MESSER, APRIL. Ph.D. Nurses' Experiences Caring for Patients With Opioid Use Disorders. (2022)
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The purpose of this study was to examine nurses' experience of quality care for hospitalized patients with a history of opioid use disorder or self-injection of opioids and whether hospital, unit, or nurse characteristics impacted experiences of quality care. A secondary aim of the study was to understand how nurses' experiences of quality care for this population have been impacted by the COVID-19 pandemic. The Institute of Medicine's Six Domains of Health Care Quality were used to define quality care in this study.

A national sample of 179 nurses completed an online survey regarding their experiences caring for patients with opioid use disorders. The majority of the participants were staff nurses who worked in emergency departments, critical care units, or mother baby units. Only 41.9% of the participants had received education regarding substance use disorders from their employers, and even less had participated in harm reduction education. Only 45% of the nurses had knowledge regarding harm reduction strategies for this population.

The participants experienced a low number of restrictive safety measures and an average number of adverse events and effective care interventions when caring for patients with opioid use disorders. The nurses rated quality care and satisfaction as average. Correlation and linear regression analysis suggested trends in nurse, hospital and unit characteristics that are associated with nurses' experiences caring for this population; substance use disorder education, harm reduction education, and unit type were most often associated with nurses' experiences. Content analysis of open-ended questions regarding equity, patient-centeredness, timeliness and the impact of COVID-19 on experiences of quality care supported quantitative findings in the study and provided insight into the nurses' experiences. The findings in this study contribute to current

evidence regarding the need for standardized hospital policies and practices aimed at improving

quality care for patients with opioid use disorders. These policies and practices should

incorporate harm reduction strategies that are patient-centered and evidence-based. Hospitals

and nursing schools should provide education aimed at reducing stigma and improving care for

this population.

NURSES' EXPERIENCES CARING FOR PATIENTS

WITH OPIOID USE DISORDERS

by

April Messer

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Approved by

_____
Dr. Debra Wallace
Committee Chair

DEDICATION

This work is dedicated first and foremost to people with substance use disorders. I would also like to dedicate this work to my beautiful sister, Alicia. I miss you. Finally, I would like to dedicate this work to my oldest daughter, Allie. I began nursing school when you were in kindergarten and finished this dissertation as you were heading to college. I hope you know how much I love you and how important it is to work for change in this world.

APPROVAL PAGE

This dissertation written by April Messer has been approved by the following committee
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CHAPTER I: INTRODUCTION

A significant increase in opioid related overdose deaths occurred between 1999 and 2016, resulting in the Centers for Disease Control and Prevention (CDC) declaring an "opioid epidemic" in the United States (CDC, 2017). CDC recommendations are for coordinated community, health care, public health and law enforcement agency efforts that can effectively address the problem (CDC, 2018a). While the number of overdose deaths related to opioid use is a significant problem in itself, opioid use is also associated with the transmission of Hepatis C virus, Human Immunodeficiency Virus, and infective endocarditis, all of which are associated with the intravenous injection of opioids with contaminated and shared needles (Wurcel et al., 2016). Since the emergence of the opioid crisis, hospitalizations for opioid-related illnesses, including illnesses related to self-injection of opioids, have increased significantly at the state and national level.

Hospitalization of a person with an opioid-related acute illness represents an important opportunity to engage a person in treatment for his/her underlying opioid use disorder (OUD) (Berk et al., 2019; Liebschutz et al., 2014; Velez et al., 2017; Winetsky et al., 2018). In general, people with substance use disorders (SUD), which include alcohol and illicit drugs (including opioids), are not likely to seek treatment specifically for substance use disorders. According to the 2018 National Survey on Drug Use and Health (NSDUH), an estimated 21.2 million people aged 12 or older needed substance use treatment, but only 3.7 million people 12 or older actually received any substance use treatment (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019b).

Persons with addiction, despite the tendency to not seek treatment for substance use disorders, are among the highest-cost utilizers of health services and tend to have longer and

more frequent hospitalizations than the general population (Englander et al., 2019).

Hospitalization (for a person with an acute illness and opioid use disorder) may represent an

opportunity to initiate and coordinate care which addresses the underlying substance use disorder

(Velez et al., 2017). It is important for health care providers in hospitals to understand the

current evidence regarding care for this population in order to improve overall health outcomes

for people with opioid use disorders.

