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Nursing Students' Knowledge and Attitudes About Pain Management and Opioids

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NURSING STUDENTS' KNOWLEDGE AND ATTITUDES

ABOUT PAIN MANAGEMENT AND OPIOIDS

by

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ABSTRACT

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Statement of the problem: healthcare professionals' knowledge of using opioids for pain management safely is critical in preventing opioid abuse and overdose. Undergraduate curricula of health professional schools, including undergraduate nursing programs, need to improve and adopt a comprehensive education regarding this issue.

Method: the first project was a systematic analysis of the literature regarding the educational interventions' impact on healthcare professional knowledge and practice behavior regarding prescription opioids. The second project was a qualitative study of nursing students to explore their experience, self-efficacy, and knowledge of prescription opioid use for pain management and whether they feel the need for more educational opportunities on this topic. The third project implemented and assessed an educational module on undergraduate nursing students' knowledge and attitudes regarding prescription opioids.

Results: the first project showed that an educational intervention on using opioids for pain management positively impacts providers' knowledge and practice behavior. The second project found that nursing students had limited knowledge and low self-efficacy regarding using opioids for pain management and preferred to receive a comprehensive education. The third project showed that the educational module improved nursing students' knowledge, attitudes, perceived behavioral control, and intention about prescription opioids for pain management. Students reflected positively on the module.

Conclusion: in this dissertation, the need for comprehensive education for healthcare professional students on using opioids for pain management is detected. Educational interventions have a positive impact on healthcare providers' knowledge regarding using opioids for pain management. Undergraduate nursing students benefited from the educational module on prescription opioids and preferred to include a similar module in their undergraduate curricula.

I would like to dedicate this dissertation to my beloved family. I wish to offer many thanks to every one of them to support and understand my situation for the past few years and beyond. My dear Mojtaba, if anyone is looking for a living example of a great companion and life partner, that would be you. Your insight, love, and support made everything seem easy. You helped me reach my goals and feel hopeful during my educational period and throughout our shared life together. Your love, my kids' beautiful smile, my parents' prayers, and siblings' encouragement gave my heart the warmth and my mind the strength to go on. I would always appreciate you all and would not take anything for granted.

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CHAPTER I

INTRODUCTION

BACKGROUND

Prescription opioid misuse is a significant health issue in the United States. There is an increasing rate of death from 1999 to 2018, due to overdose on prescription opioids in the US (National Center for Health Statistics, 2020). Almost 200,000,000 opioid painkillers were prescribed by American providers in 2017. Among patients who receive long-term opioids, about 25 percent will face addiction to opioids (Boscarino et al., 2010; Centers for Disease Control and Prevention, 2018). The overdose mortality rate due to opioids, including prescription opioids as well as heroin and synthetic opioids, is ever rising (CDC, 2020).

Promoting safe practice regarding pain management by opioid painkillers is a preventive step toward tackling the opioid crisis. The Centers for Disease Control and Prevention (CDC) Guideline for Prescribing Opioids for Chronic Pain is an effort to reduce the misuse of opioid painkillers. Nurses play a critical role in patients' pain management plan and reducing the rate of opioid misuse among patients (Costello & Thompson, 2015). It has been concluded that empowering nurses by enhancing their knowledge and skills for managing pain could be one of the most critical preventive steps necessary to control the opioid crisis (Abdalrahim et al., 2011).

The prescription rate for opioids varies across the United States and is not consistent with the health problems of the local population who receive them (CDC, 2014). The inconsistency of prescription rates is unexplainable and implies the need for uniform practice behaviors regarding pain management. Some providers have issues such as feeling unconfident with their pain management approach that causes either inadequate prescribing painkillers or choosing unnecessary medication such as opioids.

The lack of an integrated approach to opioid therapy and related education in the nursing and medical programs is likely the reason for the high number of mismanaged patients with pain (International Pain Summit of the International Association for the Study of Pain, 2011). The inconsistent educational approach in different schools and insufficient emphasis on the available resources and guidelines might contribute to this issue.

To integrate the healthcare profession schools' curricula on pain management and use of opioids, the educators could include the valid and reliable information that is available to them, such as the CDC recommendations on opioid therapy in the curriculum of different disciplines, including nursing programs. The CDC has developed guidelines for improving opioid prescription behaviors among providers and reducing the rates of medication misuse and opioid overdose. The recommendations of these guidelines do not apply to cancer pain or end of life pain management (CDC, 2017). Active cancer pain management and end-stage cancer palliative care routinely use opioids. For instance, Methadone has been one of the best choices for cancer pain management because of its effectiveness for severe pain (Mercadante & Bruera, 2017). The CDC guideline could help providers to improve their practice regarding chronic non-cancer pain management.

The CDC's recommendations are grouped into the following areas: "1. determining when to initiate or continue opioids for non-cancer pain; 2. opioid selection, dosage, and duration; follow-up and discontinuation; and 3. assessing risk and addressing harms of opioid use" (Dowell et al., 2016). Based on the CDC's guidelines, healthcare providers should make sure that they start pain management with non-opioid medication unless they are confident that their patients would benefit from an opioid painkiller. They also need to choose the lowest dose possible and preferably choose immediate-release opioids instead of long-acting types. The

healthcare providers should check the patients' health records and check for risk factors for opioids misuse, such as a positive history of mental health disorders, alcohol and substance abuse, concurrent opioid medications, and other medications such as benzodiazepine, which could interact with opioids to increase the potential risk of overdose. The healthcare providers are also encouraged to perform a periodic urine test while they have their patients on opioids and have a clear plan to discontinue opioids and treat drug misuse disorder or overdose if needed. Patients need to receive all the necessary information about the benefits and complications of opioids before starting their regimen (Dowell et al., 2016).

STATEMENT OF THE PROBLEM

A review of opioid prescribing guidelines underscores the need for more research on safe and effective medication plans for non-cancer pain (Barth et al., 2017). Weimer, Hartung, Ahmed, and Nicolaidis (2016) conducted a study about the effectiveness of the guidelines regarding opioid prescription, by comparing the dosage of prescribed opioids one year before and one year after adopting the guidelines among a few practitioners. The study suggests that after adopting the recommended guidelines, the average opioid doses prescribed for patients declined. Weimer et al. (2016) show the positive impact of gaining knowledge of the guidelines and adherence to the recommendations on the health professionals' practice, as well as their patients' outcomes.

Graduates of medical and nursing schools are the key players in prescribing and administering medication. They have a critical role in patient pain management in any clinical setting. The International Association for the Study of Pain (IASP, 2011) has stressed the need for improving the undergraduate curricula for health professionals, which underscores the

importance of undergraduate education on pain management. Pain as a subject has not received adequate attention in undergraduate nursing or medical curricula and needs improvement (Institute of Medicine Report from the Committee on Advancing Pain Research, Care, and Education, 2011; Watt-Watson, 2004). A small number of studies have examined the existing pain curricula in different disciplines (Briggs et al., 2011). Most of these studies concluded that pain education varies among different schools. Valid measures are necessary to evaluate the effectiveness of current pain education on knowledge, attitudes, and perceptions of medical and nursing students (Ung et al., 2016).

Nurses are in a vital position to reduce the incidence rate of prescription opioid misuse and possible overdose. Pain assessment and reporting to practitioners, administration of "as-needed" opioid painkillers, patients education regarding the side-effects and disposal of unused medicine, and tracking patients medication are some of the possible ways that nurses could have an impact on pain management, especially the opioid crisis (Manworren, & Gilson, 2015). Nurses could influence prescribers regarding the medication prescribed. Teamwork and collaboration between nurses and physicians are key points to assure patients' safety and appropriate outcome (Reeves et al., 2013).

The main reason for the lack of knowledge of pain management among healthcare professionals may have a relationship with the time and the mode of teaching the topic of pain management in their schools' curricula. In nursing programs, pain and pain management are often addressed across different subjects in the context of other topics. For instance, pain may be taught in pathophysiology or in nursing pharmacological therapeutics content. This fragmentation and multidisciplinary format not only makes the evaluation of the students' knowledge more challenging but may lead to gaps in delivering specific pain management

material in their educational curricula. This issue emphasizes the need for an independent and standard subject of pain management in the medical and nursing schools (Ung et al., 2016).

PURPOSE OF THE STUDY

Although there have been many efforts to prevent opioid misuse disorder and overdose mortality, the rates of these issues are still high. One of the most important preventive steps starts at the providers' level when the opioids are allocated to the patients. There are many nurses in the US that are actively involved in the patients' care plan. Due to the nurse's role in pain management, the sufficiency of the content included in the undergraduate curriculum regarding this topic is critical. Including information on opioid therapy and recommended guidelines such as the CDC guideline in undergraduate disciplines like nursing programs could impact their strategies for opioid therapy and patient safety.

The overarching purpose of this dissertation was to explore whether educating healthcare professionals, including nurses, about the guidelines and available resources for pain management and opioid use would help them to gain knowledge that could impact their practice behavior and patient outcomes.

The first project was a systematic review of all educational interventions regarding opioid painkillers targeting healthcare professionals in the US. The results highlighted the positive impact of such interventions on the providers' knowledge of implementing opioids safely. The review also showed that no study had targeted nursing students at the undergraduate level. The last point underscored a need for a study that targets undergraduate nursing students.

The second project was qualitative research regarding nursing students' knowledge and self-efficacy of pain management and opioid use. The study explored the students' knowledge of

available guidelines for opioid prescriptions, specifically the CDC guideline. It also assessed their pain management skills and their reflection on whether they believe there is a need for a comprehensive education in nursing school or not. The teaching mode of pain management and opioid pain relievers in the undergraduate nursing curriculum was explored, which underscored the need for an educational intervention about pain management and using opioids (the third project). The result of this study guided the third project and helped to design a survey questionnaire.

The third project focused on the nursing students' knowledge and attitudes on pain management and the importance of having knowledge and adhering to the CDC's guidelines to prevent opioid prescription misuse and overdose. An educational module teaching the CDC Guideline for Prescribing Opioids for Chronic Pain and a video called "A Nurse's Call to Action for Safer Opioid Prescribing" that emphasizes the nurses' role in pain management was completed by prelicensure undergraduate nursing students. The impact of the module on the students' knowledge and attitudes was measured. The study explored the students' feedback and reflection on the module.

GAP IN THE LITERATURE

Not many studies have evaluated the overall knowledge and attitude of nursing students and nurses about pain management. The literature indicates that there is a need to develop specific strategies to effectively teach undergraduate and graduate nursing students about all the aspects of pain management. This could be a necessary step to improve patients' outcomes and satisfaction (Latchman, 2014). The studies that have conducted educational interventions

regarding prescribing opioids for pain management have mainly targeted medical students and practitioners. The nursing students' knowledge of the CDC's guideline has not been measured.

This project is innovative since it acknowledges the critical position of nurses in patients' pain management and would evaluate the nursing students' knowledge and attitudes regarding the CDC's guidelines and its recommendations to avoid medication abuse and overdose by patients complaining of non-cancer chronic pain. The study is instrumentally innovative too. The instrument used for this study has not been used before.

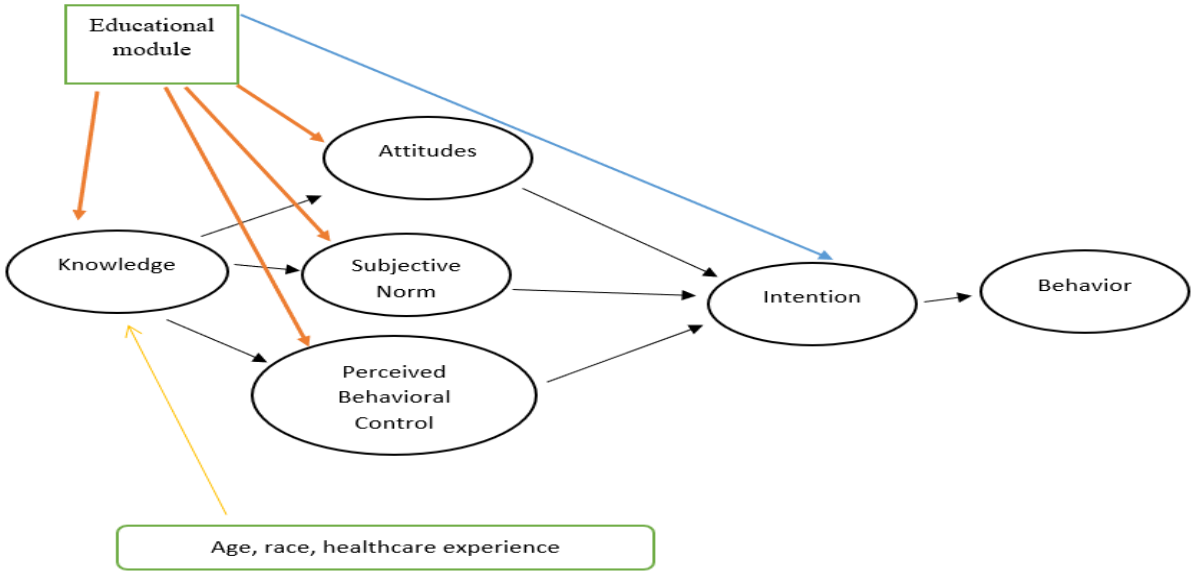
THEORETICAL FRAMEWORK

The theoretical constructs of the third project of this dissertation are adopted from the Theory of Planned Behavior (TPB). TPB constructs include attitudes, subjective norms, and perceived behavioral control, as the determinants of intention and behavior (Ajzen, 2010). Attitudes towards a behavior include the affective and instrumental beliefs regarding the behavior. Affective beliefs are based on the person's emotion and self-evaluative ideas, while the instrumental beliefs are based on the possible benefits or barriers. Attitudes could be positive or negative (Ajzen, 1991). Perceived behavioral control, which is the perceived ease or difficulty of performance, refers to two sub-constructs. One is the control beliefs regarding the behavior, and the other is perceived power. Subjective norms construct has two components of normative beliefs and motivation to comply. This construct refers to the others' beliefs and expectations from the individual to perform (Ajzen, 1991). All the constructs of TPB could predict the intention to manage pain using opioids among providers. TPB has been identified as one of the most reliable theories explaining healthcare professionals' intention to treat pain (Godin et al., 2008). The constructs of TPB have provided a significant explanation regarding practice

behavior among practitioners. Nurses' attitudes and perceived norms have had a significant impact on their intention to perform pain assessment and management. Each one of the TPB constructs directly predicted the intention to treat pain in patients (Youngcharoen et al., 2016). Weber et al. (2011) studied paramedics' intention to administer morphine for pain management and noticed that TPB constructs, mainly subjective norms, are strong predictors of intention to use morphine. Knowledge could influence the attitudes, subjective norms, and perceived behavioral control, which all could impact the intention to manage pain using opioids.

This research evaluated the impact of an educational module that informs the nursing students of the CDC Guideline for Prescribing Opioid for Chronic Pain and nurses' role in pain management on the students' knowledge, attitudes, subjective norms, perceived behavioral control, and intention regarding pain management and opioid use. Demographic factors of age, race, and having healthcare experience outside the nursing program were considered as moderators that could impact knowledge. Based on the TPB, improved attitudes, subjective norms, and perceived behavioral control could impact the intention of the students in their future practice to manage pain in an informed and safe manner. The intention could impact behavior, which was not evaluated in this study but could be a part of the long-term goals. Figure 1 shows the schematic of the theoretical framework that was used for this study.

Figure 1. Theoretical Model Adopted from TPB (Ajzen, 1991)



RESEARCH QUESTIONS, HYPOTHESES, AND AIMS

First Project

Research question 1: Do educational intervention enhance healthcare providers' knowledge and practice behavior regarding pain management using opioids?

Aim1. To review the impact of educational interventions on providers' knowledge and practice behavior regarding pain management using opioids.

Hypothesis 1: Educational interventions have positive impacts on healthcare providers' knowledge and practice behavior regarding pain management using opioids.

Second Project

Research question 2a: How are nurses trained to address pain management and opioid use?

Aim 2a. To explore how nursing students are trained for pain management and opioid use

Hypothesis 2a: Nursing students do not have the opportunity to receive a comprehensive education regarding pain management and opioids use in nursing school.

Research question 2b: Do nursing students have knowledge of pain management guidelines, and specifically the CDC guideline?

Aim 2b. To examine the nursing students' knowledge about the CDC pain management guideline using opioids.

Hypothesis 2b: Nursing students do not have knowledge of the CDC guideline for pain management using opioids.

Research question 2c: How confident are the nursing students in their skills to manage pain?

Aim 2c. To explore nursing students' confidence level regarding their pain management skills.

Hypothesis2c: Nursing students do not feel confident in their pain management skills.

Third Project

Research question 3a: Do undergraduate nursing students have knowledge of the CDC guideline for prescription opioids?

Aim 3a. To determine the baseline of knowledge and attitudes of undergraduate nursing students regarding the CDC guideline for prescription opioids

Hypothesis 3a: Nursing students do not have knowledge of The CDC guideline for prescription opioids.

