseminated through the submission of an abstract for a poster presentation, in-services presentation either at the organizational or state level and national conferences. Education is essential to increase knowledge of PDMP, therefore prescribers should have access to studies through publications. Project publications are important ways to share information because they can be easily implemented in the clinical setting where there are frequent encounters between care providers and patients with OUD, to improve patients' outcomes. A major barrier to implementation is cost and the attitudes of practitioners to accept and comply with new practice guidelines, however, through effective collaboration of all stakeholders a favorable decision can be made to influence practice for improved outcomes.

DNP Essentials

DNP I: Scientific Underpinnings for Practice (AACN, 2006).

The five stages of Cooper's theoretical framework guided the integrative review design to help assess study quality and provide a framework for the relevance of the efficient use of the prescription drug monitoring program (PDMP) by prescribers to increase reporting of opioid misuse, in addressing the opioid crisis. Cooper's theoretical framework focuses on practitioners as its intended audience to influence practice change (Hopia et al., 2016). Relating Cooper's framework to the topic of discussion, it is evident that there is a dire need for practice change according to the review of the literature. Practice change can be facilitated through the educating

of prescribers on the effectiveness of the PDMP to bridge the knowledge gap and guide safe prescribing practices.

DNP II: Organizational and System Leadership for Quality Improvement and System Thinking (AACN, 2006).

The information obtained from this literature review has given this writer an insight into the magnitude of the opioid crisis, and the complex needs of clients affected by opioid misuse, addiction, and overdose. This also encouraged this writer to assess her leadership qualities to influence safe opioid prescribing in the clinical setting. As an advanced practitioner, this writer hopes to use this information to influence the development of clinical practice guidelines, outline evidence-based interventions, and evaluate practice outcomes on prescription opioids.

DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice (AACN, 2006).

Using the PRISMA model a review of relevant literature was conducted for the implementation of best practices on the care of clients with prescription opioid misuse. However, results indicated knowledge gaps in the efficient use of the PDMP, warranting a need for providers' education on the PDMP as best practice for addressing opioid misuse, and evaluating performance outcomes. Further research is therefore warranted for concrete evidence on the use of the PDMP as an evidence-based tool for safe practice.

DNP Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care (AACN, 2006)

Information technology facilitates the provision of safe, efficient, patient-centered care. Utilizing information technology such as the PDMP as screening tools to identify patients who

are at risk for opioid misuse, can promote increase reporting of data to initiate timely interventions. This can also help address the prescription opioid crisis by decreasing misuse, abuse, and deaths. Prescribers need to be well vast and registered to efficiently use the PDMP for safe prescribing practices and reduced patient harm.

DNP Essential V: Health Care Policy for Advocacy in Health Care (AACN, 2006).

Based on the literature review, a significant need for opioid prescription policy change is apparent at the organizational and state levels due to inconsistencies in prescribing practices by individuals and states. knowledge acquisition and involvement in policy and advocacy in prescription opioid guidelines are crucial to facilitate effective change. Furthermore, adherence to opioid prescribing guidelines is of great importance.

DNP Essential VI: Inter-Professional Collaboration for Improving Patient and Population Health Outcomes (AACN, 2006).

Some important information encountered in writing this integrative review is the lack of treatment facilities for opioid abuse victims and the unavailability of skilled practitioners which magnified the opioid crisis. Collaboration with other healthcare members to facilitate early screening for opioid misuse and easy access to treatment centers and related resources for individuals with opioid use disorder (OUD) is imperative. The availability of treatment centers and trained skilled providers will promote quality care and improve outcomes for clients with OUD.

DNP Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health (AACN, 2006).

The opioid crisis is a public health issue and several contributory factors have been identified. Studies from the literature review identified several strategies for prevention and improved outcomes. However, there is more work to be done in addressing opioid misuse through developing, implementing, and evaluating strategies to improve population health through safe prescribing practices. The most important is the education of patients, communities, and prescribers on the potential dangers of opioid prescription misuse to increase awareness, guide practice, and improve outcomes.

DNP Essential VIII: Advanced Nursing Practice (AACN, 2006).

The Doctor of Nursing Practitioner has the ethical duty of showing compassion, and exploring resources to provide quality care for individuals struggling with OUD. As a subject matter expert and leader, the DNP will influence clinical decision making for quality patient care and improved outcomes, through comprehensive needs assessment for opioid misuse victims. Collaboration, advocacy, and policy development are dire in addressing the opioid crisis.

Conclusion

Despite various strategies had been initiated to address the opioid epidemic, it remains a problem. The use of the PDMP can be an essential tool to identify at-risk prescription opioid misuse, encourage providers' versatility in using this database, and increase reporting of clients exhibiting opioid misuse behaviors. This will facilitate prompt intervention based on the client's level of risk. The inefficient use of PDMP among providers and its inconsistent guidelines among states resulted in mixed evidence which warrants further research. Despite the mixed

evidence, PDMP has shown some improvements in identifying opioid misuse behaviors, which subsequently reduces opioid over-prescription.