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Background

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Over the past few decades, there has been an increase in hospitalizations and acute care

for people with opioid use disorder (OUD). There is strong evidence that hospitals and

emergency departments have been impacted by the opioid crisis; the number of hospitalizations

and emergency department (ED) visits are increasing in correlation with the opioid crisis.

Understanding how the opioid crisis developed, how addiction impacts the brain, strategies for

treating OUD, and recommendations for hospitals regarding how to respond to the opioid crisis

provide insight into the burden of the opioid crisis on hospitals and the importance of addressing

the underlying opioid use disorder contributing to increased morbidity for this population.

Development of the Current Crisis

Before the CDC declared the opioid crisis, the U.S. battled addiction as a public health

problem. As early as 1900, there were an estimated 200,000–300,000 people in the United States

with addiction disorders (Courtwright, 1978). National efforts to battle addiction in the U.S. have

been ongoing for the past century and more. Despite these efforts, the opioid crisis emerged and

has become one of the most serious public health problems in the United States. By 2016, the

rate of overdose deaths related to opioids increased by five times that of the rate in 1999 (CDC,

2017). Currently, in the U.S., an estimated 130 people are dying per day from an opioid related overdose (CDC, 2019a) and more than 2 million people are addicted to opioids (Monroe, 2018).

The development of the opioid crisis stemmed from a perfect storm of complex factors including the overmarketing of opioids by the pharmaceutical industry in the 1990s, the designation of pain as the fifth vital sign by the American Pain Society (APS) in 1995, and the subsequent adoption of APS's recommendation by the Veteran's Health Administration in 1998 and the Joint Commission in 2000 (Morland, 2019). Upon recognition of pain as the fifth vital sign, simple, unidimensional, subjective pain assessments quickly became institutionalized in health care (Levy et al., 2018). Under the Joint Commission's adoption of the new guidelines, providers were mandated to adequately treat pain. At the same time, pharmaceutical companies were marketing opioids as a safe and effective way to control pain (Levy et al., 2018).

According to the CDC, the development and progression of the opioid crisis can be understood from three distinct waves, or distinct increases in overdose deaths attributable to specific types of opioids (CDC, 2018b; Ciccarone, 2019). The first wave marks the increase in opioid-related overdose deaths attributable to prescription opioid pills; this rise in deaths has been steadily increasing since 1999, corresponding with the increase in prescription opioids that occurred in the 1990s. The second wave is the increase in overdose deaths related to heroin that began in 2010. The number of deaths related to heroin surpassed the number of deaths related to opioid pills in 2015 (Ciccarone, 2019). The third wave began in 2013 and represents the overdose deaths related to synthetic opioids such as fentanyl. The third wave of synthetic opioid deaths is largely comprised of illicitly manufactured opioids; this market continues to change, with newly developed synthetic opioids and drugs mixed with heroin, cocaine and other drugs.

The illicitly manufactured synthetic opioids vary in potency and are often sold as heroin (Ciccarone, 2019).

Opioids and Intravenous Drug Use

Drug use can be both helpful and harmful. Drug use has a range of harmful and deadly health consequences. Many of these effects depend on the type of drug used, duration of use and dose of use, and the mode of drug administration (National Institute on Drug Abuse [NIDA], 2017). Opioids are substances which are derived from opium poppy or from synthetic analogues and include, but are not limited to morphine, oxycodone, heroin, oxycodone and fentanyl (World Health Organization [WHO], 2021). While prescription opioids are an effective treatment for the management of pain, opioids have the potential to cause dependence and opioid use disorder, which is defined as the "problematic pattern of opioid use that leads to clinically significant impairment or distress" (American Psychiatric Association [APA], 2013, p. 541). Opioids affect the brain and when taken in high doses can cause respiratory depression and death, known as an overdose.

Drug-injecting or self-injecting involves injecting a substance into a vein or skin with the use of a syringe and needle (Crane, 2019). Self-injection of drugs produces faster and more intense effects of the drug compared to oral administration, which requires intestinal absorption and hepatic metabolism prior to the drug reaching the bloodstream. In addition to the rapid and intense effects of self-injecting, this method of administration increases the likelihood that a person will overdose or develop an addiction to the substance. When a person injects opioids (or other drugs) into the bloodstream, the risk of contracting blood-borne illnesses is significantly increased (NIDA, 2018a). In addition to an increased risk of acquiring Human Immunodeficiency Virus or Hepatitis C virus, people who self-inject drugs are at an increased

risk of developing infective endocarditis or skin infections (Laing, 2015). Infective endocarditis is an infection of a heart valve and most commonly caused in people who self-inject when the person uses contaminated or dirty needles which allow entry of microorganisms (most commonly bacteria) into the bloodstream. Infective endocarditis has a high morbidity and mortality rate, and is increasing in incidence in the U.S., a trend that aligns closely with the increase in opioid use in the U.S. (Rudasill et al., 2019).