Research question 3b: Does an educational module positively impact the nursing students' knowledge and attitudes on using opioids?

Aim 3b. To evaluate the impact of an educational module, the CDC Guideline for Prescribing Opioids for Chronic Pain, and nurses' role in pain management, on nursing students' knowledge and attitudes about using opioids for pain management.

Hypothesis 3b: After completing an educational module on opioid use, nursing students will have improved knowledge and attitudes about pain management using opioids.

Research question 3c: Do nursing students believe that the educational module on opioids has had any impact on their confidence level and future practice regarding using opioids for pain management?

Aim 3c. To explore the students' reflection on the educational module's impact on their confidence level and future practice regarding using opioids for pain management.

Hypothesis 3c: The students will reflect positively about their experience and believe that the educational model has positively impacted their confidence level and future practice regarding using opioids for pain management.

LIMITATIONS

First Project

The first limitation of the systematic review project was that among the reviewed studies, the long-term impact of interventions was not measured. The review could not determine which intervention method was more effective. Another limitation was that the studies chose different information regarding the topic. Although all materials were related to opioid painkillers, no two interventions were quite similar.

Second Project

The main limitation of the qualitative study was the small number of the participants with different experience levels from one local nursing school. Increasing the participants number and including students from other nursing schools would add to the trustworthiness of the results. Another limitation of this study was the small number of the participants with experience of working in different types of settings such as educational clinics or private and non-educational companies. It would be possible to be more confident about the saturation of the data and diversity of the results due to the environment of work if there was a higher number of participants with different practical experiences

Third Project

One limitation is that the study sample is small, which limits the generalizability of the results. Another issue with the small number of participants is with the questionnaire's reliability test that would not be recommended to conduct for small sample sizes.

The other limitation is that the study included only the students from one institution, which could limit the generalizability of the results. It would be preferable to include students from other nursing schools at the local, state, or national level to make the generalization of the results more possible.

The last limitation is that the participants' behavior (practice behavior) was not evaluated in this study. The theoretical constructs' impact on the behavior is often missed in the studies that apply the Theory of Planned Behavior.

CHAPTER II

ARTICLE I

ABSTRACT

Purpose: To review educational interventions' impact on providers' knowledge regarding pain management and opioid painkillers. Methodology: The literature search took place in January 2018 using three search engines of PubMed, Cochrane, and Psychinfo. The search included articles between the years 2008–February 2018. The keywords consisted of "prescription opioids," "pain," "education," and "practitioners (all fields such as physicians, nurse practitioners, e.g.). The inclusion criterion was conducting an educational intervention regarding pain management and opioids. The exclusion criteria were not having a target population of healthcare providers or the study had taken place outside the US. The articles assessment tool was a modified version of the Critical Appraisal Skills Program (CASP) criteria for cohort studies. Findings: After reviewing the title of possible publications, 505 prospective articles were found. After full review (the title, abstract, and full text) of all, fifteen published articles were included. All studies reported improved the outcome of providers' knowledge. Summary: educational interventions for providers are helpful steps for prescribing opioids safely. Conclusions. The review demonstrates the positive impact of an educational intervention on the health professionals' knowledge and practice behavior regarding pain management and opioids and the need for similar opportunities. Recommendations: educating healthcare professionals about guidelines such as the CDC's could help to prevent opioid abuse.

INTRODUCTION

Prescription opioid misuse has been identified as a health crisis in the US. In 2018, more than thirteen thousand hospital visits were related to drug overdose, among which more than seven thousand were due to opioid overdose (Virginia Department of Health, 2018). The total "economic burden" of this problem in the US is $78.5 billion a year (Florence et al., 2016). According to the Centers for Disease Control and Prevention (CDC) (2019), about 11% of adults in the US experience daily pain, and millions of them are treated with prescription opioids. About 21 to 29 percent of patients who receive prescription opioids to manage their chronic pain will misuse them (Vowles et al., 2015). Among the population who misuse their prescribed opioids, about 12 percent will struggle with an opioid use disorder (Muhuri et al., 2013).

Furthermore, prescribing opioid pain relievers to individuals diagnosed with opioid use disorders may increase the risk of relapse and overdose (Stein et al., 2017). The mortality rate due to drug overdose in all populations in the US is rising. In 2016, about 66% of the drug overdose deaths were related to opioids. Among the opioids related deaths, about 40% of the mortalities are due to prescription opioid overdose (CDC, 2020).

To prevent drug misuse and overdose, the CDC has suggested a guideline that helps the healthcare providers take the necessary measures for patient's safety when treating pain by prescribing opioids. A state-based database called the Prescription Drug Monitoring Program (PDMP) stores patients' prescribed medication information. Utilizing this data could help practitioners and pharmacists to avoid multiple opioid prescriptions or possible dangerous drug interactions such as overdose due to concurrent benzodiazepines and opioids.

Some studies have noted that adopting the recommended guidelines could reduce the average opioid dosage prescribed for patients, but providers' knowledge of the guidelines can

vary. For instance, opioid prescribing providers in Washington State who did not adhere to any guideline felt concerned regarding opioid use for pain, however those affiliated with opioid prescribing guidelines were feeling more confident about their practice and prescription opioids (Franklin et al., 2013).

Chen et al. (2016) noted that, although there is pressure to familiarize the providers with opioid prescribing guidelines for pain management, evidence shows that only knowledge about the guidelines does not always produce a positive impact on providers' practice behavior.

Primary care providers (PCPs) prescribe most of the opioid painkillers dispensed for non-cancer chronic pain, but only a few primary care practitioners follow the suggested guidelines(Lasser et al., 2015). Chronic pain management training only exists in about half of family medicine programs (Schiel Zoberi et al., 2016). Providers believe that treatment of pain by using opioids is challenging, and they feel the need for more training (Porucznik et al., 2013). There are some online educational programs for pain management with opioids available to healthcare providers to enroll in as part of their continuing medical education (SAMHSA, n. d.). There is a growing focus for more comprehensive education regarding pain management in medical students and residents training, but educational interventions remain considerably variable (Barth et al., 2017). Medical schools, residency programs, and others have different approaches to training their students about pain management and opioid use, highlighting the need for additional, more standardized education for healthcare providers. Comprehensive education on opioid painkillers' topic might improve providers' practice behavior and the patient's outcome.

This systematic review will assess whether an educational intervention has any impact on the healthcare provider's knowledge and attitudes towards pain management using prescription

opioids. Enhancement of providers' knowledge and practice behavior due to a comprehensive education could indicate the need for global education for all healthcare workers.

METHODS

The literature search included the papers between the years 2008-2018, and was started in January 2018 and finished March 2018, using three search engines of PubMed, Cochrane, and Psychinfo. The keywords consisted of "prescription opioids," "pain," "education," and "healthcare professionals each separately as: healthcare providers, practitioners, doctor, nurse, physician, physician assistant, dentist, or pharmacist." The primary selection was based on the title and abstract relevance to the topic. Using the Endnote reference manager, the duplicated articles were removed. Conducting an educational intervention (lectures, workshops, e g.) for healthcare providers in the US which covers prescribing opioid painkillers usage in pain management was the inclusion criterion. The exclusion criteria were not having a study population of healthcare providers or the study had taken place outside the US. The secondary selection was conducted by reviewing the contents of full text, considering the exclusion criteria, and the relevance to the topic and inclusion criteria. All other studies were excluded.

The first author made the articles' search and selection, and quality assessment was done by the two authors independently. The assessment tool was a modified version of the Critical Appraisal Skills Program (CASP) criteria for cohort studies (Critical Appraisal Skills Programme Cohort Study Checklist, n.d.). The modification point was to simplify the scoring process and fit the studies included in this review, and the answers to the questions were chosen as "yes" or "no." The modified assessment questions are included in Table 1. The maximum possible assessment score was 12. The assessment scores by the two authors were quite similar.

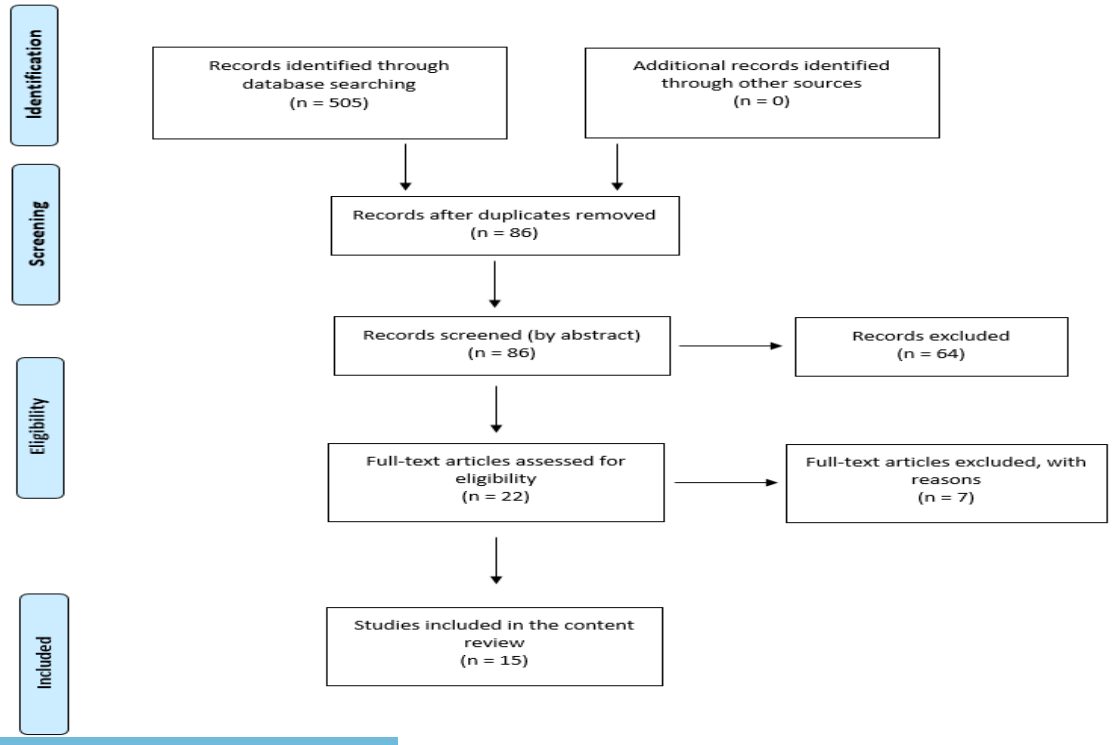
The summary of the process is demonstrated in Figure 2, which exhibits the Prisma flow chart (Moher et al., 2009)

Table 1. Articles Assessment Questions for the Scoring

Question	Yes	No
1. Did the study address a clearly focused issue?		
2. Was the cohort recruited in an acceptable way?		
3. Was the exposure accurately measured to minimize bias?		
4. Was the outcome accurately measured to minimize bias?		
5. Have they taken account of the confounding factors in the design and/or analysis?		
6. Was the follow up of subjects complete enough?		
7. Was the follow up of subjects long enough?		
8. Are the results precise?		
9. Do you believe the results?		
10. Can the results be applied to the local population?		
11. Do the results of this study fit with other available evidence?		
12. Are the implications of this study clear for practice?		

Note: The Maximum Possible Score is 12

Figure 2. The Summary of the Article Selection Process



RESULTS

During the first review, five hundred and five articles were found through different combinations of the keywords. Through reading the titles or abstracts among 505 articles, sixty-four articles that did not have the study population of healthcare providers or did not meet the inclusion criteria were excluded (Figure 2). Since the study aims to evaluate the impact of further education on American healthcare providers' knowledge of the available guidelines to manage pain using opioids, seven articles conducted outside the US were excluded through reviewing the full text. In the end, fifteen articles were used in this review. The range of scores was 9-12, with an average of 10.

Most of the studies implemented a combination of live interactive workshops or lectures while offering extra resources to the participants. A few studies had the option of participating in an online module or a live session. The mode of the intervention is categorized in Table 2.

Table 2. Type of Educational Interventions Methods on Prescribing Opioid

Educational Intervention Category	Number of Articles
Lecture/Workshop	5
Books/Online Resources	2
Combination of Lecture/Workshop & Online Resources	8
Total	15

Data extraction was completed for each selected paper, and the following variables were recorded, including the study population, type of intervention, and the main result. The summary of the results is available in Table 3.

Table 3. Summary of the Data Extraction

Type of intervention(s)	Author, Year	Study population	Results
Educational presentations	Cochella & Bateman, 2011	Primary care physicians and health care providers	Death rate due to accidental opioid overdose dropped. Providers' prescription behavior changed regarding following recommendations
Book (physicians' guide)	Young et al., 2012	Physicians	Most physicians, especially primary care practitioners were likely to follow the pain management guidebook
Interactive didactic lectures	Brown et al., 2013	Internal medicine and transitional year residents and medical students enrolled in internal medicine	Improved knowledge of addiction and pain management using opioids
A combination of lectures, case reports, journal clubs, and decision support tool for electronic health record	Guglemann et al., 2013	Physicians, residents, nurse practitioners, and nurses	A drop in the prescription opioids' rate especially for patients with a history of dependency
Training and providing protocols (electronic medical record-based) and instructions	Canada et al., 2014	Internal medicine interns, Primary care residents, attending physicians, nurse practitioners	Providers adherence to the guidelines improved, providers' knowledge and attitude improved, decreased number of opioid prescriptions
Live and online educational program	Alford et al., 2016	Clinicians who manage chronic pain	Improvement in clinicians' knowledge, confidence, attitude, and practice
Guidelines distributed through emails or at mandatory meetings presentation, and social marketing	Chen et al., 2016	Internal medicine residents and faculties, family medicine faculties	Decreased opioid prescription rate for non-cancer chronic pain, increase in using urine drug screening test
Interactive lecture and pictorial demonstration	Dion, 2016	Nursing students	Improvement in knowledge of opiate overdose signs and administration of intranasal naloxone

Table 3. Continued

Type of intervention(s)	Author, Year	Study population	Results
One-on-one educational visits, provided additional resources	Kattan et al., 2016	Physicians, nurse practitioners, physician assistants	Decreased in prescription rate of high-dose opioids, improved providers' knowledge
Interactive didactics	Regunath et al., 2016	Internal medicine residents	Improve knowledge and confidence regarding prescribing opioids
Multidisciplinary educational grand rounds, CME modules, lectures, interactive workshops, framework for prescribing opioids, and assessment tools	Lester et al., 2017	Physicians, pharmacists, nurses, physician assistants, nurse practitioners	Reduction in prescription opioids, improved practice and knowledge, higher patient satisfaction rate
Meetings or online education, workshop	Zisblatt et al., 2017	Physicians, pharmacists, nurse practitioners, physician assistants	Improvement in knowledge, confidence, attitude and self-reported practices
Case-based experimental or text-based online continuing education program	Trudeau et al., 2017	Primary care providers (MDs, DOs, residents, fellows, NPs, Pas)	Improved knowledge, attitude, pain practice behavior; the experimental program group were less likely to prescribe tamper-resistant opioids compared to text-based group
Lectures, discussions, and workshop	Ruff et al., 2017	Internal medicine residents (second- and third-year)	Improved knowledge and confidence in pain management and opioid use

Lecture/Workshop

Cochella and Bateman (2011) conducted a series of educational presentations in Utah, teaching providers and incentivizing them with continuing medical education credits. After the presentations, which included information regarding opioid painkillers, the rate of prescribed opioids dropped, and providers reported improved prescribing behaviors. Brown et al. (2013) offered a series of interactive lectures covering addiction, pain management, and use of opioids to a group of medical students, and transitional-year and internal medicine residents. After the intervention, the survey showed that the participants' knowledge of addiction and the use of opioids improved compared to the baseline. Dion et al. (2016) conducted an interactive lecture and pictorial demonstration for nursing students to teach the symptoms and signs of opioid overdose and intranasal Naloxone administration for the patients in need. The study found an improvement in nursing students' knowledge about the diagnosis of opiate overdose and Naloxone's use. Regunath et al. (2016) conducted a module informing internal medicine residents about chronic non-cancer pain management and opioid use. The participants' knowledge and confidence level in prescribing opioids improved as the result of the intervention. Ruff et al. (2017) implemented a set of lectures, a workshop, and discussions targeting second- and third-year internal medicine residents regarding chronic pain management and opioid misuse disorder. The intervention had a positive effect on the residents' confidence level and perceived skills for managing patients.

Online Resources

A physician guidebook on prescribing opioids for pain was distributed among physicians in Georgia by Young et al. (2011). Young and his co-investigators surveyed to evaluate the

impact of the book. The most significant effect was noted among the primary care physicians who were more likely to change their practice patterns regarding opioid use. Trudeau et al. (2017) conducted a study that assigned the participants to either a case-based experimental module or a text-based routine online continuing medical education module. The participants were primary care providers, including medical doctors, doctors of osteopathic medicine, residents, fellows, nurse practitioners, and physician assistants. Both groups showed an improvement in knowledge, attitude, and practice behavior. The experimental group who learned the information by the help of simulated patient cases had a more significant improvement regarding the use of tamper-resistant opioids.