Increased prescribers' education and consistent use of the PDMP is fundamental to eliminate the gaps in PDMP use across the country to guide safe prescribing practices (Young et al., 2017). Findings from this Integrative Review highlighted the multiple impacts of the prescription opioid crisis on healthcare, society, and the economy. Future research into the use of PDMP as a tool for best practice to reduce opioid misuse is warranted. Additionally, legislation regarding prescription opioids should be reviewed for consistent and mandatory implementation to address this opioid epidemic.

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Appendix A

Table 1: Evidence Table

Name: Claudia Georgestone

Review Question: "How can prescription opioid misuse be addressed through the increased reporting of prescription drug monitoring program (PDMP) data? This integrative review intends to explore literature with great significance to the topic of discussion."

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Example, A. (2015) Title, etc. per Current APA	To identify the need for technology to prevent falls	A convenience sample of 44 nurses in an acute care hospital	A non-experimental, descriptive survey	Findings indicate that fall rates decreased by 2% with the introduction of technology into the care setting	Level 6: descriptive design	Conducted in only one setting, the small sample size	It does provide some good foundational information even though the level is a 6.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 1 Adewumi et al., (2018). Prescribed Dose of Opioids and Overdose: A Systematic Review and Meta-Analysis of Unintentional Prescription Opioid Overdose. CNS Drugs, 32(2), 101–116. https://doi-org.ezproxy.liberty.edu/10.1007/s40263-018-0499-3	To determine the doses of opioids that are associated with increased risk of severe opioid poisoning or death.	Seven studies out of 1332 were meta-analyzed	A systemic review and meta-analysis.	The result revealed an increased risk of unintentional prescription opioid overdose with 20-50 (morphine milligram equivalents) MME/day, and increased risk of fatality with opioid doses higher than 50 MME/day.	Level 1	Varying definitions of exposure. Defined by some studies as the filling of a prescription while others defined it as the prescription of an opioid to the patient. Also, all studies assumed that patients took the prescribed opioid. Consideration was not given to other drugs that can cause an overdose.	This is a prospective study for evidence-based practice, and patient education on safe opioid dosages to prevent harm. I will use this study.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 2 Carrico et al., (2018). The association of patient satisfaction-based incentives with primary care physician opioid prescribing. *Journal of the American Board of Family Medicine: JABFM, 31*(6), 941-943. doi:10.3122/jabfm.2018.06.180067	To surmise that providers who report being incentivized based on patient satisfaction surveys are more likely to report an impact of such surveys on their opioid prescribing practice.	1404 members of the Colorado Academy of Family Physicians.	A survey study	Findings indicate that among physicians using patient satisfaction surveys, incentivized physicians reported at least a slight impact on opioid prescribing 3 times more often than physicians who were not incentivized.	Level 6	Limitations to this study are; a low participants' response rate, lack of direction on reported impact, and self-report of physicians instead of the assessment of actual opioid prescription data. Further research is recommended.	I will use this study to educate prescribers on adherence to the CDC guidelines for opioids prescriptions, regardless of incentives or patient survey scores.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 3 Coffin, P. O., Santos, G., Matheson, T., Behar, E., Rowe, C., Rubin, T., . . . Vittinghoff, E. (2017). Behavioral intervention to reduce opioid overdose among high-risk persons with opioid use disorder: A pilot randomized controlled trial. *PloS One, 12*(10), e0183354. doi:10.1371/journal.pone.0183354	To reduce the occurrence of opioid overdose among high-risk opioid-dependent individuals with the use of repeated-dose motivational interviewing intervention (REBOOT), versus treatments.	63 participants aged 18-65 with a history of an opioid use disorder, who had experienced an overdose in the past four months. 67% male, 65% White, 17% African-American, and 14% Latino.	A pilot single-blinded Randomized control trial.	The findings revealed that participants were less likely to experience an overdose.	Level 2	None discussed. Conducting more studies to compare outcomes could be beneficial.	This study is valid and can be used to prevent opioid overdose and in some cases deaths. Yes, I will use this study.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 4 Delcher et al., (2015). Abrupt decline in oxycodone-caused mortality after the implementation of Florida's Prescription Drug Monitoring Program. Drug And Alcohol Dependence, 150, 63–68.	To evaluate the effects of PDMP on oxycodone-caused mortality in the state of Florida	120 repeated monthly observations and monthly counts of oxycodone-related deaths, obtained from the Florida Medical Examiners Commission as the outcome variable.	A quasi-experimental research design	Results indicate that for a system-wide increase of one PDMP inquiry per prescriber, oxycodone-related deaths declined by 0.229 persons per month ($p=0.002$). This indicates that PDMP had a significant effect on decreasing oxycodone-caused fatality in Florida.	Level 3	It will be great to extend to other states and compare outcomes. Possible changes to drug treatment that impact oxycodone decline. Possible misclassification of deaths if other drugs are involved.	Yes, I will use this study despite mixed feelings about PDMP and its inconsistent use among states. This study will serve as a good resource to promote uniformity and consistency in opioid prescriptions in all states, to address the prescription drug epidemic.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 5 Finnell et al., (2017). The role of continuing medical education in increasing enrollment in prescription drug monitoring programs. Clinical Therapeutics, 39(9), 1896-1902. doi:http://dx.doi.org.ezproxy.liberty.edu/10.1016/j.clinthera.2017.07.040	A continuing medical program to increase awareness of the PDMP and its use.	465 clinicians participated in 1 of 2 webcasts. Only 207 of those responding to a pre-survey, and 64 responded to a post-survey.	A pre- and post-interventional study design	The result indicated a significant likelihood of increase physician use of the PDMP after the educational intervention.	