Addiction as a Brain Disease

In order to understand opioid use disorder and current evidence-based treatments, it is important to understand the science of addiction. Throughout the 1900s, two opposing theories regarding addiction have persisted: addiction as a brain disease and addiction as a moral failure (Pickard et al., 2015). The school of thought maintains that addiction is a moral failing postulates that a person with addiction is responsible for his/her choices and should be judged based on those choices (Heather, 2018; Pickard et al., 2015). Over the past several decades, research in neuroscience has led many in addiction research to support the brain disease model of addiction (Volkow & Koob, 2015; Volkow et al., 2016). The brain disease model of addiction is a conceptual framework based on research in neuroscience in which researchers have identified changes that occur in the brain during repeated exposure to drugs with abuse potential (Volkow & Koob, 2015).

Contemporary scientific definitions of addiction are often based on the neurobiological understanding of the implications certain substances can have on the brain (Pickard et al., 2015; Volkow, 2018). The National Institute of Drug Abuse (NIDA) defines addiction as a "chronic, relapsing disorder characterized by compulsive drug seeking, continued use despite harmful consequences, and long-lasting changes in the brain" (NIDA, 2018b, "What is drug addiction?,"

para. 1). The Center on Addiction (formerly the National Center on Addiction and Substance Abuse at Columbia University), a science-based non-profit organization that conducts research and makes recommendations regarding best practices for prevention and treatment of substance abuse, defines addiction as a complex disease that causes disruptions in the rewards, motivation, learning, judgement and memory pathways and includes the compulsive use of one or more substances despite harmful consequences (Center on Addiction, 2017). According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, the essential feature of a substance use disorder (SUD) is "a cluster of physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems" (APA, 2013, p. 483). The APA acknowledges an underlying brain circuitry that extends beyond detoxification and includes 10 classes of drugs under the umbrella term: alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives, hypnotics and anxiolytics, stimulants, and tobacco.

From over 40 years of research in neuroscience, researchers have been identified neural circuits and receptors implicated with every drug with abuse potential, neural pathways affected by drugs of abuse, biochemical cascades within cells that occur after drug use, significant changes in brains of people with addiction (regardless of the substance being abused) and specific molecular and functional neuroplastic changes at the synaptic and circuitry level that are triggered by repeated drug exposure (Leshner, 1997; Volkow & Koob, 2015). Scientific evidence has shown that disruptions in the basal ganglia, amygdala and prefrontal cortex are particularly involved in the onset, development and maintenance of addiction. These neural disruptions lead to pathologies in these areas of the brain causing increased incentive salience from substance-

associated cues, reduced sensitivity of brain systems involved in pleasure experience, and reduced functioning of the brain's executive control center.

The brain changes involved with persistent drug exposure provides a framework for explaining some of the behaviors associated with addiction, such as the phenomenon of craving. Sustained drug use leads to disruption of brain chemistry, prefrontal cortex functions, and results in an over-response in the limbic system when exposed to cues that remind the affected person of drug use, leading to incentive salience, also known as cravings (Bhalia et al., 2016). These cravings are intense and powerful responses to drug-related cues; cravings are a hallmark of addiction and lead to drug-seeking behaviors and relapse (Sinha, 2013). Relapse is the return to drug use after a sustained period of abstinence (NIDA, 2018a). The classical sets of craving and relapse triggers include re-exposure to addictive drugs, stress, or re-exposure to environmental cues the person associates with use of the drug (Gardner, 2011). In other words, the cues that initiate cravings may simply be exposure to the drug itself, but may include stress or anything that reminds the person of the drug, including (but not limited to) friends the person used drugs with, places the person used drugs, or situations in which the person would commonly use drugs. From this increased understanding, the brain disease model of addiction has the potential to help in developing treatment strategies, such as helping people with addiction to identify and avoid relapse triggers.

Despite neuroscience, medical and public support of the brain disease model of addiction, stigma regarding addiction as a deficit of morality still persists. Research suggests that people are more likely to have negative attitudes towards people with addiction compared to other mental health illnesses (Barry et al., 2014). Nora Volkow, director of the National Institute on Drug

Abuse (NIDA), emphasizes the importance of viewing addiction as a treatable medical condition in order to reduce stigma and ensure people with addiction are able to access care.