Combination of Lecture/Workshop & Online Resources

A combination of interventions including case discussions, journal clubs, lectures, and support tools for using electronic health records was implemented by Gugelmann et al. (2013), targeting a group of providers. The providers included physicians, residents, nurse practitioners, and nurses at two urban emergency departments. After the educational interventions, a drop in the rate of prescribing opioids was noted, especially for the patient with a history of substance dependency. Canada et al. (2014) conducted a study that offered providers an electronic medical record-based protocol, management, and data sortation instructions for patients with chronic pain who use opioids. They included primary care residents, internal medicine interns, attending physicians, and nurse practitioners. They also offered monetary compensation for attending physicians. The result of their study showed an improvement in the providers' adherence to the protocols. Canada et al. (2014) also noticed that the health caregivers' practice behavior (such as the use of urine drug screening and documentation of the diagnosed chronic pain), attitude, and

knowledge improved, and the number of opioid prescriptions reduced. Another series of online or live educational programs were held in sixteen US states that targeted clinicians who manage chronic pain (Alford et al., 2015). An immediate and a two-month post-program assessment of the clinicians' knowledge, confidence, attitude, and practice regarding pain management showed improvement. Chen et al. (2016) distributed guidelines for prescribing opioids for chronic pain through emails or at mandatory meetings presentation. They also implemented social marketing by using posters to raise awareness about the guidelines. The recipients of the guidelines were Stanford's internal medicine residents and faculties, as well as family medicine faculties. They compared pre- and post-intervention medical records to evaluate the practice behavior changes due to the intervention. The results suggested a decrease in the opioid prescription rate for non-cancer chronic pain and increased urine drug screening tests. Kattan et al. (2016) provided public health detailing campaign by one-on-one educational visits and handing out "action kits" that included additional resources. The data analysis showed improved providers' knowledge of opioids and a drop in high-dose opioid painkillers' prescription rates. In Oregon Health and Science University, the general internal medicine clinic implemented an educational intervention and introduced an opioid prescribing policy that limited the dosage of opioids for the patients (Weimer et al., 2016). The target of that intervention was all primary care providers, including residents, faculties, and mid-level providers. After the intervention, the overall rate of opioid dose prescribed for patients reduced. They also found that younger physicians tend to prescribe less high-dose opioids than providers with longer years of practice. In another study, a series of multidisciplinary educational grand rounds, continuing medical education modules, lectures, and interactive workshops while providing a framework for prescribing opioids, and assessment tools for the prescribers were implemented (Lester et al., 2017). The interventions' target population

was a group of physicians, pharmacists, nurses, physician assistants, and nurse practitioners. The focus of these rounds and workshops was on pain management and selection of painkillers, including opioids. A reduction in the number of prescription opioids, an improvement in practice and knowledge, and a higher patient satisfaction rate of their treatment were the results of Lester et al.'s (2017) study. Through a three-hour educational meeting or an online module, and a series of two-hour workshops, Zisblatt et al. (2017) disseminated the information about long-acting and immediate-release opioids, and risk evaluation and mitigation strategy when prescribing opioids. The participants were the providers, including physicians, pharmacists, nurse practitioners, and physician assistants. The survey results showed that the providers' confidence level, attitude, knowledge, and self-reported practices improved after receiving the information.

DISCUSSION

According to the literature, the healthcare providers' knowledge of prescription opioids is inconsistent (Rasulnia, Burton, & Patel, 2019). In this systematic review we found that educational interventions regarding pain management, addiction, and opioid use positively impact healthcare providers' knowledge and practice behavior. Due to the interventions, providers' knowledge level of safe practice when prescribing opioid painkillers (choosing dosage, monitoring patients on chronic opioid therapy, avoiding multiple prescriptions, e.g.) improved. Also, practice behavior, confidence level, and attitudes of the prescribers were enhanced. In some studies that measured the rate of prescribed opioids for patients, a decline in the number of opioids prescriptions was noted.

The limitation of the studies included in the review was that the interventions' long-term impact on knowledge, attitudes, and behavior of the providers was not measured. Despite this

limitation, all studies were adequately significant to suggest that comprehensive education on pain management and opioid painkillers targeting healthcare professionals is effective.

This review could not categorize the intervention methods based on their effectiveness. Whether one educational method works better than the other is not clear. Another limitation was that the studies chose different materials to inform their participants; although all materials were related to opioids in some way, no interventions were quite similar. Hence, there is a possibility of bias when comparing the impact of different educational materials.

CONCLUSION

Health care providers are mostly concerned about pain management and prescribing opioids and would prefer more education (Franklin et al., 2013). The literature also showed the effectiveness of focused training regarding the use of opioid painkillers, made available to healthcare providers (Aronowitz et al., 2020).

The positive impact of additional education for health care providers on pain management and prescribing opioids is evident. Additional education in the healthcare professions' curricula could clarify misunderstood points or any confusions about prescription opioids (Busse et al., 2020). Whether some intervention method is more effective than the others, and which one is preferable to the providers are two critical points that are unclear. More research focusing on the method, material, and length of effective educational interventions is needed. There is also a need to study the long-term effect of the educational interventions, aiming at the providers' practice behavior and opioid prescription rates.

RECOMMENDATIONS

This review underscores the need for more comprehensive education regarding using opioid painkillers for pain management to inform healthcare providers. As suggested in the literature, adherence to practice guidelines could result in evidence-based practice patterns among healthcare providers (Busse et al., 2020). The available guidelines, including the CDC's Guideline for Prescribing Opioids for Non-Cancer Chronic Pain, could be an appropriate resource to educate the providers. Detailed information on the CDC's guideline recommendations could be the common ground of the educational material shared with all healthcare professionals to enhance their knowledge.

Nurses, as healthcare providers, are in a position that could influence prescribers regarding pain management plans. Including the CDC's suggested recommendations for prescribing opioids in nurses' education could enhance their knowledge and empower them to play their essential role in patients' pain management effectively.

CHAPTER III

ARTICLE II

ABSTRACT

Healthcare providers' education could be a critical contributor to their knowledge of pain management concept and using opioid painkillers. This study examined nursing students' knowledge, experience, and self-efficacy regarding opioid use to manage patient's pain. The critical constructivism paradigm was implemented to conduct a multiple case study. The students' lived experience regarding the topic of study was explored through individual interviews and a focus group. The study found that nursing students have a great understanding of pain assessment, but the knowledge of medication choice, specifically opioids, was inconsistent. The students were not familiar with the Centers for Disease Control and Prevention guideline for safe prescribing opioids. This study highlighted the need for a comprehensive education regarding opioid painkillers in nursing schools' curricula.

INTRODUCTION

The rate of death due to drug overdose among all US populations is rising. In 2016, about 66% of the deaths due to drug overdose were related to opioids, of those, 40% involved prescription opioids (CDC, 2017). Millions of adults in the US receive prescription opioids to relieve pain (CDC, 2017). Prescribing opioid pain relievers for individuals diagnosed with opioid use disorders may increase the risk of relapse and overdose (Stein et al., 2017). More than 25 percent of patients complaining of chronic pain will misuse prescription opioids with 12 percent developing an opioid use disorder (Muhuri et al., 2013; Vowles et al., 2015).

The Centers for Disease Control and Prevention (CDC) has suggested a guideline that recommends safer practices to manage pain effectively. This guideline could help healthcare

providers face the challenges of pain management when utilizing opioid painkillers. State-based Prescription Drug Monitoring Programs (PDMPs) store patients' prescribed medicine information, and it is a tool that provides practitioners the necessary information to avoid multiple opioid prescriptions and drug interactions. For instance, practitioners could avoid concurrent prescription of opioid pain relievers and benzodiazepines which could cause respiratory arrest (patient stops breathing). Boscarino et al. (2016) show that using electronic health records to notify physicians about possible risk factors for medication misuse in a patient could help to improve opioid overdose rates and outcomes. It is suggested by the CDC to check the electronic health records and PDMPs before prescribing opioids.

To avoid opioid misuse and overdose, the healthcare providers should know when and how to prescribe opioids, as well as the techniques to detect misuse behaviors and patterns, and the importance of educating patients (CDC, 2017). Dealing with patients in desperate need of pain relievers, the load of daily work and limited time, and work fatigue might put the providers in an emotional and mental state that might influence their practice behavior. Whether healthcare professionals, including nurses, have enough training for pain management is controversial. Research on nursing schools' mode of pain management education and the depth of training on opioids could help to understand the gaps and strengths of the undergraduate nursing curriculum. This study was designed to examine nursing students' knowledge, experience, and self-efficacy about pain management practice using opioids. The research questions are: 1) How are nurses trained to address pain management and opioid use? 2) Do the nursing students have knowledge of pain management guidelines, and specifically the CDC guideline? 3) How confident are the nursing students in their skills to manage pain?

The current study hypotheses are: 1) Nursing students do not have the opportunity to receive a comprehensive education regarding pain management and opioids use in nursing school. 2) Nursing students do not have knowledge of the CDC guideline for pain management using opioids. 3) Nursing students do not feel confident in their pain management skills.

The study results would be used as a guide for developing a survey for the study of "nursing students' knowledge and attitudes regarding pain management using opioids," the researcher's dissertation project.

Literature Review

The primary concern in pain management is pain relief while ensuring the patient's safety (Gordon et al., 2008). Following the CDC guideline and utilizing PDMPs could help to avoid unwanted results among patients. The healthcare providers' knowledge of these resources is dependent on their education. The extensive research and evidence-based clinical suggestions, such as practice guidelines, do not necessarily determine the healthcare providers' intention to adopt specific protocols (Presseau et al., 2014). Chen et al. (2016) noted that, despite the pressure to learn opioid prescribing guidelines for chronic pain management, no real changes had been made in routine clinical practice. Most practitioners who do not have the proper knowledge of the guidelines have announced their concern when using opioids for pain management (Franklin et al., 2013). Providers also believe that they need additional training regarding pain management (Porucznik et al., 2013). Washington state providers who utilized opioid prescribing guidelines reported that they feel more comfortable dealing with opioid-related problems or discontinuing prescribing opioids (Franklin et al., 2013).

Nurses play a vital role in patients' care plans and can help to control opioid misuse epidemic (Costello & Thompson, 20015). It has been concluded that empowering nurses by developing their knowledge and skills for pain management could be one of the most critical steps to improve patients' outcomes (Abdalrahim et al., 2011).

This study will evaluate the nursing students' knowledge and experience about pain management and opioid use, and whether or not they are familiar with the CDC guideline. The possibility of any gaps in the nursing curriculum regarding training on opioid painkillers will be explored through the eyes of students.

Theoretical Framework

SCT is considering the reciprocal relationship between behavior, personal, and environmental factors (Bandura, 1986). The constructs of SCT include self-efficacy, outcome expectation, and sociostructural factors as the predictors of goals, and behavior. Self-efficacy, the confidence of being able to perform, has a central role in the theory. Based on the skills, self-esteem, emotional status, and past experiences, self-efficacy is one of the major determinants of goals and behavior. Outcome expectation, physical, social, and self-evaluative beliefs could be under the influence of self-efficacy, while as a construct, it could impact goals and behavior. Self-efficacy also impacts sociostructural factors and barriers and facilitators constructs, while the latter could impact goals and behavior as well. The proximal goals construct the last one right before the behavior construct. Goals could be a determinant for the behavior too. Social-Cognitive Theory (SCT) could predict the impact of knowledge on healthcare professionals' intention to use opioids for pain management. All the SCT constructs contribute to predicting practitioners' intention to use opioids for pain management. Self-efficacy has explained clinical

practice performance. Hrisos et al. (2008) found that self-efficacy is a strong predictor of general practitioners' practice behavior.

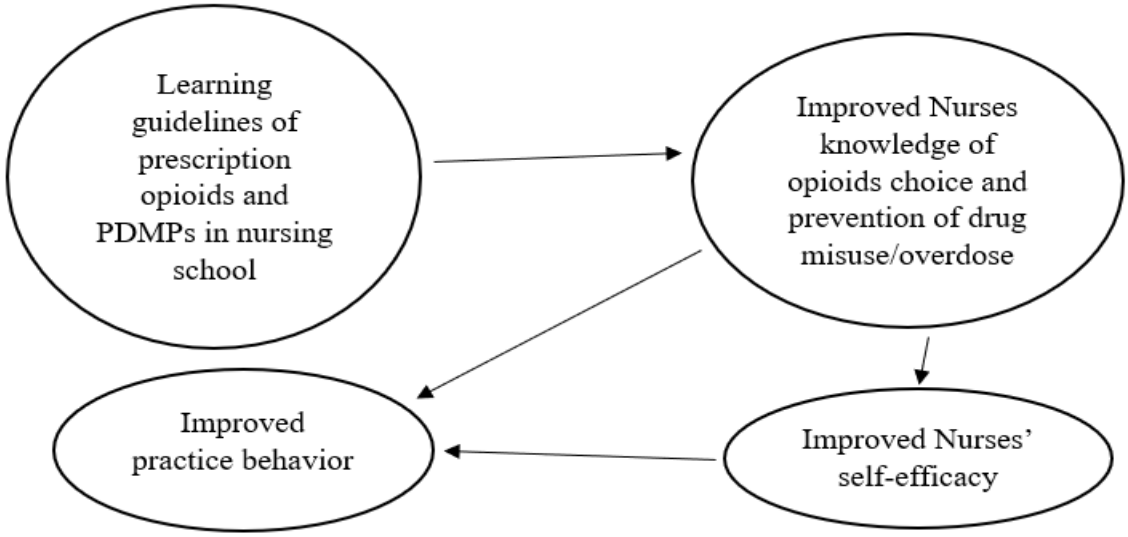
The impact of learning (via coaching, e.g.,) and improving knowledge could impact self-efficacy (Bandura, 1986). The relationship between improved knowledge and self-efficacy has been tested frequently in research to explain the healthcare professionals' practice behavior regarding health issues such as the opioid crisis. A study of pharmacists examined the constructs of outcome expectation (knowledge) and self-efficacy about filling the prescriptions of opioid painkillers. The study found both constructs were predictors of the pharmacists practice behavior (Hagemeier et al., 2014). Samuel et al. (2016) studied the impact of knowledge (which could be influenced by learning) on the attitude and self-efficacy of emergency room physicians regarding opioid prescription and found significant relationship among the knowledge and the two specific constructs. Ryan et al. (2013) found that knowledge was a contributor affecting doctor's confidence in their performance, which could impact their practice behavior.

Teaching nursing students regarding the appropriate guidelines for prescription opioids and utilizing PDMPs could positively impact their knowledge about pain management and opioid use. Improved knowledge could enhance the students' self-efficacy and practice behavior, while higher self-efficacy could improve their overall practice behavior. Knowledge improvement could also empower nurses to influence prescribers when managing pain. The theoretical model that inspires this study was based on SCT.

METHODS

The impact of knowledge on self-efficacy and practice behavior was adopted from SCT. The theoretical concept that formed the logic model of the study is demonstrated in figure 3.

Figure 3. Theoretical Model Adopted from SCT (Bandura, 1986)



A multiple case study method was conducted to test the hypothesis of the study by learning in-depth about the students' experiences and their concerns regarding their knowledge of the concept of pain management and opioids use as well as their curriculum coverage of the topic of pain management (Hays & Singh, 2012). A case study is an excellent method for the health sciences research and would help to develop a theory (Baxter & Jack, 2008) that could help to understand and approach the existing issues. This method could help to evaluate the theoretical constructs of this study.

The cases were bounded (Yin, 2003) by the participants being nursing students of the nursing program of a local university. There was no demographic discrimination for participation in this study except for the age under 18 to avoid the vulnerable group of children. The criteria for participation in this study were to be a nursing student at the nursing school and to be above 18 years old. All participants signed or acknowledged a consent form prepared for this study.

Epistemological Stance

The critical constructivism paradigm was used in this study which reflects the knowledge, experiences, and self-efficacy of the nursing students regarding pain management and drug choice, as their perspectives would be based on their lived experiences (Hays & Singh, 2012). The critical constructivism epistemology would seek the critical points that could be changed to improve the lives of the study population (Hayes & Singh, 2012).

Data Collection and Analysis

A focus group including three participants and two individual interviews were conducted. A mixed purposeful (Nastasi, n.d.) sampling method for recruiting the participants was considered including the convenience method and the criterion strategy. The criterion strategy helped to include participants through convenience sampling. A nursing faculty agreed to the role as the gatekeeper for recruiting the participants and posted the announcement for the study to the school's blackboard announcement site. Having a gatekeeper whom the potential study population trusts would help the researcher to recruit people to participate in the research (Hayes & Singh, 2012). The volunteers were contacted through email, and the mode of focus group and interviews were decided based on the participants' preference. Table 4 demonstrates the characteristics of the participants. To protect the participants' identity, their names are not published.