Level 4	Despite increased clinician knowledge and the likelihood of PDMP usage, the education did not result in a significant increase in enrollment in state PDMPs.	Yes, I will use this study. This is a very good study indicating that education significantly improved clinician knowledge about the characteristics of addiction, and findings in a PDMP that is suggestive of diversion or abuse.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 6 Goedel et al., (2019). Randomised clinical trial of an emergency department-based peer recovery support intervention to increase treatment uptake and reduce recurrent overdose among individuals at high risk for opioid overdose: Study protocol for the navigator trial. *BMJ Open*, *9*(11) doi:http://dx.doi.org.ezproxy.liberty.edu/10.1136/bmjopen-2019-032052	To determine the efficiency of peer recovery support intervention to address opioid overdose.	Sample size (n=650) High-risk adult patients presenting to the ED for opioid overdose, or opioid abuse-related problems.	RCT	Findings from this trial have the potential to create the evidence base for peer recovery support services as an effective intervention for fatal and non-fatal opioid abuse. This study also facilitated unlimited access to data-sharing between key entities such as hospitals, behavioral healthcare facilities, and researchers on overdose-related morbidity and mortality.	Level 2	Databases used to characterize the primary outcomes might not be representative and will fail to capture resources of all individuals who enroll in OUD treatment programs, presenting to EDs in other states.	Yes. This is a very good study that strengthens a statewide comprehensive data-sharing platform to use administrative records to characterize the primary outcomes such as OUD treatment enrolment, recurrent ED visits. It also gave an insight into the problem of OUD through the review of opioid-related morbidity and mortality data.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 7 Hawk et al., (2018). Past-year Prescription Drug Monitoring Program Opioid Prescriptions and Self-reported Opioid Use in an Emergency Department Population With Opioid Use Disorder. Academic emergency medicine: official journal of the Society for Academic Emergency Medicine, 25(5), 508–516. https://doi.org/10.1111/acem.13352	To evaluate a relationship between PDMP opioid prescription records and self-reported non-medical opioid use of prescription opioids in a cohort of opioid-dependent ED patients enrolled in a treatment trial.	329 adults meeting Diagnostic and Statistical Manual IV criteria for opioid dependence, after reviewing of PDMP data.	RCT	Results indicate that 36% of patients had at least one opioid prescription in the states' PDMP. Patients who reported 15 out of 30 days' use of non-medical prescription opioids have a minimum of four PDMP opioid prescriptions (53%) than patients reporting 1 to 14 days (37%) or no day of using a non-medical prescription opioid ($p = 0.002$). Being a female and having health insurance coverage have a significant representation in the PDMP ($p < 0.05$ for both).	Level 2	Patients' opioid use pattern changes over time and that may not have been reflected in this study. Furthermore, patients may obtain a prescription under an alias. Additionally, PDMPs are limited to interstate data-sharing agreements and may not reflect all prescriptions obtained. Inaccurate data entry into the PDMP by pharmacist or	The PDMP may help identify patients exhibiting risky behavior indicative of opioid misuse but is incapable of identifying patients with opioid use disorder. Yes, I will use this information because early identification of opioid misuse warrants prompt interventions based on patients' risk levels.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
						provider may result in erroneous information.	
Article 8 Jefferies, S. (2018). *Medication-Assisted Therapy Interventions and Prescription Opioid Misuse* (Order No. 10982632). Available from ProQuest Central; ProQuest Central; ProQuest Dissertations & Theses Global. (2151416647). Retrieved from http://ezproxy.liberty.edu/login?url=https://search-proquest-com.ezproxy.liberty.edu/docview/2151416647?accountid=12085	To provide a systematic review of literature on the effectiveness of medication-assisted therapy (MAT) interventions and psychotherapy in addressing the prescription opioid misuse within the health care environment.	15 peer-reviewed journal articles, 14 were randomized controlled trials (RCTs), and 1 quasi-experimental study.	Systemic reviews and meta-analysis of RCTs	Findings support some evidence of the effectiveness of psychosocial interventions in addition to medications, in the treatment of opioid dependence.	Level 1	The varying interventions used affected the strength of the study outcomes.	I will use this study because it portrayed diverse treatment interventions. Addressing the opioid crisis requires multiple strategies for desirable outcomes.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 9 Kelly, Johnson & Harbison, (2016). "Pressured to prescribe" The impact of economic and regulatory factors on South-Eastern ED physicians when managing the drug-seeking patient. *Journal of emergencies, trauma, and shock, 9*(2), 58–63. https://doi.org/10.4103/0974-2700.179454	To obtain the opinions of Emergency Department (ED) physicians, practicing in the United States, about the economic and regulatory impact on managing patients exhibiting "drug-seeking" behavior.	141 Emergency department (ED) physicians	A descriptive, cross-sectional study	71% reported a perceived pressure to prescribe opioid analgesics to avoid administrative and regulatory criticism. The high emphasis placed on patient satisfaction scores impacts their pain management skills.	Level 5	Self-reporting of physicians may result in the provision of inaccurate information. The study participants were limited to ED physicians in Georgia and Florida. The potential for bias exists. .	This study seems to be on the right track but needs some modifications to prevent unnecessary opioid prescriptions due to poor patient ratings. Yes, I will use this study because it provides useful information to influence administrative guidelines and practice change. .
Article 10 Kohlbeck, Akert, Pace & Zosel, (2018). A Multistep	To evaluate provider knowledge, attitudes, and behaviors	Emergency room providers who were invited to participate in an	A multi-step approach consisting of clinicians survey, a focus	The result revealed an increase in provider knowledge about the	Level 4	Self-reporting of surveys may create issues relating to response or	Yes, I will use this study because it can be useful for health care organizations, and the states to emphasize the benefits