Policies That Impact Care for People with Addiction Disorders

As early as addiction was recognized as a public health problem, how to treat or care for people with addiction has been debated (Clark, 2017). In the U.S., there has been an emphasis on the criminalization of addiction rather than the treatment of addiction as a disease, which has largely been influenced by federal policies aimed at combatting addiction. Policies that address addiction in the U.S. have traditionally focused on banning substances deemed to be dangerous (Issitt, 2018). The Harrison Narcotic Act of 1914 marked the first federal policy to address addiction in the U.S. and imposed taxes on anyone who manufactured, sold or distributed narctics (Wilson et al., 1914). The original intent of the Harrison Act was to reduce the use of drugs for non-medical use. However, within several years of the enactment of the policy, it became illegal for physicians to precribe narcotics, opening the possibility that physicians can be charged criminally for prescribing narcotics for any reason (Issitt, 2018). The practice of prescribing narcotics came to a quick halt, including the prescribing of narcotics for people with addiction, a common practice at the time. Unfortunately, an unintended consequence was the growth of illicit distribution of narcotics in society and an overall increase in the number of people with substance abuse disorders (Issitt, 2018).

The implementation of the Harrison Narcotic Act and its failure to effectively combat addiction provided a foundation for subsequent federal drug policies which have perpetuated the criminalization of addiction and have been ineffective in addressing addiction in the United States. In 1970, the Comprehensive Drug Abuse Prevention and Control Act was passed into law, with the intention of increasing research and preventing drug abuse and dependence,

providing treatment and rehabilitation for people who abused or were dependent on drugs, and to strengthen the authority of law enforcement for drug abuse (Comprehensive Drug Abuse Prevention and Control Act, 1970). Titles II and III of the Comprehensive Drug Abuse Prevention and Control Act, also known as the Controlled Substance Act, endorsed the placement of drugs into one of five categories or schedules, based on the substance's medical use and potential for abuse (Stolberg, 2009). Additionally, the Drug Enforcement Agency was established and tasked with enforcing the Controlled Substance Act and investigating domestic and international drug trafficking (Drug Enforcement Administration, n.d.).

From 1978 through 2016, the number of federal prisoners increased from 29,803 to 189,192; 49.1% of the federal inmates in 2016 had been convicted of drug offenses with sentences mandated under the Controlled Substance Act (Bureau of Justice Statistics, 2016). On average, the federal government spends $9.2 million every day to incarcerate people who have been charged or convicted of drug-related offenses (Pearl, 2018). The increase in federal prisoners convicted of drug crimes is strong evidence that the Drug Enforcement Agency has been effective in enforcing the Controlled Substance Act. The more important question is whether this enforcement has reduced the amounts of drugs available, or more importantly, whether it has helped to prevent the use and abuse of dangerous drugs.

Despite increased drug convictions, subsequent incarcerations and increased costs of enforcing the Control Substance Act, reducing the supply of drugs in the United States has been unsuccessful (Keck & Correa-Cabrera, 2015). Drug arrests and access to drugs continues to be a problem. Reducing the supply of drugs is only part of the equation when it comes to addressing drug use and abuse. Perhaps the best evidence of the failure of the Control Substance Act to prevent drug use and abuse is the opioid crisis. Drug overdose death rates have steadily risen

since 1970 and according to the Centers for Disease Control, drug overdose death rates have never been higher (CDC, n.d.).

Opioid Use Disorder (OUD) Treatment

While there has been a strong emphasis on the criminalization of drug use rather than treatment of addiction as a disease, treatment options have emerged and evolved over the 21st century, enabling addiction science and research to grow and facilitate the evolution of addiction treatment. From the beginning of the 1900s, treatment for addiction was completely unregulated, even after the Harrison Act marked the federal regulation of prescribing drugs with addictive properties (Gerstein & Harwood, 1992). There were no standard treatments for addiction; physicians had the freedom to manage addiction with any type of experimental therapy they felt was appropriate, including (but not limited to) electrical therapy, un-tested concoctions, or dietary measures.

Today the common treatment options for people with addiction include medicines, counseling and behavioral therapies. Commonly, care occurs in an inpatient or outpatient residential facility, where staff are trained to care for people with addiction (NIDA, 2019). Initial treatment often takes place in a facility that specializes in addiction, but long-term recovery in the community is encouraged for people with addiction (Van Wormer & Davis, 2018). Also, community interventions show that opioid use disorder and people who inject drugs can survive and recover (Larochelle et al., 2018).