Table 4. The Participants' Characteristics

Participants	Characteristics
K1	Newly enrolled in the nursing program, background of psychology, her mom was a nurse, had personal interest and knowledge of opioid crisis
K2	Just graduated from Nurse Practitioner (NP) masters and was enrolled for doctorate degree in NP, experienced on in-patient and out-patient care, have experience of working with opioid painkillers
K3	Had a nursing Associate degree and was in her first year of the nursing program in the school of interest, working in an educational hospital's urgent care, have experience of working with opioid painkillers
K4	A Registered Nurse (RN), was an online student at the school of interest, working at a hospice company as homecare nurse, had the experience of working at a cardiac unit with acute care patients for two and a half years, have experience of working with opioid painkillers

The focus group was conducted with three participants (K1, K2, and K3) through the videoconference software platform WebEx. One interview was done with phone audio and WebEx video (due to an unexpected voice problem in WebEx). The interviewee (K2) was a focus group participant as well. The second interview with K4 was conducted by phone. The focus group was recorded through WebEx, and the interviews were recorded with the help of a second phone. To achieve the favorable results as well as to give the participants enough freedom and comfort to discuss what they might need, the interview protocols were semi-structured. The questions were designed to address the recommendations of the CDC Guideline for Prescribing Opioids for Chronic pain and the overall knowledge of pain management. The students were asked questions regarding their pain assessment and pain management skills; knowledge of opioid use, knowledge of monitoring patients on long-term opioid therapy; and whether they acknowledge any guidelines (mainly CDC guidelines) and PDMPs. They were also questioned about their self-confidence regarding pain management. A good rapport was built between the researcher and the participants during the focus group and interviews that made the

participants comfortable to openly talk about their experiences and concerns regarding the topic. Probing questions were used anytime that felt necessary.

The data analysis started by writing the transcripts manually. Field notes were written on the same day of each focus group and individual interviews to capture the details about events and the researcher's reflection. Pseudonyms chosen by the researcher (known only by her) were considered to maintain confidentiality, as it was discussed with the participants through consent forms and verbally at the beginning of each event. Initial descriptive coding was performed to capture the accurate participants' ideas and belief (Saldana, 2009). This technique can capture all the details revealed in the interviews while helping to categorize the codes. Other methods mainly help to create codes that have single words which would not transfer the detailed information needed for this study. Based on the meaning of the codes and repeated patterns and categories, themes were developed as the secondary coding process was conducted (Saldana, 2009). The analysis within the cases helped to determine the patterns and themes while the analysis across the cases (interviews and focus group) made another round of coding and finding broader categories necessary. After the second round of secondary coding based shared patterns, four major themes were recognized as the most organized and informative data which includes the other themes as subcategories.

Trustworthiness

To triangulate the data, two data collection methods of focus group and individual interviews were conducted. All participants were from the same pool of the study population. The overlapping data gathered from the focus group and interviews help to enhance the dependability of the study (Hays & Singh, 2012). Also, conducting one interview with a person

who participated in the focus group as well helped to iterate. Some of the questions were repeated in a slightly different manner and timing to make sure the responses are accurate (Shenton, 2004). Another interview was conducted with a person who unlike the other participants was not working in an educational healthcare setting. Having information from a student who works in a different setting helped to capture practical and broader information regarding the topic which could add to the overall trustworthiness of the results. Also, the responses and some of the apparent codes and themes were confirmed with the participants at the end of the interviews to have more credible data. Meanwhile, the detailed fieldnotes and thick description that reflect the lived experiences of the investigator were other ways to bolster the credibility of the study (Hays & Singh, 2012). Using probing questions whenever the researcher felt necessary also enhanced the trustworthiness of the research.

To avoid bias in the study as much as possible, the inclusion criteria were including all nursing students to make sure the nurses who are specifically working in a pain management clinics or settings were not the only ones included. The point of this study was mainly to evaluate all the nursing students' knowledge regarding pain management and opioids. Including students who have had special training or experience regarding pain management would cause distorted results. Avoiding the exclusion of different demographics of the participants was another point for reducing bias. Since the study is a qualitative research, the investigator's point of view might have an impact on the overall results which would count as a bias.

RESULTS

Based on the categories of the final coding process, four major categories emerged from the data which are relevant to the research questions. There are sub-categorical themes to most

major themes. The main themes are knowledge of pain management, use of opioids, self-efficacy, and education. Table 5 includes the themes and subthemes.

Table 5. Themes and Subthemes

Themes	Subthemes
Knowledge of pain management	Knowledge of pain assessment Knowledge of treatment options
Knowledge of opioid use	Considering drug interactions and contraindications Choosing dosage Using antidote Urine drug test Utilizing PDMPs Educating patients about the disposal of their narcotics
Self-efficacy	
Education	CDC guideline and PDMPs The need for comprehensive education

Knowledge of Pain Management

As it is evident by its name, the ability to manage pain and keep the patient satisfied is the main concern in pain management. The process of pain management starts with pain assessment and understanding the needs of the patient and goes on by finding a treatment option that would be the most appropriate for the patient.

Knowledge of Pain Assessment

Except for K1 (a focus group participant) who was just enrolled in the nursing program, the others had a good idea of the overall pain assessment. The students knew all the correct responses to different questions such as finding the source of pain, observing the patient's body language, asking about the onset of the pain, having other symptoms and issues, what kind of treatment have they had before, how long the pain has had continued, and asking their patients about the feeling and the intensity of the pain.

Considering what patients complain of was mentioned by most participants. As K3 said, "it depends on what that patient is saying and what they are feeling, and whether they are in pain and I have to go by that because I don't know exactly what they are feeling."

All nurses were familiar with the pain scale, and they would consider asking their patients from one to ten, one being almost no pain to ten being the most severe pain imaginable, what number would they give as the intensity of their pain. K2 referred to pain scale as well as the importance of observing the patient's body language and appearance, "by asking them …, we have scales … the facial, just asking them zero to ten … guarding, facial expressions, yelling out anything like that." While K3 thought that she should not judge patients by how comfortable they seemed to be, since people have different pain threshold and tolerance, "Subjective is when a patient is feeling and saying, and objective is what I see. So, fortunately, I'm not one of those people who would go with what I think because they could look like they are not in pain because they have a higher tolerance than some people, so it's really a subjective, objective situation."

There was a clear understanding of how to tell the difference between pain with different duration and onset, as well as the emphasis on what treatment methods the patients used (if any). "If they had this pain or this is an acute onset of pain situation. If they've had it is like a chronic pain what do they have been doing to manage this pain and have they been managing it and now what's the next step; we need to take and figuring out what's working for you? What will work for you?" K3 said.

The students were also considering looking for other symptoms as well as the possible cause of the pain, as K2 said, "know what you've been doing when the pain started, and other things have been going on."

Knowledge of Treatment Options

There was an inconsistency in the answers of the students depending on their working experience. K1 who was new to the field was a big fan of the alternative approach. As she described, this "is because I am a more holistic person, so I will like where is your pain, is it on your back? Have you seen a chiropractor?" While K2 who had experience in an educational outpatient setting thought that she would start with over-the-counter medication and if needed would start on opioids, "rest, ice, and elevate something like that, if it's chronic depending on what they've tried like NSAID or anti-inflammatory, Tylenol … depending and if that didn't work I would go to the next step obviously…probably narcotics," she said. K4 had experience working at a non-education hospice company. She dealt with the patients with chronic and severe pain and had a different idea of the treatment option, she explained, "usually I go with medications like Morphine, Dilaudid, Trazodone, um, I mean I don't give a lot of Tylenol, it's honestly mostly opioids."

Knowledge of Opioids Use

The providers' knowledge of guidelines and electronic health records or PDMPs for prescribing opioid painkillers are vital in reducing unwanted results such as overdose. There was an inconsistency regarding how knowledgeable the nursing students were about those resources.

Considering Drug Interactions and Contraindications

This theme refers to how students search the patient's history and other medications to avoid the possible interaction between opioids and other medicines that could be dangerous,

sometimes fatal. It also covers their knowledge about contraindications for opioids such as the history of abuse, or physical issues like allergies.

The students who were working in educational settings as well as K1 who was familiar with the topic of opioids addiction knew that they should watch for other medications. “One of the classes that I’m taking now, opioids and SSRIs, so… SSRIs can increase the level of the opioid in the blood and can cause respiratory depression and death if they are not supervised I thought that was really important,” said K1. K2 stated, “: Benzodiazepines… alcohol use,” “Just for the pure factor of respiratory depression in general,” she said. However, K4 would only consider respiratory depression, agitation, allergic reaction, or drowsiness as contraindications to opioid use; she said, “Only if there is an allergic reaction or a negative reaction to the medication like either physical or emotional as far as medication goes, that would make me discontinue it.”

Choosing Dosage

The students knew that they should start the narcotics with the lowest possible dose unless their experience would have proven to them that a higher dose would be more useful for moderate to severe chronic pain. K2 said, “I … usually would like to go with something like Norco with the lowest dose or 5 milligrams or and I kind of go up from there.” K3 stated, “we need to start with small things and work our ways up to stronger things,” while K4 said, “I give the higher dose … when they have pain of 6 or above, and they are symptomatically in pain.”

Using Antidote

Most of the participants were familiar with Narcan, the antidote for the opioids, and knew that if a patient had symptoms of overdose such as respiratory depression, they need to

administer that, but they were not routinely using it as a cautionary step for patients on long-term prescription opioids. K4 said, “I don’t work with it in homes now as a hospice nurse. But we always had it in the hospital, there was as needed if they were overmedicated like their respiration rate was low.” K2 said, “well I have seen it, but I haven’t been able to prescribe it. As a nurse I have given it even after ER, that was worn off we had to keep giving it, so … that’s the only experience I had with that.”

Urine Drug Test

A routine urine test could help healthcare providers to detect the possible abuse or misuse of prescription painkillers. The students who were working in an educational environment were utilizing that test; however, the student who was working for a private company and dealing with end-stage patients was not used to performing a urine test. K2 remarked, “I know in the office we drug test.” “every person gets a cup… that’s when we know if something is going on and we send to a lab for a thorough test because sometimes the addiction POCT test could be a little off, and we send it upstairs, and we can do drug screening through that as well,” said K3. K4 said, “with hospice no; we don’t monitor the amount of medication that’s in the terminally ill patient. Like I do know in the facilities like even in a hospital, no we don’t.”

Utilizing PDMPs

The PDMPs help the providers to be informed about any controlled medication that the patient is taking. Electronic health records could also be helpful. Only the students who are exposed to a teaching environment learned about PDMPs and health records. K2 stated, “There’s something that I want to point out that we also check, everybody, physicians do as well that

check the PDMPs if they have multiple providers and pharmacies." K3 also said, "I've seen it with the ER doctors that helps them to see certain medications that they look up for them as well." K4 was not familiar with PDMPs and believed there is no time for utilizing health records on regular bases. She said, "If you scan the medication and something pop up like a pain medication then, it can't be an extra tool to look for it because we don't have time for that, you know the hospitals are about money and get patients in and out."

Educating Patients About the Disposal of Their Narcotics

Although the participants were familiar with safe methods of disposal of the unwanted opioids, they never felt the need to advise their patients regarding that issue. As K4 stated, "so usually if the patient… well, honestly, I've never had that situation, but I know as a hospice nurse the only reason that we would get rid of medication is when it's expired, and they still had it, and there's a couple ways that they recommend that."

Self-Efficacy

The overall self-efficacy of the capability to manage pain properly was high among the nurses. After talking about the details of the guidelines for prescription opioids and the importance of utilizing PDMPs or health records, the students felt less confident and felt the need for more knowledge to improve their confidence and performance. In the beginning of the interview with K4, she said, "I never felt unconfident when administering a medication or feel that I wasn't able to take their pain under control." After getting through the details at the end of the interview, she stated, "you know that is actually really bad because you know now that we are focusing on this topic, we don't have enough alternative measures to care for chronic pain. I

mean most patients they still take a pill form of any narcotic, and I still administer it, without any concern of long-term effect." K2 also believed that she does not feel very confident when dealing with a possible drug abuser, she said, "especially when I think someone is drug seeking… I get really nervous and uncomfortable, and I am not sure."

Education

It was a unanimous conclusion among the participants that they do not receive a focused and comprehensive education regarding pain management and opioid use in nursing school. They all believed that their education on this topic is mainly through practice and experience.

CDC Guideline and PDMPs

The students were never explicitly educated about the CDC guideline for prescribing opioids for chronic pain or any other guidelines that are available to prescribe narcotics. They also believed that they have learned about PDMPs in practice and not through any theoretical subject. K3 expressed how she learned about PDMPs for the first time. She said, "I used to do insurance, and I had to go initial screening for a lot of my insurance clients, I kind of learned it that way," and K4 had never heard about them. None of the students knew anything about CDC guideline.

The Need for Comprehensive Education

All students raised concern about their education regarding this topic. They felt if the pain management topic were covered while pain assessment is being taught in the nursing curriculum, it would be the most effective in improving their knowledge, confidence level, and

practice behavior. K1 was enrolled in nursing school so that alongside her psychology degree, she could become an addiction specialist nurse, she stated, “it (pain management) needs to have its own separate subject.” K2 remarked, “a guideline would be nice (chuckles). It would be nice to know exactly when to change the medication and how to go stronger, we wouldn’t have to send them out or refer them that much, we could do more.” K4 said, “I don’t know, I’d say yes, and no, I still qualify to give the medication but as far as knowing what pain management is, no, I don’t think there’s any defined guidelines to properly manage pain.”

DISCUSSION

Based on the CDC’s guideline for prescribing opioids for chronic pain or other guidelines available for using opioids for any pain, the safest method is first to consider other medications and if necessary to use opioids, start with lowest dose of fast-release painkillers when there is no possibility of interaction with other medications that the patient is taking such as benzodiazepines (CDC, 2017). It is also recommended by CDC to get a urine test every few weeks from patients who are on chronic opioid painkillers to be able to detect the possible misuse. Prescribing the antidote such as Narcan for the patients who receive long-term opioids is recommended to avoid overdose-related death. It is critical for nursing schools to educate their students regarding this topic in a thorough and focused manner.

The convenience sampling was used to be more flexible about the inclusion criteria and to deal with the issue with the timing of the study (Summer) when students may not to be available for participation. The criterion strategy helped to include the participants who had the characteristics of having enough information to address the research questions and find any possible systematic weaknesses in nursing school curricula (Nastasi, n.d.).

The data were collected via two methods of focus group and individual interviews to evaluate the nursing students' knowledge and experience regarding pain management and prescription opioids. The interviews were semi-structured. Interviews were implemented because of their strength in finding nuances about people's perspectives and their lived experiences (Jacob & Furgerson, 2012).

The transcripts were coded, and themes emerged after two rounds of secondary coding was completed. The study's framework helped to shape the final categories, and the most meaningful themes became the subcategories. The themes that were addressing the research questions and the framework were chosen for the report.

The data analysis showed that the nursing students have appropriate knowledge of pain assessment and have learned most of their education through practice. They might follow some points suggested in the CDC guideline for prescribing opioids but are mainly for the sake of following their mentors and not because of being familiar with the guideline. Their knowledge is very dependent on their experience and the environment of their work rather than the theory or guidelines. The nursing students felt the need for a comprehensive theoretical training about pain management using opioids before entering the field of practice. They believed more focused education could help them to gain more knowledge, self-efficacy, and improved strategies to practice regarding pain management and use of opioids specifically.

There are a few implications for future research including considering students from other local and states' schools to participate in such a study to be able to compare the results. Also, conducting an educational intervention for nursing students and comparing their knowledge and self-efficacy before and after the intervention regarding pain management and drug choice would enrich the data on what topics nursing curriculum needs to cover. Such a

study could be useful to evaluate whether having a focused and comprehensive education could help the students to improve their knowledge.

Undergraduate nursing curriculum could add a focused and comprehensive topic devoted to pain management and a guideline for drug choice, especially opioids to boost the students' confidence level, knowledge, and practice behavior. Also, nursing faculty and physicians who work with nursing students could explain and clarify the details about their techniques and protocols and the logic behind them. This approach could help the students to understand the scientific explanation for each step that their mentors take. Another suggestion would be to extend access to PDMPs to Registered Nurses to make sure that they would not miss any critical information and prevent an unwanted situation with their patients.

One limitation of this study was the small number of the participants with experience of working in different types of settings such as educational clinics or private and non-educational companies. It would be possible to be more confident about the saturation of the data and diversity of the results due to the environment of work if there was a higher number of participants with different practical experiences. Another limitation was that the participants were bounded by being a student at one local school. Including other nursing schools' students would add to the trustworthiness of the results.

CONCLUSION

Costello & Thompson (20015) found the nurses' role in the opioid crisis is critical and their education could improve this dilemma as it could improve their practice and the patients' outcome (Abdalrahim et al., 2011). This study found that nursing students are experts in pain assessment but would prefer to learn pain management and medication choice comprehensively.