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Approach to Address Clinician Knowledge, Attitudes, and Behavior Around Opioid Prescribing. *WMJ: Official Publication of The State Medical Society of Wisconsin*, *117*(1), 38–41. Retrieved from https://search-ebscohost-com.ezproxy.liberty.edu/login.aspx?direct=true&db=mnh&AN=29677414&site=ehost-live&scope=site	regarding the Wisconsin PDMP before and after study interventions.	anonymous online survey.	group, and a pre- and posttests educational intervention study.	PDMP, and foster a practice change.		recall bias. Selection bias due to participation of only those physicians interested in PDMP usage or the opioid crisis.	of the PDMP to clinicians about safe prescribing practices.
Article 11 Lagisetty, et al., (2017). Primary care models for treating opioid use disorders: What actually works? A systematic review.	To use Medication-Assisted Treatment (MAT) interventions to identify program structures and processes to improve patient	Thirty-five interventions including ten RCTs and 25 quasi-experimental interventions.	Systemic review and meta-analysis	The study revealed that multidisciplinary and coordinated care delivery models are effective strategies to implement OUD treatment and increase	Level 1	The potential for bias and confounding exists because all of the studies were not randomized designs.	Yes, I will use this study because of its strong evidence to improve opioid misuse disorder through multidisciplinary coordinated quality care. It highlights the benefits of interprofessional collaboration in the care of patients with OUD.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Plos One, 12(10), e0186315.	outcomes, and guide future policy implementation in the primary care settings.			MAT access in primary care		Furthermore, studies published were limited to peer reviews, possibly omitting interventions that may be in the pilot phase or have outcomes presented through other platforms such as forums or webinars.	
Article 12 Lyapustina et al., (2017). The Contribution of the Emergency Department To Opioid Pain Reliever Misuse And Diversion: A Critical Review. *Pain*	To critically evaluate peer-reviewed articles that purposely identify the ED as a source of opioid pain relievers (OPRs).	Emergency department physicians who prescribe pain killers.	Systemic literature review	Results from the study suggest that the ED is an important contributor to both OPR misuse and diversion of oxycodone and hydrocodone.	Level 5	Only two search engines were used which resulted in the omission of data. Additionally, limited quantitative studies, make it difficult to draw firm conclusions	This is a great study, adherence to the State and hospital-based OPR prescribing guidelines can assist ED physicians to make reasonable pain management decisions and also support them in explaining their decisions to patients.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Practice, *17*(8), 1097–1104. https://doi-org.ezproxy.liberty.edu/10.1111/papr.12568						about the role of ED prescribing in opioid misuse and diversion issue. Furthermore, the type of medical provider or setting was not consistently defined.	
Article 13 McDonald, Carlson & Jalbert, (2019). An experimental test of the effectiveness of unsolicited reporting by a prescription drug monitoring program in reducing inappropriate acquisition of opioids. Pain Medicine (Malden,	To determine whether prescribers and pharmacy will reduce their prescribing pattern if they are notified about patients who "doctor shop" for opioids, through data obtained from the PDMP to	All patients receiving narcotics for more than four different Nevada prescribers and more than four pharmacies within six months. Intervention group (N = 436) or control group (N = 441).	Control trial	Findings indicate that eighty-four percent of prescribers of the intervention group discontinued prescriptions after the experiment, compared with 80.5% of the control group's prescribers-who were uninformed.	Level 3	Notification had minimal effects in both groups of patients because patients found other prescribers to continue their risky drug habits.	This study is promising but requires some modifications. The more effective use of the PDMP is to require prescribers to solicit patients' prescription histories instead of proactive notifications.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Mass.), 20(5), 944-954. doi:http://dx.doi.org.ezproxy.liberty.edu/10.1093/pm/pny095	identify these patients.						