In response to opioid- related overdoses and injection-related infections, community-based harm reduction strategies have been implemented and have become an important part of the community-response landscape in battling the opioid epidemic (Barry, 2018). Harm reduction refers to strategies aimed at reducing the negative consequences of drug use and is

rooted in social justice, calling for the non-judgmental and non-coercive provision of resources and services, providing a voice to people who use drugs (National Harm Reduction Coalition, 2018). Harm reduction strategies include, but are not limited to, medication assisted recovery, safe drug consumption sites, anonymous drug-checking services, safe-needle exchange programs, and naloxone training and distribution (Barry, 2018; Des, 2017).

Medication Assisted Recovery

The effectiveness of medication assisted recovery in treating OUD has been well-established. Methadone and buprenorphine have established efficacy in treatment retention and reducing illicit drug use with less side effects than detoxification from drugs (Amato et al., 2011; Mattick et al., 2014; Neilsen et al., 2016). Methadone is generally more effective than buprenorphine in treatment retention, and both methadone and buprenorphine are more effective with psychotherapy than alone in treatment retention and reducing illicit drug use (Neilsen et al., 2016). Retention in methadone and buprenorphine treatment is associated with a significant reduction in all-cause and overdose mortality in people with opioid use disorder (Sordo et al., 2017). There is an increased risk of mortality during the induction phase of methadone and an increase in mortality for both drugs after leaving residential treatment (and returning to the community), representing a vulnerable time, requiring support and monitoring. Based on a systematic review of studies regarding the effects of medication assisted recovery for opioid use disorder on functional outcomes (cognitive, physical, occupational, social/behavioral and neurological function), the effect of medication assisted recovery on functional outcomes was unclear (Maglione et al., 2018).

The World Health Organization (WHO), American Society of Addiction Medicine (ASAM) and the Substance Abuse and Mental Health Services Administration (SAMHSA) have

published guidelines for the prescribing of medication assisted recovery (ASAM, 2019; SAMHSA, 2019a; WHO, 2012). The WHO guidelines are based on the results of Cochrane Reviews; utilizing the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) to evaluate research upon which the guidelines are based, researchers graded 8 of the 15 recommendations as strong (Davoli et al., 2015). Some of the guidelines that were graded as strong include that methadone is preferred to buprenorphine for most patients, methadone dosing should be dependent on level of neuroadaptation (at no more than 20-30mg) during induction, methadone maintenance dose should range from 60-120 mg, with a warning against use of opioid antagonists with heavy sedation.

Despite compelling evidence of the effectiveness and safety of medication assisted recovery, there are persistent misunderstandings regarding these therapies as legitimate treatment options for people with opioid use disorders, and medication assisted recovery remains greatly underutilized (Salsitz & Wiegand, 2016). While there has been an increase in the number of prescriptions, less than 4% of all licensed providers are approved to prescribe buprenorphine and nearly half of all counties in the U.S. are without a provider approved to prescribe buprenorphine (Haffajee et al., 2018). In a qualitative study in which researchers conducted interviews with 46 people who inject drugs, participants often avoided medication assisted recovery because of negative stigma associated with the treatment (Paquette et al., 2018). According to the American Medical Association, medication assisted recovery is the gold standard for treating opioid use disorders, yet barriers to accessing medication assisted recovery persist due to inadequate provider networks, prior authorization issues and stigma about medication assisted recovery that prevent patients and providers from utilizing the effective treatment (American Medical Association and Manatt Health, 2019). The American Medical Association called for an end to

delays in barriers to this effective treatment and insisted that payers revise current policies that restrict access to medicaion assisted recovery based on arbitrary thresholds.

Naloxone

Opioid toxicity can lead to decreased respiratory effort and possible death from overdose, which has become a leading cause of death in the U.S. (Schiller & Mechanic, 2019). Naloxone is a drug that is indicated for the treatment of opioid toxicity which reverses the respiratory depression associated with opioid overdose (Jordan & Morrisonponce, 2019). The Centers for Disease Control recommend naloxone as a critical part of the response to the opioid crisis, as naloxone provides people who have overdosed with an opportunity to survive and enter treatment (CDC, 2019b). The CDC specifically recommend that providers consider prescribing naloxone when factors increase the risk for overdose, including a history of overdose or substance use disorder, opioid doses $\geq$ 50 morphine milligram equivalents/day, concurrent use of benzodiazepines (Guy et al., 2019). According to a CDC (2019b) report, the number of naloxone prescriptions dispensed from retail pharmacies increased significantly from 2012 to 2018, with a 106% increase from 2017 to 2018.