Knowledge could be gained through education and precise coaching that could improve nurses' self-efficacy and practice behavior. As it is recommended in the literature, enhancing nurses' practice behavior regarding pain management could be a critical strategy to help to control the opioid crisis and improve patients' outcome.

CHAPTER IV

ARTICLE III

INTRODUCTION

The overdose rate due to opioid abuse is rising in the US, which involves prescription opioid painkillers and illicit drug use (CDC, 2020). One preventive step toward controlling this issue is promoting safe practice by introducing available guidelines such as the CDC Guideline for Prescribing Opioids for Non-Cancer Chronic Pain (Dowell et al., 2016). The pattern of prescribing opioids in the US varies (CDC, 2014), and the practice behavior among healthcare providers is inconsistent. The lack of consistent pain management practice by prescribing opioids could lead to mismanaging the patients (International Pain Summit of the International Association for the Study of Pain, 2011). The International Association for the Study of Pain (IASP, 2011) has emphasized the need to enhance undergraduate curricula in health professional schools. Valid measures are needed to evaluate the students' knowledge of pain management and opioid (Ung et al., 2016).

Nurses have an essential role in patient care and could impact the opioid crisis by receiving comprehensive education on using opioid painkillers to manage patients' pain (Manworren, & Gilson, 2015). This study implemented an educational module on prescription opioids for undergraduate nursing students and assessed the module's impact on the students' knowledge and attitudes regarding the topic. The evaluation was conducted by per- and posttest surveys and a reflective log. The aims and hypotheses are explained below.

Research Questions, Hypothesis, and Aims

Research question 1: Do undergraduate nursing students have knowledge of the CDC guideline for prescription opioids?

Aim 1. To determine the baseline of knowledge and attitudes of undergraduate nursing students regarding the CDC guideline for prescription opioids

Hypothesis 1: Nursing students do not have knowledge of The CDC guideline for prescription opioids.

Research question 2: Does an educational module positively impact the nursing students' knowledge and attitudes on using opioids?

Aim 2. To evaluate the impact of an educational module, the CDC Guideline for Prescribing Opioids for Chronic Pain, and nurses' role in pain management, on nursing students' knowledge and attitudes about using opioids for pain management.

Hypothesis 2: After completing an educational module on opioid use, nursing students will have improved knowledge and attitudes about pain management using opioids.

Research question 3: Do nursing students believe that the educational module on opioids has had any impact on their confidence level and future practice regarding using opioids for pain management?

Aim 3. To explore the students' reflection on the educational module's impact on their confidence level and future practice regarding using opioids for pain management.

Hypothesis 3: The students will reflect positively about their experience and believe that the educational model has positively impacted their confidence level and future practice regarding using opioids for pain management.

METHODS

Study Design

This study was designed based on a theoretical model adopted from the Theory of Planned Behavior (TPB). The study was a pre-experimental study to determine the impact of an educational module on nursing students' knowledge and attitudes regarding pain management and opioids. This study was conducted using an online educational module, pre and posttest surveys, and a reflective log.

Population and Sample Method

The target population was prelicensure nursing students in the last year of their undergraduate BSN program at a local nursing school. All students enrolled in the course completed the online educational module, pre and posttest surveys, and reflective log as part of required coursework. The potential study population number was 83 students enrolled in a summer course. The required sample size was calculated through Qualtrics sample calculator. Assuming a confidence level of 95% and a margin error of 5 percent, the ideal sample size would be 69. The convenience sampling method was used. A Blackboard announcement invited the students who were enrolled in the course to join the study. The announcement included a direct link to the consent form. Participation in the study was voluntary.

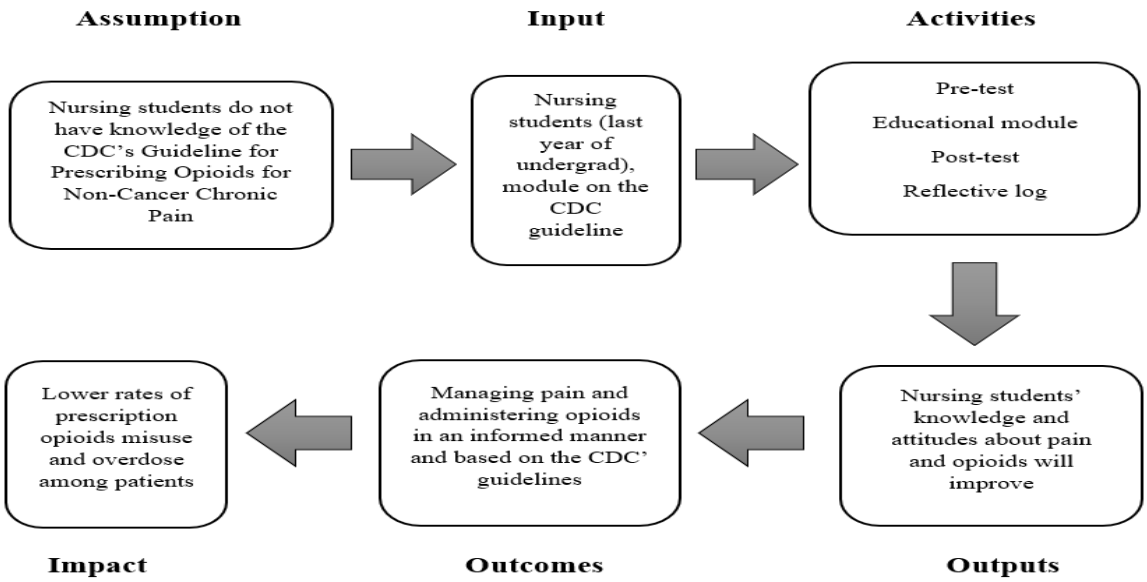
Data Collection Procedures

The data was gathered through a mandatory online educational module that was completed as part of a class offered during the summer semester 2020. The educational module outline and reflective log are included in Appendix A and Appendix B, respectively.

At the beginning of the module, the students were informed of the study. The students who were willing to participate were asked to provide consent through a link in Blackboard (the consent form was uploaded into Qualtrics, and the link was provided in Blackboard). As part of the course requirements, students completed the online educational module that focused on a summary of the CDC guideline recommendations for prescribing opioids for non-cancer chronic pain, and a CDC provided video named "A Nurse's Call to Action for Safer Opioid Prescribing" which specified the nurses' role regarding opioid use for pain management. The module could be completed in approximately three hours. As assignments of the course, a pre and posttest was conducted through blackboard. The assignments also included a reflective log to practice the material and gain the students' perspective and their knowledge about the topic. Students who agreed to participate in the study gave consent for the researcher to access their course data for inclusion in the study analysis. The consent form included demographic questions that were answered only by the students in the course who agreed to participate in the study. All the assignments and consent forms were matched to students by using the anonymous IDs that they provided upon enrolling in the study.

The project's logic model is demonstrated in figure 4 The study does not include evaluating the outcomes and impact mentioned in the logic model.

Figure 4. The Project's Logic Model



Instrument

The methodology for this project was innovative since it used a new instrument to measure nursing students' knowledge and attitudes regarding pain management and the use of opioids for non-cancer chronic pain. The questionnaire (Appendix C) was designed to capture the knowledge on opioids use, as suggested by the CDC recommendations, and the students' attitudes regarding pain management and opioid use (CDC, 2019; Dowell et al., 2016).

The questionnaire consisted of two parts. The first part included demographic questions (age, gender, race, healthcare experience outside the program, and experience of implementing opioids), which was collected with the consent form in Qualtrics. The second part included questions addressing students' knowledge, attitudes, subjective norms, perceived behavioral control, and intention related to safe opioid use. Additional questions regarding their experiences regarding the educational module were asked in the posttest. The questions about the module

asked students whether they believe that the educational module enhanced their knowledge and prepared them for their future role as a registered nurse.

Variables

The Statistical Package for the Social Sciences software (SPSS. Version 21.0) was used to analyze the data. The demographic questions about students' healthcare work experience outside the program and their experiences of opioids use to manage patients' pain were considered modifiers for the responses to the questions regarding the study's constructs. Based on the previous qualitative study, having healthcare work experience outside the program and working with opioid painkillers were expected to have a meaningful relationship with the data. The relationship between the experience with each construct was evaluated.

Theory of Planned Behavior (TPB)

The TPB's constructs of attitudes, perceived behavioral control, subjective norms, and intention were measured alongside the knowledge construct. Attitudes were measured with four items (each including a 5-point Likert scale) regarding the students' view of following the CDC's guideline for prescription opioids. One item measured perceived behavioral control through a 5-point Likert scale, capturing the sense of confidence in nursing practice with administration of opioid painkillers for patients. Two items with a 5-point Likert scale measured subjective norms addressing students' normative beliefs of the expectations from a nurse as a pain management team member using opioids. Seven 5-point Likert scale items measured intention to follow and implement the guideline's suggestions. Knowledge was measured through two 5-point Likert scale items and five multiple choices to capture students' familiarity

with the guideline and nurse's role in pain management using opioids. A series of Spearman's Rank Correlation tests were conducted to capture any correlations among the TPB's constructs, and the knowledge construct correlation with the theory constructs.

Aim 1

The pretest was considered the baseline information of the students' knowledge and attitudes before exploring the module and addressing Aim 1.

Aim 2

This study's primary independent variable was "completing the educational module," and the dependent variables were the students' responses to the pre and posttest questionnaire that captured knowledge, perceived behavioral control, subjective norms, attitudes, and intention. Another set of dependent variables was computed by renaming all questions related to each construct as one variable with the specific construct's name, and one overall variable, including all constructs, with the name "All-Constructs." The questions related to each construct are categorized in Table 6 Comparing pre and posttest results through Wilcoxon Signed Rank test for each group of the overall, experienced in healthcare work or inexperienced, experienced in using opioids for patients' pain or inexperienced, and healthcare experience of one year or more versus less than one year addressed Aim 2.

Since there was no normal distribution, and the data was non-parametric, the educational module's impact on all the constructs was evaluated through the Wilcoxon Signed Rank test. Each question and each construct were evaluated separately.

Whether students with healthcare experience outside the school's curriculum have different results with students with no other experience other than their program was measured through Wilcoxon. For that purpose, the independent variable was "having healthcare experience," and the dependent variables were the "constructs." Each construct was evaluated separately. The same analysis took place for the question regarding the experience of working with opioids. The opioid use experience was the independent variable, and the responses to construct-related questions of the pretest were the dependent variables. A Wilcoxon test was conducted to compare the pre and posttest for each group of experienced and inexperienced for both healthcare and opioids, as well as for the group with one year or more healthcare experience and less than a year of experience.

The impact of years of experience on the pretest results was measured through the Mann-Whitney U test. The independent variable was "years of experience (less than one year and more than one year)," and the dependent variable is "the pretest constructs." Another dependent variable was created by summing all constructs together as one variable of "All-Constructs" to compare the pre and post changes in all constructs as one overall variable.

The sample size of the study was sufficient for an effect size of medium (.3-.5) to large (.5-.8), which would need a smaller number of participants than the potential participants of 83 for this study (N=31). The Alpha was pre-set at (.05), which is the most commonly used in research. Any results with a P-value of "less or equal to .05" would be considered statistically meaningful.

Aim 3

Qualitative data collection was through gathering the written information in response to the reflective log. The students' writing was categorized and analyzed based on the themes that

were extracted. Initial descriptive coding was performed and was followed by secondary pattern coding. The primary themes emerged from the data using descriptive coding. The students' own words were used in order to capture the accurate information of the data and minimize the bias. The secondary coding was performed based on pattern coding. The major themes emerged from the secondary coding process, based on the information gained from the logs while reflecting the educational points within the module. The result of the qualitative analysis of the reflective logs and the post-test questions addressing the students' experience and beliefs about the module's necessity addressed Aim 3.

Table 6. Construct Specific Questions

Theoretical construct to be addressed	Question
Knowledge	1) How knowledgeable are you about the CDC's Guideline for Prescribing Opioids for Chronic Pain? 2) How knowledgeable are you about PDMPs (Prescription Drugs Monitoring Programs)? 3) Which medications should **NOT** be the first choice to treat non-cancer chronic pain? 4) Which statement about opioid painkillers is correct? 5) What type of opioids is the best choice to start long-term opioid therapy for non-cancer pain? 6) When should a urine drug screen test be ordered for a patient prescribed long-term opioid therapy for non-cancer pain? 7) When should an antidote be prescribed for the patient receiving prescription opioids?
Attitudes	1) For me, following a guideline to manage a patient's pain is easy. 2) How important is it to know the patient medication history? 3) How important is it to educate patients about the opioids side effects/disposal options? 4) How important is checking the electronic patients' records when managing pain?
Perceived behavioral control	1) When you start to practice as an RN, how confident would you be about managing a patient in pain?
Subjective norms	1) Most Registered Nurses follow pain medication orders; no questions asked. 2) Because patients will receive a hardcopy of medication side effects from their pharmacist, it is not necessary for the registered nurse to educate their patients about side effects they may experience from their medications.
Intention	1) How likely are you to educate yourself more on opioid painkiller use for pain management? 2) How likely are you to influence prescribers by discussing options for pain management? 3) How likely are you to speak up about your concerns on patients' pain medication? 4) How likely are you to educate your patients about the side effect of their prescribed opioids? 5) How likely are you to suggest safe options to your patients regarding disposal of their unused opioid painkillers? 6) How likely will you look for signs/symptoms of opioid abuse/misuse in your patients? 7) How likely will you learn about your patient's medication history?

Reliability and Validity for the Instrument

The questionnaire was designed directly based on the concept of pain management, the results of the qualitative study that was conducted prior to this study, the CDC recommendations of the guideline for prescribing opioids for chronic non-cancer pain, and the video on a nurse's role in pain management using opioids. An expert panel of seven members with different backgrounds of nursing, public health, research design, biostatistics, and medicine inspected the questionnaire. Their feedback included the questions' appropriateness to capture the intended constructs as well as addressing the topic, and the format. Whether the questionnaire fit the participants' expected knowledge level and criteria was also inspected. After implementing the expert panel's comments, the questionnaire was approved to be utilized.

A factor analysis was conducted to evaluate each question capturing the related construct and the relationship to other questions, as well as the percentage of explanation of the variables. The Cronbach Alpha test of reliability was not used for a few reasons. Since the questions' format was different in using either a scale or multiple choice, the Cronbach Alpha test could not capture a reliable result. Also, for a small sample size of 30-50 (this study' sample size was 42), the Cronbach Alpha would only be used when the first eigenvalue is above 6. The largest eigenvalue of the questionnaire's factor analysis for this study was 4.6, which indicates that to run a Cronbach Alpha, a sample size of 100 is required (Yurdugul, 2008).

Protecting Human Subjects

Participating in the study (giving permission to use the survey data and reflective log responses) was voluntary and anonymous. No penalty or negative consequences would result from not participating in the study. The course instructor was not part of the research study.

Participants would complete the informed consent form, including a few demographic questions, granting permission to the investigator to use the answers to the surveys and reflective log for the study. Willing participants were asked to put an anonymous ID on all questionnaires and the log (in order to link pre and posttest responses and the reflective log with the consent form). The students used the same ID for consent. Only the researcher had the list of IDs. The researcher gave the list of IDs to one of the committee members who was given access to the blackboard for the purpose of downloading the data for the researcher. The committee member who was also a nursing faculty member was not involved in the grading of the course assignments. To make sure the participation in the study would not impact the students' grades, the student researcher would have access to the data after the pre and posttest were graded. The researcher did not have access to the blackboard.

A unique ID made up of the participants' date of birth (month and date) and the last four digits of their phone numbers helped to match the questionnaires and link the consent forms and logs. Since the process of pre and posttest was done on the same day, no change to the phone numbers was expected. The data was confidential, and the instructor of the course did not have access to them. Only the investigator handled and input the data.

There was no higher risk to the participants than a typical encounter and the possibility of feeling uncomfortable about being subjected to knowledge evaluation and being identified by other participants during the focus group. The participants' privacy and data were respected following IRB protocol and approval. To protect participants' identities, the relationship between age, gender, and ethnicity with the results was not measured. Data is kept in a password protected K-drive. After the project write-up and dissemination were completed (after a minimum of three years per IRB guidelines), the data would be destroyed.

RESULTS

Out of 83 potential participants, 65 students agreed to participate. The participation rate was 78.31 percent. Table 7 includes all participants' demographic information, including age, gender, race, and healthcare experience outside of the program, as well as information on the use of opioids to manage patients' pain. Most participants were 21 years old, Caucasian females. The average age was 25 years with a standard deviation of 5.785 and a range of 20-47. Almost half of the participants were experienced in utilizing opioids to manage their patients' pain, and more than half had healthcare work experience outside of the nursing program.

After matching the anonymous IDs with the data, only 42 students remembered to include their anonymous ID on all assignments (pre, posttest, and reflective log). The demographic information of all 42 students whose survey results and reflective logs were used for the study were similar to the demographics of the total population of 65 participants who agreed to the consent form.