Article 14 McGinty, et al., (2018). Protocol: a mixed-methods study to evaluate implementation, enforcement, and outcomes of U.S. state laws intended to curb high-risk opioid prescribing. Implementation Science, 13, 1. https://doi-org.ezproxy.liberty.edu/10.1186/s13012-018-0719-8	This is a mixed-methods study to evaluate implementation, enforcement, and outcomes of the United States' laws intended to restrict high-risk opioid prescribing and non-opioid treatments for chronic non-cancer pain.	Interviews with key leaders in 18 treatment states to analyze the timing, scope, and strength of each state law's implementation and enforcement	The mixed design method of qualitative analysis study	Variation in law implementation across States leads to inconsistencies. The use of the PDMP is recommended with strong guidelines. Further study is recommended for the consistency of law enforcement and outcomes.	Level 5	The IQVIA missed important data such as over-the-counter pain medications or mail-order prescriptions. Furthermore, the clinical appropriateness of pain treatments and data on non-clinical pain management such as yoga are missing.	I will use this study because it explores the state laws designed to reduce opioid prescribing patterns. Once further studies are completed the results will hopefully influence the dynamic policymaking process in various states to pass, revise, implement, and enforce laws to address opioid prescribing.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 15 Neven et al., (2016). A Randomized Controlled Trial of a Citywide Emergency Department Care Coordination Program to Reduce Prescription Opioid-Related Emergency Department Visits. The Journal of emergency medicine, 51(5), 498–507. https://doi.org/10.1016/j.jemermed.2016.06.057	Using a citywide care coordination program combined with an ED care coordination information system to reduce ED visits and decrease opioid prescriptions to patients.	165 patients with the most ED visits for complaints of pain were randomized in three ED hospitals in metropolitan Washington.	Randomized controlled trial (RCT)	This RCT showed the effectiveness of a citywide ED care coordination program in reducing ED visits and controlled substance prescriptions. PDMP data indicated that participants in the intervention group received fewer controlled substance prescriptions and pills from all prescribers than participants in the normal treatment group.	Level 2	Only ED visits made to the 3 metropolitan hospitals were measured, patients could have sought medications outside the metropolitan area. This risk is low based on PDMP data within that region. The study failed to measure patients who obtain opioids through theft, or use medications of family or friends, etc.,	This study is very impressive, it highlights the importance of technology in monitoring patients' prescription habits and aid in reducing frequent ER visits and decrease opioid prescriptions. I will use this study.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Article 16 Norwood & Wright, (2016). Promoting consistent use of prescription drug monitoring programs (PDMP) in outpatient pharmacies: Removing administrative barriers and increasing awareness of Rx drug abuse. Research in Social & Administrative Pharmacy: RSAP, 12(3), 509–514. https://doi-org.ezproxy.liberty.edu/10.1016/j.sapharm.2015.07.008	To identify barriers to PDMP use in outpatient pharmacies and determine the impact these barriers have on its utilization.	1000 outpatient pharmacists	A cross-sectional study design	The results revealed that outpatient pharmacists were 10 times more likely to report using the (PDMP) INSPECT if they were extremely concerned with prescription drug abuse as compared to those who were not concerned at all.	Level 5	The study was conducted in only one state, and therefore cannot be generalized. The response rates of the survey were also low which can lead to bias.	Yes, I will use this study to help develop strategies to improve the utilization of PDMPs and explore innovative ways to limit barriers and increase outpatient pharmacists' awareness of prescription drug abuse and misuse within the community.
Article 17	To evaluate the practicality of an educational	Internal medicine residents	Pre and post-test	The implementation of this educational intervention was	Level 4	Only students at one program studied. The	A very good study to implement in all medical programs to nurture appropriate opioid prescribing skills