Table 7. Demographic Information

Demographic question	*n(%)*
Gender	
Male	9(13.8)
Female	56(86.2)
Race	
African American	7(10.8)
Caucasian	39(60.0)
Asian/Pacific Islander	10(15.4)
Hispanic	5(7.7)
Multiracial	5(6.2)
Experience of healthcare work outside of the program	
Yes	34(52.3)
No	31(47.7)
Experience of using opioids to manage patients' pain	
Yes	33(50.8)
No	32(49.2)

Quantitative Data

The results include the analysis of the data from pre and posttest and reflective logs of the participants. The sample size is 42.

Theory of Planned Behavior

The correlation among the theory constructs of attitudes, perceived behavioral control, subjective norms, and intention was measured. The results were statistically insignificant. Among the measured correlations between knowledge and all the theory constructs, only the correlation between knowledge and subjective norms was a statistically significant, strong, and positive correlation of $r(40)= .462$ with $p <.01$.

Aim 1

The baseline information of the participants' knowledge and attitudes is demonstrated in Table 8 The mean value and standard deviation for each item of pretest are included. An inconsistency in students' responses to the knowledge questions regarding the correct information on prescription opioids was detected. The majority did not know much about the CDC guideline or PDMPs. Students' score was neither too low nor perfect on the other items related to TPB. The results favored the Hypothesis 1 of the study.

Aim 2

The mean value, standard deviation, and Z-value of the items of pre and posttest are presented in Table 9 Overall, a post-intervention improvement is detected. Students' scores on

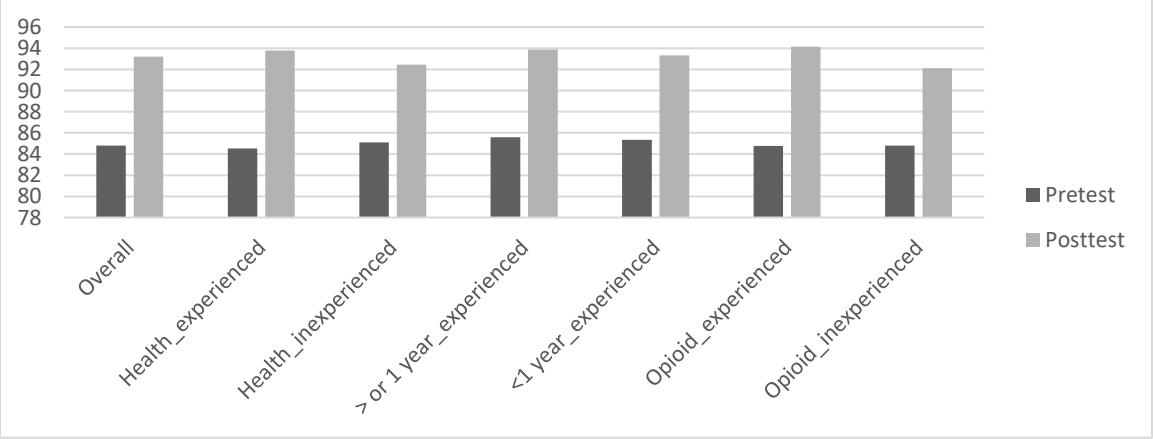
most items regarding their knowledge of the CDC guideline were statistically higher in the posttest compared to the pretest, which favors the Hypothesis 2.

Table 10 includes the mean value and minimum and maximum values possible for each construct as a variable at pre and posttest. Table 11 shows the Wilcoxon results for each construct and the All-Constructs variable in different groups. The comparison between pre and posttest for the overall group shows that except for the subjective norms construct, all other constructs had higher scores in the posttest, supporting Hypothesis 2.

The only statistically significant difference in the Mann-Whitney U tests was for the Subjective Norm construct (p = .029) among the healthcare (work outside the program) experienced group versus inexperienced. The higher score was found for the healthcare experienced group. There was no statistically significant difference in the Mann-Whitney U test on the All-Constructs among different groups.

Figure 5 demonstrates the mean value for the All-Constructs variable in pre and posttest belonging to each group. There was an improvement in the All-Constructs variable among every group regardless of the experience level.

Figure 5. Comparison of Mean Value for All-Constructs among Different Groups in Pre and Posttest



Aim 3

Three questions captured students' ideas of the module' effectiveness and whether they believe the nursing curriculum needs to include a similar topic. About 79% of the students felt the need for extra material regarding pain management and opioid use in the nursing curriculum. Almost 90% thought that the module was informative, and 87.5% felt that the module helped them to prepare for their future practice. Hypothesis 3 was supported by the results of the last three questions.

The differences among healthcare experienced group versus inexperienced, and opioid experienced group versus inexperienced for responses to the Aim 3 questions were measured through the Mann-Whitney U test. Healthcare experienced and inexperienced groups did not score differently. However, the opioid experienced group scored higher on the question "the educational module regarding safe medication administration was informative." The U-value was -.637 with p <.01.

The qualitative data also addressed the Aim 3. The students' reflection on the module is presented in the respective section of "qualitative data."

Validity and Reliability of the Instrument

The validity of the questions to address the intended constructs and the intervention material was done through the expert panel review. Some questions were edited based on the panel's comments. The items included either a multiple-choice format or a five-point Likert scale, with different scale for each construct as it was appropriate.

To evaluate the questionnaire, a factor analysis test was conducted. On the correlation matrix, the items seemed slightly correlated, but the correlations were small enough to consider

each item independent from the other. Eight components were recognized (the eigenvalues were over 1), which explained 75.514% of the variables. On the rotated component matrix, the items from at least two different constructs were loaded on each factor, which means that some items capturing each construct overlapped to at least one more construct. The Kaiser-Meyer-Olkin (KMO) was above .5 (.548), and the Bartlett Test of Sphericity was statistically significant (p =.000). The KMO above .5 indicates the adequacy of the sample size. The significance of the Bartlett Test verifies the validity and sustainability of the collected data.

The effect size of the study was calculated for the sum of all constructs, the All-Constructs variable. The effect size was equal to .589, which was a large effect size.

Table 8. Students' Baseline Responses to Pretest

Items in Each Construct	Mean (SD)	Min. Possible*	Max Possible**
Knowledge			
1) How knowledgeable are you about the CDC's Guideline for Prescribing Opioids for Chronic Pain?	1.60 (.780)	1	5
2) How knowledgeable are you about PDMPs (Prescription Drugs Monitoring Programs)?	1.42 (.723)	1	5
3) Which medications should NOT be the first choice to treat non-cancer chronic pain?	5.62 (1.051)	1	6
4) Which statement about opioid painkillers is correct?	3.80 (757)	1	4
5) What type of opioids is the best choice to start long-term opioid therapy for non-cancer pain?	1.82 (.684)	1	3
6) When should a urine drug screen test be ordered for a patient prescribed long-term opioid therapy for non-cancer pain?	3.60 (.939)	1	4
7) When should an antidote be prescribed for the patient receiving prescription opioids?	4.47 (1.375)	1	5
Attitudes			
1) For me, following a guideline to manage a patient's pain is easy.	3.29 (.968)	1	5
2) How important is it to know the patient medication history?	4.93 (.252)	1	5
3) How important is it to educate patients about the opioids side effects/disposal options?	4.98 (.149)	1	5
4) How important is checking the electronic patients' records when managing pain?	4.89 (.318)	1	5
Perceived behavioral control			
1) When you start to practice as an RN, how confident would you be about managing a patient in pain?	3.73 (.809)	1	5
Subjective norms			
1) Most Registered Nurses follow pain medication orders; no questions asked.	3.29 (.968)	1	5
2) Because patients will receive a hardcopy of medication side effects from their pharmacist, it's not necessary for the registered nurse to educate their patients about side effects they may experience from their medications.	4.84 (.638)	1	5
Intention			
1) How likely are you to educate yourself more on opioid painkiller use for pain management?	4.49 (.815)	1	5
2) How likely are you to influence prescribers by discussing options for pain management?	4.07 (.915)	1	5
3) How likely are you to speak up about your concerns on patients' pain medication?	4.56 (.755)	1	5
4) How likely are you to educate your patients about the side effect of their prescribed opioids?	4.84 (.638)	1	5
5) How likely are you to suggest safe options to your patients regarding disposal of their unused opioid painkillers?	4.69 (.701)	1	5
6) How likely will you look for signs/symptoms of opioid abuse/misuse in your patients?	4.69 (.733)	1	5
7) How likely will you learn about your patient's medication history?	4.76 (.712)	1	5

Notes: * Minimum Possible Value, ** Maximum Possible Value

Table 9. Pre- and Posttest Items' Mean and Z-Value

Items in Each Construct	Mean (SD) Pre-Test	Post-Test	Z
Knowledge			
1) How knowledgeable are you about the CDC's Guideline for Prescribing Opioids for Chronic Pain?	1.60 (.780)	3.77 (.812)	-5.714***
2) How knowledgeable are you about PDMPs (Prescription Drugs Monitoring Programs)?	1.42 (.723)	3.40 (.760)	-5.531***
3) Which medications should NOT be the first choice to treat non-cancer chronic pain?	5.62 (1.051)	6.00 (.000)	-2.232*
4) Which statement about opioid painkillers is correct?	3.80 (757)	3.60 (.979)	-1.857
5) What type of opioids is the best choice to start long-term opioid therapy for non-cancer pain?	1.82 (.684)	2.60 (.728)	-4.196***
6) When should a urine drug screen test be ordered for a patient prescribed long-term opioid therapy for non-cancer pain?	3.60 (.939)	3.81 (.627)	-1.354
7) When should an antidote be prescribed for the patient receiving prescription opioids?	4.47 (1.375)	4.91 (610)	-1.633
Attitudes			
1) For me, following a guideline to manage a patient's pain is easy.	3.29 (.968)	3.53 (.960)	-2.068*
2) How important is it to know the patient medication history?	4.93 (.252)	5.00 (.000)	-1.732
3) How important is it to educate patients about the opioids side effects/disposal options?	4.98 (.149)	4.98 (.152)	.000
4) How important is checking the electronic patients' records when managing pain?	4.89 (.318)	4.98 (.152)	-1.633
Perceived behavioral control			
1) When you start to practice as an RN, how confident would you be about managing a patient in pain?	3.73 (.809)	4.14 (.560)	-3.047**
Subjective norms			
1) Most Registered Nurses follow pain medication orders; no questions asked.	3.29 (.968)	3.42 (1.006)	-1.191
2) Because patients will receive a hardcopy of medication side effects from their pharmacist, it is not necessary for the registered nurse to educate their patients about side effects they may experience from their medications.	4.84 (.638)	4.93 (.457)	-.736
Intention			
1) How likely are you to educate yourself more on opioid painkiller use for pain management?	4.49 (.815)	4.81 (.394)	-2.066*
2) How likely are you to influence prescribers by discussing options for pain management?	4.07 (.915)	4.70 (.465)	-3.819***
3) How likely are you to speak up about your concerns on patients' pain medication?	4.56 (.755)	4.93 (.258)	-3.000**
4) How likely are you to educate your patients about the side effect of their prescribed opioids?	4.84 (.638)	4.95 (.213)	-.577
5) How likely are you to suggest safe options to your patients regarding disposal of their unused opioid painkillers?	4.69 (.701)	4.91 (.294)	-2.121*
6) How likely will you look for signs/symptoms of opioid abuse/misuse in your patients?	4.69 (.733)	4.93 (.338)	-1.941
7) How likely will you learn about your patient's medication history?	4.76 (.712)	4.91 (.294)	-1.134

Notes: *<.05; **<.01; ***<.001

Table 10. The Mean Value and Possible Values of the Constructs in Pre- and Posttest

Construct	Mean		Possible Value	
	Pre-Test	Post-Test	Minimum	Maximum
Knowledge	22.2381	28.0714	7	32
Intention	32.6667	34.1190	7	35
Subjective Norms	8.1190	8.3810	2	10
Attitudes	18.0238	18.5000	4	20
Perceived Behavioral Control	3.7381	4.1429	1	5

Table 11. Statistical Comparison of the Constructs among Different Experience Groups in Pre- and Posttest

Construct	Overall	Healthcare Experienced		Years of Experience among Experienced		Opioid Experienced	
		Yes	No	<1 year	> or 1 year	Yes	No
	Z(p)	*Z(p)*	*Z(p)*	*Z(p)*	*Z(p)*	*Z(p)*	*Z(p)*
Knowledge	-5.551(.000)	-4.209(.000)	-3.688(.000)	-3.677(.000)	-3.522(.000)	-4.116(.000)	-3.769(.000)
Intention	-4.019(.000)	-3.157(.002)	-2.511(.012)	-2.568(.010)	-2.493(.013)	-3.042(.002)	-2.658(.008)
Subjective Norms	-1.344(.179)	-.263(.793)	-1.543(.123)	-1.725(.084)	-.054(.957)	-1.641(.101)	-.159(.873)
Attitudes	-2.584(.010)	-2.800(.005)	-.893(.372)	-1.604(.109)	-1.980(.048)	-1.922(.055)	-1.721(.085)
Perceived Behavioral Control	-3.047(.002)	-2.517(.012)	-1.732(.083)	-2.138(.033)	-1.732(.083)	-2.517(.012)	-1.732(.083)
All-Constructs	-5.396(.000)	-.4076(.000)	-3.582(.000)	-3.685(.000)	-3.316(.001)	-3.990(.000)	-3.684(.000)

Note: $p < .05$

Qualitative Data

Qualitative data were collected from the same 42 students who included their ID on the survey and logs. The main themes and subthemes are in Table 12 The themes that emerged supported Hypothesis 3 since they showcased the knowledge that the participants gained through the module. Also, the qualitative results reinforced the accuracy of the questionnaire responses.

Table 12. Qualitative Data Themes and Subthemes

Themes	Subthemes
Thorough assessment	1. Pain assessment 2. Medication history assessment 3. Assess mental health
Patient education	1.Educate patients on the risks & benefits/side effects of opioids 2.Educate patients safeguarding opioids to prevent others from consuming them 3.Educate patients about medication/alcohol interaction
Evaluate/avoid the risk of misuse or overdose	1.Opioid selection 2.Urine drug test 3.Utilize PDMP 4.Evaluate the possibility of risk factors 5.Consider Naloxone
Nurse's role as a care-team member	1.Communicate with the patient 2.Be a patient advocate 4.Clear documentation 3.Communicate with the multidisciplinary team

Thorough Assessment

The students were aware of the importance of a thorough assessment to manage patient's pain.

Pain Assessment. About 62 percent of students explained about how they would assess pain. They understood the concept of pain assessment and using validated scales such as the PEG scale. A student wrote, "I would perform a pain assessment using the PEG scale to evaluate how

severe the pain is." Another noted, "initial assessment needs to be conducted to assess the need for this (prescription opioids) as the next method of treatment."

Medication History Assessment. Almost 43 percent of the students mentioned the importance of assessing the current medication and methods of pain relief. For instance, one indicated the assessment should include questions to determine "…how is he taking his Ibuprofen and if he is taking enough dosage." Students noted that before making any decisions on opioids they "would need to determine patient's medication history, including OTC supplements and medications."

Assess Mental Health. The CDC guideline emphasized conducting mental assessment for the severity of perceived pain and evaluating possible risk factors of medication abuse. Almost half of the students refer to this point in their writing. As someone noted, "before considering opioid treatment, a mental health evaluation should be conducted…" Another mentioned, " (the patient) should have a mental health screening, as depression and anxiety can interfere with improvement in pain." Students used the term "assess for mental health" or " assess for depression and anxiety" many times in their logs.

Patient Education

Patient education was mentioned in most logs, as it was a suggested point in both the guideline and the video.

Educate Patients on the Risks and Benefits/Side Effects of Opioids. Conversations about the contraindications of receiving opioids, their side effects, and effectiveness for chronic pain were noticeable in 64 percent of the logs. One student noted, "I would provide considerable patient education on the risks of therapy and develop a comprehensive care plan per the CDC's

recommendations." Establishing realistic treatment goals collaboratively with the patient was emphasized in many logs. A student wrote, "the provider can determine whether or not to start opioid therapy or start with nonopioids and determine goals for pain and function." Patients should know that expecting a total relief from pain is not the goal, and instead, they should focus on function and quality of life, which they are more likely to achieve. Another point that was mentioned as a risk factor was the fact that opioids "are not ideal for safety-sensitive jobs," because the patient in the scenario was a construction worker and would need to climb ladders.

Educate Patients Safeguarding Opioids to Prevent Others from Consuming them. Some students (less than 10 percent) referred to the importance of educating patients about the disposal options for unwanted medications. "Keeping their prescribed opioids safeguarded" is an important step that could prevent their household members from abusing them.

Educate Patients about Medication/Alcohol Interaction. The students were aware of the possible side effects of drug interactions. For instance, avoiding alcohol was mentioned in almost all logs. "The patient should be made aware that mixing alcohol and opioids is dangerous," a student mentioned. Some logs also refer to the "contraindication of antibiotics use with opioid painkillers." Almost 50 percent of students referred to the necessity of avoiding drug or alcohol interaction with opioids.

Evaluate/Avoid the Risk of Misuse or Overdose

Evaluating and avoiding the possible risks of opioid misuse or abuse risk was a significant point that was indicated very commonly in students' writings.

Opioid Selection. Safely prescribing opioid painkillers was the central point of the CDC guideline discussed in the module. About 90 percent of participants understood that opioids are

not the first choice to manage non-cancer chronic pain. One student wrote, "non-pharmacological, and non-opioid strategies … I would discuss with an interdisciplinary team and then suggest to Mr. Brice (the patient's name in the scenario) if appropriate are physical therapy, weight loss, cognitive behavioral therapy, and OTC acetaminophen." Starting the opioid therapy with an "immediate release" opioid and the "lowest dose possible" was noted in some writings. "Combination of opioids with other painkillers such as Ibuprofen" was mentioned in more than 40 percent of the responses. This strategy could help patients avoid developing tolerance to opioids, as well as achieving effective pain management. The critical role of follow-ups and consideration of the possibility of discontinuing opioid therapy were discussed in 43 percent of the logs. One noted, "the care plan I would develop would include treatment goals, when to discontinue the therapy, and when to schedule reassessments throughout the therapy." Another mentioned that, "opioids need to be discontinued appropriately if risks exceed the potential benefits. Minimizing risks is paramount in the strategic plan of care."

Urine Drug Test. A urine drug test was mentioned in some logs too. For instance, a student mentioned, "to take extra precautions with a urine drug screen to confirm presence of prescribed substance and for undisclosed prescription drug or illicit substance use."

Utilize PDMP. Utilizing PDMPs was recognized as a tool to avoid the risk of drug interaction and overdose in more than 14 percent of the writings. "One of the most important strategies for this patient include reviewing the patient's-controlled substance history by using prescription drug monitoring program (PDMP) …," a student noted.

Evaluate the Possibility of Risk Factors. Patients' "history of drug or alcohol abuse" and mental disorders such as "depression" were emphasized in the guideline as risk factors for drug abuse, among others, to which the students paid attention.

Consider Naloxone. Prescribing Naloxone for the patients at risk of opioid overdose is suggested in the guideline, and a few students (more than 10 percent) captured that. One noted, "Naloxone should be prescribed, and Mr. Brice and his family need to be instructed on how to take it in the situation of an OD and signs of respiratory distress."

Nurses' Role as a Care-Team Member

The nurses' role as a care-team member as emphasized in the CDC's video, was a recurring theme in the students' reflective logs. More than 60 percent mentioned at least one of the subcategories to this theme.

Communicate with the Patient. Asking open-ended questions was a critical point discussed in the CDC's video, and students reflected on that. A student noted, "more information about the reported back pain should be obtained by asking open-ended questions about how the pain impacts his life …" Setting realistic goals for pain relief was captured in more than 60 percent of the logs. The fact that long-term opioid therapy might not be beneficial for chronic pain was also mentioned. One student wrote, "I will assist the patient in setting realistic goals for pain and function based on his diagnosis of chronic low back pain and his lifestyle." While another noted, "there isn't any well-documented evidence that they improve pain or function with long-term use and that complete relief of pain is unlikely."

Be a Patient Advocate. The students understood the importance of nurse-patient communication and empathizing with and advocating for the patient as part of their responsibility. "The establishment of a therapeutic relationship is essential in order for the patient to open up and share more information," one wrote. Another student mentioned that, "pain is

subjective; therefore, we must actively listen and advocate for the patient without any bias." The participants also noted the importance of "validating the patient's feelings."

Clear Documentation. Participants realized how critical it is "to take clear documentation on patients' assessment and medical history for other team members."

Communicate with the Multidisciplinary Team. Communicating with other members of the team was also discussed in some logs, "As a member of the healthcare team, they (nurses) play a vital role in risk mitigation strategies, quality improvement, and care coordination to ensure patient safety and improve patient outcomes," a student wrote.

DISCUSSION

This study was conducted to implement and assess an educational intervention targeting undergraduate nursing students. The educational material included highlights of the CDC Guideline for Prescribing Opioids for Chronic Pain, and a video named "A Nurse's Call to Action for Safer Opioid Prescribing," provided by the CDC (Appendix A). As noted by the literature, educational interventions regarding pain management using opioids could positively impact healthcare providers' knowledge, attitudes, and confidence level (Cardarelli et al., 2018). The systematic review that formed this dissertation document's first project underscored the benefits gained through an educational intervention regarding pain management using opioids for healthcare providers throughout the US. The results found through the second project emphasized the need for comprehensive education regarding opioid painkillers in undergraduate nursing curricula. Therefore, the third project objectives focused on theoretically informed aspects of nursing students' knowledge and attitudes about opioids before and after learning the educational module. The third project's findings echoed the literature and showed improvement

in all theoretical constructs and the participants' knowledge level as a direct result of the intervention.

The Baseline of Students' Knowledge and Attitudes

The Aim 1 results showed that the students had limited knowledge of the CDC guideline, and their information on each guideline's recommendation was inconsistent. They had relatively positive attitudes, subjective norms, perceived behavioral control, and intention regarding the use of opioids for pain management. Knowledge deficit among nurses about pain management, specifically by administering opioid painkillers, was expected (Toba et al., 2019).

The educational and clinical implication emerging from the results of Aim 1 showcases the need to improve undergraduate nursing students' knowledge about pain management using opioids. Enhanced knowledge and skills for nurses could lead to better patient outcomes (Latchman, 2014).

The Impact of an Educational Module on Students' Knowledge and Attitudes

The findings of Aim 2 demonstrated a notable improvement in nursing students' knowledge and attitudes regarding managing pain by opioid painkillers after the intervention. Students scored significantly higher in the posttest than the pretest in questions that addressed knowledge and every theoretical construct except for the subjective norms.

The literature demonstrates how advanced education about pain management and opioids will improve healthcare providers' knowledge and confidence level (Cardarelli et al., 2018). In the posttest, knowledge, and perceived behavioral control, which measures self-confidence and feeling of control over one's behavior (Montano & Kasprzyk, 2015) improved significantly.

As noted by the literature (Webb & Sheeran, 2006), educational interventions could positively influence the intention. This point was demonstrated by the Aim 2 results as well. Improved attitudes among students regarding pain management using opioids were found after they received the module. This finding was also an expected outcome of an educational intervention on attitudes regarding health behaviors (Mashoofi et al., 2010). The analysis of the sum of the constructs (the All-Constructs variable) displayed a highly significant positive impact of the module on the students' knowledge, attitudes, subjective norms, perceived behavioral control, and intention among all groups of the overall, healthcare or opioid experienced, and inexperienced. This analysis implicates that the participants' future practice behavior could be influenced positively by enhancing the theoretical constructs examined in this study by providing nursing students with more educational opportunities on this topic (Ajzen, 2010).

The analysis of the data based on healthcare practice experience outside the nursing program demonstrated an interesting result. The experienced group for healthcare work outside nursing program showed significant improvement in their attitudes compared to the inexperienced group. According to the literature, higher experience in pain management among healthcare professionals could lead to less adherence to the newly developed guidelines (Desveaux et al., 2019). This study's finding of experienced groups may indicate that they might be more susceptible to improvement in their beliefs and approach toward opioid painkillers' topic after receiving educational interventions. As noted in the literature (Pattison-Sharp et al., 2017), conducting educational interventions for practicing nurses could be greatly effective. Higher scores among experienced students in the posttest questionnaire could emphasize on this point.

An educational and clinical implication for Aim 2 of the study is that since there was no correlation among the TPB's constructs in this study, except for the knowledge and subjective norms, more theory-testing approaches are needed to explain educational interventions' impact on healthcare professionals' knowledge and attitudes regarding opioids. Although the TPB has been recognized as a notable fit to explain healthcare workers' pain management behavior (Godin et al., 2008), it might not be the best fit for this study. Even in the most careful study designs, TPB constructs fail to show a stronger correlation than .60 (Ajzen, 2011). The modified Theory of Planned Behavior was partially supported by showing a strong, significant, and positive correlation between knowledge and subjective norms. Subjective norms have been detected as strong predictors of intention to use opioids among healthcare workers (Weber et al., 2011). This point implies an opportunity to explore further the impact of knowledge on subjective norms regarding prescription opioids.

A need for comprehensive education regarding opioid prescription guidelines for pain management in nursing schools' curricula is apparent. Enhancing healthcare professionals' knowledge of prescription opioids could positively impact the opioid crisis and prevent drug abuse and overdose (Manworren, & Gilson, 2015; Weimer et al.'s, 2016).

Nursing Students' Reflection on the Educational Module

The results of Aim 3 demonstrated significantly positive feedback and reflection from the students. The findings showed that after learning the module, nursing students felt more prepared for their future practice. They believe that similar educational modules to the one they received could not only be beneficial but also necessary. This finding echoed the literature about

healthcare providers' favorable feedback on additional education about opioid painkillers in previous studies (Pruskowsk et al., 2019).

The module included a multi-mode of educational material (readings, video, repeating questionnaire, and a reflective log that included a case scenario). Having such an approach could enhance the knowledge gained through the module (Michie et al., 2018). The students demonstrated their excellent understanding of the material in their reflections. The reflective logs' responses showcased their gained knowledge and positive attitudes toward following the CDC guideline for prescription opioids. Most students understood the critical recommendations of the CDC guideline (Dowell et al., 2016) and reflected on them. For instance, remembering that opioid painkillers should not be chosen as the first line of therapy for non-cancer chronic pain was the highlight of the students' responses.

Aim 3 results imply that adopting educational modules on the guidelines for prescribing opioid painkillers in nursing schools' curricula could lead to knowledgeable and confident healthcare professionals entering the practice field. According to the CDC (2017), when healthcare providers know the details of how and when to utilize opioid painkillers, the prescription drug abuse and overdose rates could drop, and patients' outcomes would improve.

Limitations and Future Directions

There are a few limitations to this study. First, the sample size was smaller than the ideal. Only 42 students remembered to include their anonymous ID on all assignments (questionnaires and logs). Although the effect size was large, a bigger sample size that includes students from multiple institutions could help in the results' generalizability. Future studies of nursing students' knowledge of opioids should include more schools and larger participants.

A small sample size is not recommended for reliability tests for new questionnaires. For that reason, the Cronbach Alpha test was not utilized. Future studies with a larger sample size are necessary to test the questionnaire's reliability designed for this study.

The other limitation is regarding the Theory of Planned Behavior. The TPB assumes that behavior would be influenced directly by the intention (Ajzen, 1991), but the actual behavior is not evaluated in the current study. Studies that would evaluate the practical outcomes of a similar educational intervention could address that limitation. A follow-up assessment for measuring the participants' behavior and knowledge level is recommended.

CHAPTER V

SUMMARY

The overall purpose of this dissertation was to evaluate whether an educational intervention regarding opioid painkillers targeting healthcare providers, including nursing students, could impact their knowledge level. The first project was a systematic review assessing the overall impact of interventions aiming to improve prescription opioids' knowledge among healthcare providers around the US. The second project was a qualitative research exploring nursing students' knowledge of opioids guidelines, mainly the CDC guideline. The skills and beliefs of nursing students regarding the addition of a comprehensive approach to educating them on the topic of opioid painkillers were also assessed. The third project consisted of an educational module teaching undergraduate nursing students about the CDC guideline for prescribing opioids and nurses' roles and impact on the opioid crisis.

CONCLUSION

In study one, a systematic analysis of the literature assessing the impact of educational intervention on prescription opioids knowledge and practice behavior among the US healthcare providers was conducted. The hypothesis of this study, "educational interventions have positive impacts on healthcare providers' knowledge and practice behavior regarding pain management using opioids," was supported by the literature analysis. All modes of interventions (lectures, workshops, online resources, or mixed-method) successfully enhanced healthcare providers' knowledge and practice behavior.

Study two was designed to explore nursing students' lived experiences regarding their education and knowledge of opioids. The two hypotheses of the study were supported by

analyzing the results. The hypothesis that "nursing students do not have knowledge of the CDC guideline for pain management using opioids" was supported since none of the participants had any information regarding the CDC guideline. After the students realized that there are available guidelines for better pain management practice, they felt unconfident practicing at their current knowledge level, so the hypothesis that "nursing students do not feel confident in their pain management skills" was supported. The students felt that they would benefit from detailed and comprehensive education about the topic if their program would offer it. The results of the second project informed the third study's design.

The third study was conducted by designing an educational module and a questionnaire that could address the study's aims. The first hypothesis that "nursing students do not have knowledge of The CDC guideline for prescription opioids" was supported by the pretest analysis results. The second hypothesis was that "after learning an educational module on opioid painkillers guideline by the CDC and nurses' role in pain management, nursing students will have improved knowledge and attitudes about pain management using opioids." This hypothesis was also strongly supported by assessing the pre- and posttest among different groups. The third hypothesis was, "the students will reflect positively about their experience and believe that the educational model has positively impacted their confidence level and future practice regarding using opioids for pain management." Hypothesis 3 was supported by most students agreeing on the importance and positive impact of the module on improving their knowledge, skills, and confidence level. The participants felt prepared for their future practice and showed that they had learned about pain management and opioids in their reflective logs. The Theory of Planned Behavior was partially supported in this study. There was a significantly strong and positive correlation between knowledge and subjective norms. According to the TPB, enhancing each

construct proximal to the behavior construct could enhance the behavior. After the study's participants completed the educational module, a significant improvement in the constructs of knowledge, attitudes, perceived behavioral control, and intention was detected, which could positively impact the practice behavior.

IMPLICATIONS

This dissertation shows the positive impact of comprehensive education on pain management using opioids on healthcare providers' knowledge. Continuing education with a focus on newly developed guidelines, such as the CDC Guideline for Prescribing Opioids for Chronic Pain and offering it in schools' curricula could help providers gain confidence and enable them to practice safely. Skillful healthcare providers could help reduce the opioid abuse and overdose rate and improve patients' outcomes. Exposure to comprehensive education regarding this topic in undergraduate programs, including nursing schools, could pave the path toward improving pain management practices and controlling the opioid crisis. Undergraduate curricula could adopt the available guidelines and resources to enhance and integrate healthcare students' knowledge and their future approach to the opioid dilemma and pain management.

Future research is recommended to decide on the best educational material and to evaluate the outcomes. A larger sample size and the inclusion of different schools nationwide could validate the results and tools utilized in this dissertation. Evaluating healthcare providers' practice behavior and patient's outcomes by analyzing the rates of prescribed opioids, patients who develop drug misuse disorder, hospital visits for overdose symptoms, and death rates due to opioid overdose could be the future direction of the related studies.

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APPENDICES

A. "USE OF OPIOID PAINKILLERS FOR PAIN MANAGEMENT" EDUCATIONAL MODULE

NURS 376

OLD DOMINION UNIVERSITY

Overview:

Millions of US citizens are prescribed opioids for chronic pain. At the same time, the number of opioid abuse/misuse and deaths relating to opioids is rising. Some states have higher opioid prescribing rate which are not directly linked to the health status of the residents. This highlights the variation in healthcare providers' practice behaviors. To address the opioid crisis, the CDC has developed resources and guidelines for opioid prescribing practices. By better understanding the guidelines for opioid use, and the nurses' role and responsibilities in pain management, nurses can positively impact patient safety and outcomes.

Module Objectives:

Module Objectives	Relevant Course Objectives
1. Describe the twelve recommendations of the CDC for prescribing opioid for chronic non-cancer pain 2. Describe the nurse's role as a member of an integrated healthcare team in implementing the CDC Guideline for Prescribing Opioids for Chronic Pain 3. Describe strategies for effective communication between the registered nurse and patients experiencing chronic pain 4. Describe approaches to improve patient outcomes through participation in quality improvement (QI) and care coordination processes across the integrated healthcare team	Objective 1 and 2 will aid in students' understanding of opioid painkillers and adherence to the CDC guideline. Objective 3 and 4 will help the students in understanding prescription drug misuse, will improve critical thinking, will support nursing interventions and skills related to pain management, and will improve patient care outcomes.

Module Summary:

I. CDC Guideline Overview

The CDC Guideline addresses patient-centered clinical practices including conducting thorough assessments, considering all possible treatments, closely monitoring risks, and safely discontinuing opioids. The three focus areas in the Guideline include:

1. Determining when to initiate or continue opioids for chronic pain
    - Selection of non-pharmacologic therapy, nonopioid pharmacologic therapy, opioid therapy
    - Establishment of treatment goals
    - Discussion of risks and benefits of therapy with patients
2. Opioid selection, dosage, duration, follow-up, and discontinuation
    - Selection of immediate-release or extended-release and long-acting opioids
    - Dosage considerations
    - Duration of treatment
    - Considerations for follow-up and discontinuation of opioid therapy
3. Assessing risk and addressing harms of opioid use
    - Evaluation of risk factors for opioid-related harms and ways to mitigate patient risk
    - Review of prescription drug monitoring program (PDMP) data
    - Use of urine drug testing
    - Considerations for co-prescribing benzodiazepines
    - Arrangement of treatment for opioid use disorder

II. Nurses' Role

Nurses are in direct contact with patients and communicate with both patients and prescribers. Pain assessment, establishing patient-provider trust, and patient education are some examples of nurses' vital role. Students will learn how they could impact patients' outcome and safety by considering the right approach to different situations.