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Raheemullah, Andruska, Saeed, & Kumar, (2020). Improving residency education on chronic pain and opioid use disorder: Evaluation of CDC guideline-based education. Substance use & Misuse, 55(4), 684-690. doi:http://dx.doi.org.ezproxy.liberty.edu/10.1080/10826084.2019.1691600	program to assess opioid-prescribing practices and pain management skills of residents without faculty involvement.		interventional study design.	practical. Surveys indicated an improvement in residents' confidence in detecting and managing addiction and improved prescribing practices and adherence to CDC recommendations.		number of participants and their year of study not mentioned. This can also be extended to other programs.	and adherence to national prescription guidelines. I will use this study.
Article 18 Rhodes et al., (2019). The effectiveness of prescription drug monitoring programs at reducing opioid-related harms and consequences: a	To determine the effectiveness of PDMP in reducing opioid-related harms and consequences,	22 studies (49 PDMPs)	A Systemic Review	No evidence was found to strongly support the overall effectiveness of PDMPs in reducing opioid-related consequences and harms. However, they act as a reminder to physicians to use	Level 5	Diverse study types result in inconsistent results. Review of literature conducted in 2014, more recent	Yes, I will consider this study because it can trigger further investigation and development of the PDMP as an evidence-based tool to help combat the opioid crisis.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
systematic review. *BMC Health Services Research*, *19*(1), 784. https://doi-org.ezproxy.liberty.edu/10.1186/s12913-019-4642-8				caution when prescribing opioids.		information could be omitted.	
Article 19 Strand, Eukel & Burck, (2019). Moving opioid misuse prevention upstream: A pilot study of community pharmacists screening for opioid misuse risk. Research in Social & Administrative Pharmacy, 15(8), 1032–1036. https://doi-org.ezproxy.liberty.e	To design the Opioid Misuse Risk Prevention Toolkit and then evaluate its use by implementing it in community pharmacy practice sites.	Eleven pharmacists trained to use the opioid misuse toolkit which was implemented afterward in their community to screen all patients receiving prescription opioids for opioid misuse behaviors through the PDMP.	Pilot study	Participating pharmacists expressed a preference for this toolkit as an objective measurement of potential opioid misuse than sole reliance on professional judgment. The study also revealed that 26% of individuals receiving opioid prescriptions were identified as showing some risk of misuse and 30% at risk of an accidental overdose.	Level 4	This pilot project has no statistical weight, therefore, results should be viewed from a qualitative perspective. Selection bias is possible due to the convenience sampling of patient-participants. A recall bias also exists since this is a self-reported tool and a	The report of this case study demonstrated the utility and the feasibility of opioid misuse risk screening at the community pharmacy level and in enhancing conversations between patients and pharmacists.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
du/10.1016/j.sapharm.2018.07.011						possibility of response bias due to insincere responses from patients.	
Article 20 Turner, Caetano & Tannenbaum, (2019). Leveraging policy to reduce chronic opioid use by educating and empowering community-dwelling adults: a study protocol for the TAPERING randomized controlled trial. Trials, 20(1), N.PAG. https://doi-org.ezproxy.liberty.edu/10.1186/s13063-019-3508-z	To test the efficiency of a population-based, wide-scale, government-led direct-to-patient educational pamphlet (intervention arm) to decrease chronic opioid use among adults in the community compared to usual care (control arm).	Chronic opioid users across Manitoba	A prospective, cluster-randomized, parallel-arm controlled trial.	This fosters communication between patients and providers about their opioid use and alternative pain treatments. Furthermore, a reduction in inappropriate prescriptions of sedative-hypnotic and non-steroidal anti-inflammatory drugs (NSAID) was evident. Results from this trial will serve as a guide for future use in the community.	Level 2 ·	Information on the indication of drug use was missing for some medications. Possible selection bias due to faulty participant identification process. Codeine and tramadol were excluded as opioids and can be considered safe, potentially leading to increased	Yes, this seems like a promising intervention to address the opioid crisis. A good study for implementation into practice.