- Describe your role as a member of an integrated healthcare team in implementing the CDC Guideline for Prescribing Opioids for Chronic Pain
- Identify how you can improve patient care by implementing recommendations from the CDC Guideline for Prescribing Opioids for Chronic Pain

- Describe strategies for effective communication between you and your patients experiencing chronic pain
- List strategies and tools for assessing and documenting chronic pain conditions
- Identify assessment criteria and treatment options for opioid use disorder (OUD)
- Describe approaches to improve patient outcomes through participation in quality improvement (QI) and care coordination processes across the integrated healthcare team

Assignments:

1.	**Note: Students who would like to participate in the study of "NURSING STUDENTS' KNOWLEDGE AND ATTITUDES ABOUT PAIN MANAGEMENT AND OPIOIDS" please READ and SIGN the informed consent form and email the signed form to hsirj001@odu.edu** **Assignment Title: Complete the pre-survey questionnaire (through Qualtrics)** **Purpose:** To evaluate students' knowledge and attitudes about the concept of pain management and opioid painkillers. **Directions for completing assignment:** Please answer the survey. If you would like to participate in the study, please click on the link to Qualtrics and give permission to Sirjani to use your responses. If you agreed to participate, **please include the anonymous ID** on the top of the survey. **Submission Guidelines**: Submit through Qualtrics. **Grading Criteria:** Not graded. **Tips for Success:** Use your knowledge and experience that you have gained through your program. **Estimated Time to Complete:** 15 minutes
2.	**Assignment title: Complete the CDC "A Nurse's Call to Action for Safer Opioid Prescribing" module.** **Purpose:** To understand the critical role of a nurse in patient' pain management and patient outcomes.

	Directions for completing assignment: Please click on the link: https://www.cdc.gov/drugoverdose/training/nurses-call-to-action/index.html **Submission Guidelines**: No submission required. **Grading Criteria:** Not graded. **Tips for Success:** Take notes on key concepts that help you further understand the best approach to opioid use for chronic pain, according to the CDC. **Estimated Time to Complete:** 1 hour
3.	**Assignment title: review the CDC Guideline for Prescribing Opioids for Chronic Pain.** **Purpose:** To learn the CDC recommendation for prescribing opioids for chronic pain (twelve recommendations) **Directions for completing assignment:** Please review the of the CDC Guideline for Prescribing Opioids for Chronic Pain https://www.cdc.gov/drugoverdose/pdf/prescribing/Guidelines_Factsheet-a.pdf **Submission Guidelines**: No submission required. **Grading Criteria:** Not graded. **Tips for Success:** Take notes on key concepts that help you further understand the best approach to opioid use for chronic pain, according to the CDC. **Estimated Time to Complete:** 20 minutes.
4.	**Assignment title: Review the extra resources below:** **Purpose:** To expand your knowledge on the concept of opioid use for pain management. **Directions for completing assignment:** Please click on each link for different topics/resource pain assessment (PEG scale) https://www.cdc.gov/drugoverdose/pdf/turnthetide_pocketguide-a.pdf, assess harms of Opioid Therapy https://www.cdc.gov/drugoverdose/pdf/assessing_benefits_harms_of_opioid_therapy-

	a.pdf, and pregnancy fact sheet https://www.cdc.gov/drugoverdose/pdf/pregnancy_opioid_pain_factsheet-a.pdf **Submission Guidelines**: No submission required. **Grading Criteria:** Not graded. **Tips for Success:** take notes as needed. **Estimated Time to Complete:** 20 minutes
5.	**Assignment title: Reflective Log** **Purpose:** To think critically and review the knowledge gained through the module. **Directions for completing assignment:** Please read the scenario and follow the directions. **Submission Guidelines**: Submit through blackboard. **Grading Criteria:** Graded. **Tips for Success:** Use your knowledge gained through the previous assignments in this module and the available literature. **Estimated Time to Complete:** 45 minutes.
6.	**Assignment title: Complete the post-survey questionnaire.** **Purpose:** To evaluate students' knowledge of the concept of pain management and opioid painkillers and compare with the pre-survey. **Directions for completing assignment:** Please answer the survey. If you have agreed to participate in the study, **please include the anonymous ID**. **Submission Guidelines**: Submit through blackboard. **Grading Criteria:** Not graded. **Tips for Success:** Use your knowledge gained through the previous assignments in this module and use your best judgement. **Estimated Time to Complete:** 20 minutes.

B. REFLECTIVE LOG

Prescription Opioid Module

The CDC Guideline for Prescribing Opioids for Chronic Non-Cancer Pain

Twelve recommendations:

1. Opioids are not the first line of therapy for non-cancer chronic pain.
2. Establish realistic goals for pain and function (refer to the PEG scale, 30% improvement for both pain and function is meaningful))
3. Discuss risks and benefits of opioids with the patients
4. Use immediate-release opioids when starting a long-term opioid therapy for non-cancer pain
5. Use the lowest effective dose when starting a long-term opioid therapy for non-cancer pain
6. Prescribing short duration opioids for acute pain
7. Evaluate benefits and harms of opioid therapy frequently (within 1 to 4 weeks of starting opioids, and every 3 months after)
8. Use strategies to mitigate risk
9. Review PDMP data (every prescription to every 3 months)
10. Use urine drug testing (before starting the log-term therapy, and at least once a year)
11. Avoid concurrent opioid and Benzodiazepine prescribing
12. Offer treatment for opioid use disorder

Read the information summarized on this page:
https://www.cdc.gov/drugoverdose/pdf/prescribing/Guidelines_Factsheet-a.pdf

Complete the online video module, A Nurse's Call to Action for Safer Opioid Prescribing, available here: https://www.cdc.gov/drugoverdose/training/nurses-call-to-action/index.html

Prescription opioid module reflective log

Please use information from the online video module and the factsheet as well as additional outside resources to respond to the prompt.

Scenario:

You are a providing patient teaching on the medical-surgical unit of a busy urban hospital. You are assigned to Mr. Brice, a 53-year-old patient who owns his own construction company. Mr. Brice does not have a primary care provider and delayed seeking treatment for his recent cough and shortness of breath. He was recently admitted to your hospital for community-acquired bacterial pneumonia. His vital signs are currently stable, and he is ready for discharge with oral antibiotic treatment. From his social history, Mr. Brice reports that he smokes two packs of cigarettes per day and drinks alcohol only on the weekends. He does not take any prescription medications but reports taking OTC ibuprofen for chronic, low back pain after a fall from a ladder five years ago. He says that his pain interferes with his daily activities and he believes that he needs a prescription for Percocet. Based upon information from the CDC online module and factsheet, what are your strategies and recommendations for managing this patient?

Grading guidelines

Support your reflective log with additional professional sources and follow the rubric

for journal entries for this course. Your log should be a minimum of 300 words in APA format.

C. QUESTIONNAIRES

PRETEST

NURSING STUDENTS' KNOWLEDGE AND ATTITUDES ABOUT PAIN MANAGEMENT AND OPIOIDS

Anonymous ID: To create a unique and anonymous ID please use month and day of your birthday and the last four digits of your phone number respectively.

Example: if your birthday is on June 20th and your phone number is 888-8888, your ID will be:

06208888

ID: _____

Part 1. Pain Management and Opioids. Please select the correct answer.

1. How knowledgeable are you about the CDC's Guideline for Prescribing Opioids for Chronic Pain? (Please select a number, 1 is "not knowledgeable," and 5 is "extremely knowledgeable")

Not knowledgeable	A little knowledgeable	Knowledgeable	Very knowledgeable	Extremely knowledgeable
1	2	3	4	5

2. How knowledgeable are you about PDMPs (Prescription Drugs Monitoring Programs)? (Please select a number, 1 is "not knowledgeable," and 5 is "extremely knowledgeable")

Not knowledgeable	A little knowledgeable	Knowledgeable	Very knowledgeable	Extremely knowledgeable
1	2	3	4	5

Please select the correct answer

3. Which medications should **NOT** be the first choice to treat non-cancer chronic pain?

   a) Acetaminophen

   b) NSAIDs

c) Gabapentin/Pregabalin

d) Antidepressants

e) Topical agents

f) Opioids

4. Which statement about opioid painkillers is correct:

a) Short-term opioid therapy can reduce pain

b) Long-term opioid therapy is beneficial

c) There is not enough evidence on long-term opioids benefits

d) a & c

5. What type of opioids is the best choice to start long-term opioid therapy for non-cancer pain?

a) Immediate release

b) Extended release/long acting

c) Depends on the pain level

6. When should a urine drug screen test be ordered for a patient prescribed long-term opioid therapy for non-cancer pain?

a) Not always necessary

b) When starting the opioid regimen

c) At least once a year

d) b & c

7. When should an antidote be prescribed for the patient receiving prescription opioids?

a) When overdose symptoms exist

b) For high opioid dosages (> 50 MME/day)

c) For patients on concurrent Benzodiazepines and opioids

d) For patients with history of overdose

e) All the above

Please answer the questions below, "In your future role as a Registered Nurse …"

8. How likely are you to educate yourself more on opioid painkiller use for pain management? (Please select a number, 1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

9. How likely are you to influence prescribers by discussing options for pain management? (Please select a number, 1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

10. How likely are you to speak up about your concerns on patients' pain medication? (1 is "very unlikely", 3 is "neutral", and 5 is "extremely likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

11. How likely are you to educate your patients about the side effect of their prescribed opioids? (1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

12. How likely are you to suggest safe options to your patients regarding disposal of their unused opioid painkillers? (1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

13. How likely will you look for signs/symptoms of opioid abuse/misuse in your patients? (1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

14. How likely will you learn about your patient's medication history? (1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

15. Most Registered Nurses follow pain medication orders, no questions asked. (Please select a number, 1 is "strongly disagree," 3 is "neutral," 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

16. Because patients will receive a hardcopy of medication side effects from their pharmacist, it is not necessary for the registered nurse to educate their patients about side effects they may experience from their medications. (Please select a number, 1 is "strongly disagree," 3 is "neutral," 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

17. For me, following a guideline to manage a patient's pain is easy (1 is "strongly disagree, 3 is "neutral", and 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

18. How important is to know the patient medication history? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

19. How important is to educate patients about the opioids side effects/disposal options? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

20. How important is checking the electronic patients' records when managing pain? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

21. When you start to practice as an RN, how confident you would be about managing a patient in pain? (Please select a number, 1 is "not confident at all," 3 is "neutral," and 5 is "very confident")

Not confident at all	Not confident	Neutral	Confident	Very confident
1	2	3	4	5

22. Do you think additional content regarding pain management and opioids is needed in the undergraduate nursing curriculum? (Please select a number, 1 is "not necessary at all," 3 is "neutral," 5 is "very necessary")

Not necessary at all	Not necessary	Neutral	Necessary	Very necessary
1	2	3	4	5

POSTTEST

NURSING STUDENTS' KNOWLEDGE AND ATTITUDES ABOUT PAIN MANAGEMENT AND OPIOIDS

Anonymous ID: To create a unique and anonymous ID please use month and day of your birthday and the last four digits of your phone number respectively.

Example: if your birthday is on June 20th and your phone number is 888-8888, your ID will be: 06208888

ID: _____

Part 1. Pain Management and Opioids. Please select the correct answer.

3. How knowledgeable are you about the CDC's Guideline for Prescribing Opioids for Chronic Pain? (Please select a number, 1 is "not knowledgeable," and 5 is "extremely knowledgeable")

Not knowledgeable	A little knowledgeable	Knowledgeable	Very knowledgeable	Extremely knowledgeable
1	2	3	4	5

4. How knowledgeable are you about PDMPs (Prescription Drugs Monitoring Programs)? (Please select a number, 1 is "not knowledgeable," and 5 is "extremely knowledgeable")

Not knowledgeable	A little knowledgeable	Knowledgeable	Very knowledgeable	Extremely knowledgeable
1	2	3	4	5

Please select the correct answer

3. Which medications should **NOT** be the first choice to treat non-cancer chronic pain?

   a) Acetaminophen

   b) NSAIDs

   c) Gabapentin/Pregabalin

   d) Antidepressants

e) Topical agents

f) Opioids

23. Which statement about opioid painkillers is correct:

a) Short-term opioid therapy can reduce pain

b) Long-term opioid therapy is beneficial

c) There is not enough evidence on long-term opioids benefits

d) a & c

24. What type of opioids is the best choice to start long-term opioid therapy for non-cancer pain?

a) Immediate release

b) Extended release/long acting

c) Depends on the pain level

25. When should a urine drug screen test be ordered for a patient prescribed long-term opioid therapy for non-cancer pain?

a) Not always necessary

b) When starting the opioid regimen

c) At least once a year

d) b & c

26. When should an antidote be prescribed for the patient receiving prescription opioids?

a) When overdose symptoms exist

b) For high opioid dosages (> 50 MME/day)

c) For patients on concurrent Benzodiazepines and opioids

d) For patients with history of overdose

e) All the above

Please answer the questions below, "In your future role as a Registered Nurse …"

27. How likely are you to educate yourself more on opioid painkiller use for pain management? (Please select a number, 1 is "very unlikely", 3 is "neutral", and 5 is "very likely")

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

28. How likely are you to influence prescribers by discussing options for pain management? (Please select a number, 1 is “very unlikely”, 3 is “neutral”, and 5 is “very likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

29. How likely are you to speak up about your concerns on patients’ pain medication? (1 is “very unlikely”, 3 is “neutral”, and 5 is “extremely likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

30. How likely are you to educate your patients about the side effect of their prescribed opioids? (1 is “very unlikely”, 3 is “neutral”, and 5 is “very likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

31. How likely are you to suggest safe options to your patients regarding disposal of their unused opioid painkillers? (1 is “very unlikely”, 3 is “neutral”, and 5 is “very likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

32. How likely will you look for signs/symptoms of opioid abuse/misuse in your patients? (1 is “very unlikely”, 3 is “neutral”, and 5 is “very likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

33. How likely will you learn about your patient’s medication history? (1 is “very unlikely”, 3 is “neutral”, and 5 is “very likely”)

Very unlikely	Unlikely	Neutral	Likely	Very likely
1	2	3	4	5

34. Most Registered Nurses follow pain medication orders, no questions asked. (Please select a number, 1 is “strongly disagree,” 3 is “neutral,” 5 is “strongly agree”)

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

35. Because patients will receive a hardcopy of medication side effects from their pharmacist, it is not necessary for the registered nurse to educate their patients about side effects they may experience from their medications. (Please select a number, 1 is "strongly disagree," 3 is "neutral," 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

36. For me, following a guideline to manage a patient's pain is easy (1 is "strongly disagree, 3 is "neutral", and 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

37. How important is to know the patient medication history? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

38. How important is to educate patients about the opioids side effects/disposal options? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

39. How important is checking the electronic patients' records when managing pain? (Please select a number, 1 is "not at all important," 3 is "neutral," and 5 is "very important")

Not at all important	Not important	Neutral	Important	Very important
1	2	3	4	5

40. When you start to practice as an RN, how confident you would be about managing a patient in pain? (Please select a number, 1 is "not confident at all," 3 is "neutral," and 5 is "very confident")

Not confident at all	Not confident	Neutral	Confident	Very confident
1	2	3	4	5

41. Do you think additional content regarding pain management and opioids is needed in the undergraduate nursing curriculum? (Please select a number, 1 is "not necessary at all," 3 is "neutral," 5 is "very necessary")

Not necessary at all	Not necessary	Neutral	Necessary	Very necessary
1	2	3	4	5

Please choose the answer that applies to your experience:

42. The educational material regarding safe medication administration was informative. (Please select a number, 1 is "strongly disagree," 3 is "neutral," 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

43. The educational material about opioids helped me prepare for my clinical practice. (Please select a number, 1 is "strongly disagree," 3 is "neutral," 5 is "strongly agree")

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

VITA

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Manuscripts

H. H. Sirjani, J. E. Hawkins, M. A. Kekeh, & M. Akpinar-Elci. Nursing students' knowledge and attitudes about pain management and opioids

H. H. Sirjani, J. E. Hawkins, M. A. Kekeh, & M. Akpinar-Elci. Knowledge and Self-efficacy of Nursing Students Regarding Pain Management and Opioids: A Qualitative Study

H. H. Sirjani, & M. Akpinar-Elci. (2020). Impact of Educational Intervention on Knowledge of Opioid Prescribing Among Healthcare Providers: A Systematic Review

W. Martha, R. Poston, R. Cramer, D. Claiborne, B. Kraj, **H. H. Sirjani**, M. Akpinar-Elci, & B. Thompson. A. Brief Co-Curricular Interprofessional Experience to Dispel Myths and Reveal Truths about Health Professions Roles and Responsibilities