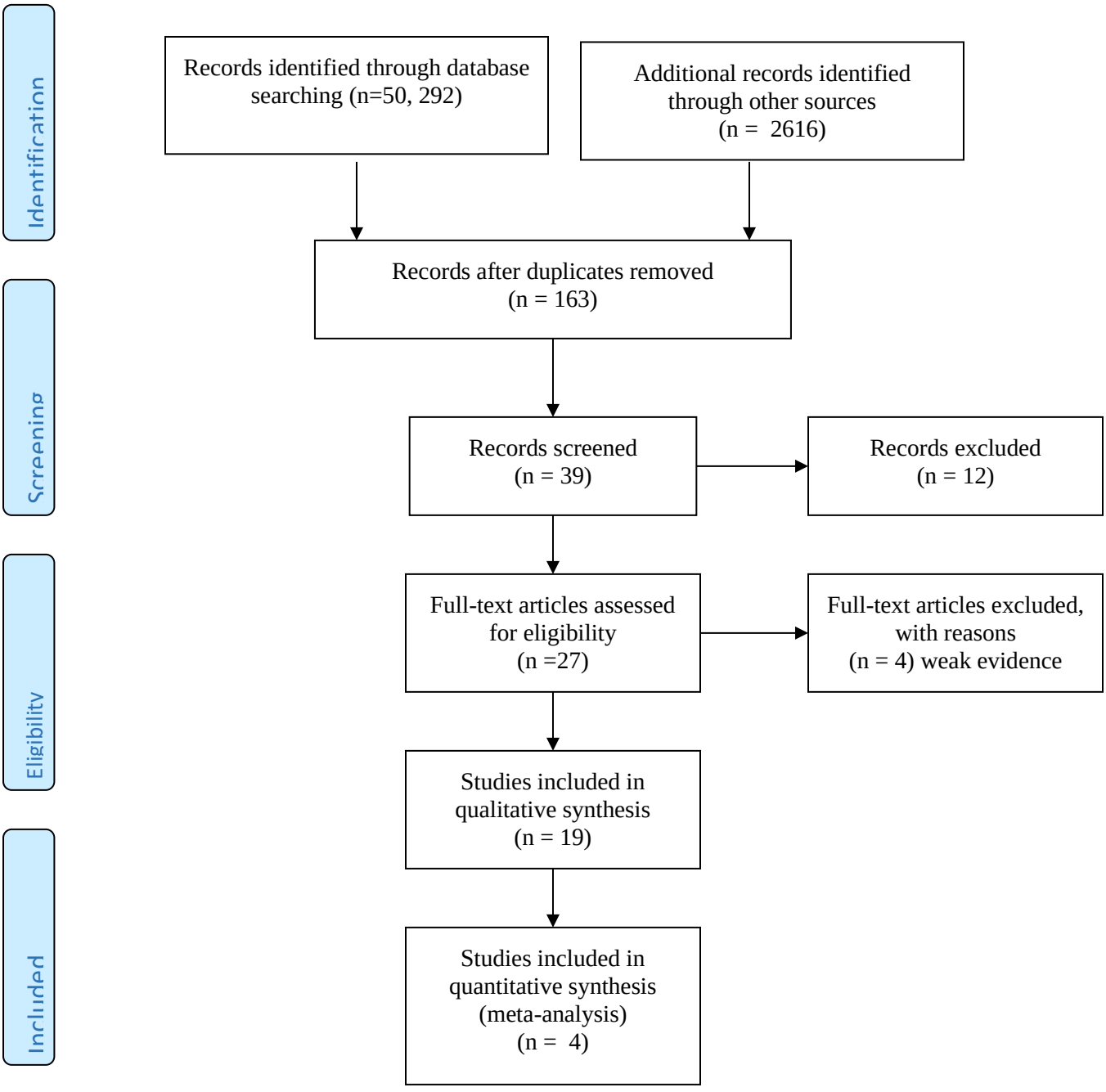
Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
						prescription and overdose.	
Article 21 Wilson, et al., (2019). The utility of a statewide prescription drug-monitoring database vs the Current Opioid Misuse Measure for identifying drug-aberrant behaviors in emergency department patients already on opioids. The American Journal of Emergency Medicine, 158250. https://doi-org.ezproxy.liberty.e	To compare the PDMP and the Current Opioid Misuse Measure (COMM), a commonly-recommended screening tool in detecting drug-aberrant behaviors in patients currently on opioids at the time of their ED visit.	Patients on opioids who were enrolled prospectively in a mixed urban-suburban ED seeing.	A prospective study	The study reveals that the PDMP by itself is a more useful screening instrument than either the COMM or combination of both for patients already taking opioids at the time of their ED visit	Level 4	The PDMP misses a majority of patients with documented drug-aberrant behaviors in the EMR, and should not be used in isolation to justify whether a particular opioid prescription is appropriate.	Yes, I will use this study because it identifies PDMP as a strong screening tool for opioid misuse behaviors.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
du/10.1016/j.ajem.2019.05.035							
Article 22 Yang, Xu & He, (2018). Efficacy and feasibility of opioids for burn analgesia: An evidence-based qualitative review of randomized controlled trials. *Burns, 44*(2), 241-248. doi:10.1016/j.burns.2017.10.012	To assess the literature regarding the effectiveness and side effects of opioids both in adult and pediatric burn patients.	Adult and pediatric patients with burns.	A systemic review of RCTs	The results revealed that topical morphine application alleviates burn-related pain and anxiety. Opioid-related side effects also decreased over time.	Level 1	Results from a small sample size in the trials are not strong enough to convince. Also, most of the RCTs were over ten years old and may have lacked updated information.	Yes, I will use this study because the results of the study are the intended outcome however, increased sample size and review of current literature will provide more convincing results.
Article 23 Young, Crausman & Fulton, (2018). Suboptimal opioid prescribing: A practice change project. *Rhode Island*	To limit opioid prescribing in urgent care settings, focusing on the treatment of acute pain.	14 physicians in four privately owned urgent care centers	A Pilot study	An immediate decline was noted in the average number of opioid prescriptions written per provider per week throughout the pilot.	Level 4	This is a Pilot study; prescribers can go back to unsafe prescribing practices after the study end.	Yes, I will use this study because it made a connection between increased prescribing and increased opioid addiction. Furthermore, it highlighted the use of prescribed opioids and heroin which is troubling and warrants immediate intervention.

Article Title, Author, etc. (Current APA Format)	**Study Purpose**	**Sample (Characteristics of the Sample: Demographics, etc.)**	**Methods**	**Study Results**	**Level of Evidence (Use Melnyk Framework)**	**Study Limitations**	**Would Use as Evidence to Support a Change? (Yes or No) Provide Rationale.**
Medical Journal (2013), 101(2), 41.						Provider awareness and education is the key.	

Appendix B

PRISMA 2009 Flow Diagram



Appendix C

IRB Exemption Email

From: irb@liberty.edu <irb@liberty.edu>

Sent: Friday, May 29, 2020 2:38 PM

To: Georgestone, Claudia <cgeorgestone@liberty.edu>; Sanders, Lynne Shurbet (Doctoral Nursing) <lsanders@liberty.edu>

Subject: IRB-FY19-20-407 - Initial: Initial - Non-Human Subjects Research

May 29, 2020

Claudia Georgestone

Lynne Sanders

Re: IRB Application - IRB-FY19-20-407 The efficient use of the PDMP for increased reporting of opioid misuse

Dear Claudia Georgestone, Lynne Sanders:

The Liberty University Institutional Review Board (IRB) has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study does not classify as human subjects research. This means you may begin your research with the data safeguarding methods mentioned in your IRB application.

Decision: No Human Subjects Research

Explanation: Your study is not considered human subjects research because it will not involve the collection of identifiable, private information.

Please note that this decision only applies to your current research application, and any modifications to your protocol must be reported to the Liberty University IRB for verification of continued non-human subjects research status. You may report these changes by completing a modification submission through your Cayuse IRB account.

If you have any questions about this determination or need assistance in determining whether possible modifications to your protocol would change your application's status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP

Administrative Chair of Institutional Research

Research Ethics Office

Appendix D

Collaborative Institutional Training Initiative (CITI) Certificate 1

CITI PROGRAM

Completion Date 01-Nov-2019
Expiration Date 31-Oct-2022
Record ID 34013625

This is to certify that:

Claudia Georgestone

Has completed the following CITI Program course:

Biomedical Research - Basic/Refresher (Curriculum Group)
Biomedical & Health Science Researchers (Course Learner Group)
1 - Basic Course (Stage)

CITI
Collaborative Institutional Training Initiative

Under requirements set by:

Liberty University

Verify at www.citiprogram.org/verify/?w5a3d0376-81a7-4419-8cb9-ab8ceea517f7-34013625

CITI Certificate 2

CITI PROGRAM

Completion Date 03-Nov-2019
Expiration Date 02-Nov-2023
Record ID 34013626

This is to certify that:

Claudia Georgestone

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Biomedical Responsible Conduct of Research (Curriculum Group)
Biomedical Responsible Conduct of Research (Course Learner Group)
1 - RCR (Stage)

Under requirements set by:

Liberty University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wf92b9eca-b818-4970-8274-fcc8c17aeb87-34013626

CITI Certificate 3

CITI PROGRAM

Completion Date 01-Nov-2019
Expiration Date 31-Oct-2023
Record ID 34013627

This is to certify that:

Claudia Georgestone

Has completed the following CITI Program course:

CITI Conflicts of Interest (Curriculum Group)
Conflicts of Interest (Course Learner Group)
1 - Stage 1 (Stage)

CITI
Collaborative Institutional Training Initiative

Under requirements set by:

Liberty University

Verify at www.citiprogram.org/verify/?w31397f60-2577-4341-853c-05cb69680b58-34013627