Researchers suggest that an increase in naloxone is a move in the right direction, but current utilization of naloxone is not enough, especially in rural areas impacted most by the opioid crisis (Guy et al., 2019). Naloxone distribution varies from county to county, with the lowest number of naloxone prescriptions in the most rural counties. Further, if every patient in the United States who was prescribed high doses of opioids had been offered naloxone, there would have been an additional 9 million prescriptions of naloxone in 2018.

Syringe Exchange Programs

Syringe exchange programs began in the 1980s in response to the Human Immunodeficiency Virus (HIV) epidemic, in an effort to reduce the transmission of HIV through contaminated needles (Guardino et al., 2014). Today, there are over 200 syringe exchange programs across the United States as well as a number of other programs that have generated many referrals to substance abuse treatment facilities (Des, 2017). Syringe exchange programs are often viewed as an opportunity to provide referrals and services to people who inject drugs.

In a systematic review and meta-analysis of studies evaluating pharmacy-based syringe exchange programs, researchers included 14 studies with 7,035 people who inject drugs. Based on the review, researchers rated most of the studies as having serious bias, with about 35% of the studies rated as moderate to low risk of bias (Sawangjit et al., 2017). The findings suggested that pharmacy-based syringe exchange programs are significantly better for sharing-syringe behavior, but the effect on HIV and Hepatitis C Virus prevalence and economic outcomes was unclear. In another systematic review, the impact of syringe exchange programs on reducing the prevalence was also unclear (Davis et al., 2017). In a third systematic review, researchers concluded that syringe exchange programs may have been effective in reducing the transmission of HIV in people who inject drugs, but also suggested that the reduction in HIV transmission may have been impacted by other interventions aimed at reducing HIV (Aspinall et al., 2014).

Abstinence

Historically, the goal of completely abstaining from the substance of abuse has been the goal of addiction treatment (Musalek, 2014). When medication replacement therapy was first introduced in the 1960s, the ultimate goal was abstinence, such that the patient was on replacement therapy until they were ready for abstinence-based therapy. Despite the emergence

of evidence that supports the overall goal that treatment for opioid use disorder should be reducing harm of people impacted by opioid use disorder, abstinence continues to prevail goals of care in the majority of settings where opioid use disorders and other substance use disorders are treated, including specialty facilities (Musalek, 2014; Padwa & Kaplan, 2018). There is very little evidence regarding abstinence-based recovery, but less than 45% of substance use disorder treatment facilities in the United States utilize pharmacotherapies such as medication assisted recovery (Padwa & Kaplan, 2018). Medication assisted recovery is supported by research in improving patient survival and increasing retention in treatment, and when treatment facilities only provide abstinence-based care, patient outcomes are negatively impacted.

Access to Care

When people with substance use disorders, including opioid use disorders, seek treatment, they are often unable to get care. In addition, people with addiction are often difficult to engage in treatment services (Hostetter & Klein, 2017). According to the 2018 National Survey on Drug Use and Health (NSDUH), the number one reason people who needed treatment for substance use disorders and didn't receive treatment was because they were not ready (SAMHSA, 2019b). Services for the treatment of substance use disorders have traditionally been separate from medical care services, and even other mental health services (SAMHSA, 2016). However, when a person is ready to seek treatment, services should be readily available (NIDA, 2019). Only a few studies indicate positive interventions to improve outcomes for the opioid crisis and many are community-based (Barbour et al., 2020).

In order to improve health outcomes for people with substance use disorders, it is vital that substance use disorder treatment be integrated across all health care systems, including

primary care and acute care (SAMHSA, 2016), including hospitals. However, it is not evident that hospitals are equipped to deal with this crisis and challenge.

Hospital Response

The Institute for Healthcare Improvement (IHI) and the Grayken Center for Addiction provide improvement recommendations for hospitals responding to the opioid crisis (Botticelli et al., 2019). The document outlines five system-level strategies for hospitals, healthcare administrators and leaders to address challenges in the prevention, identification and treatment of opioid use disorder: (a) identification and treatment of people with opioid use disorders at key clinical touchpoints, including the emergency department, inpatient setting and primary care setting, (b) modification of opioid prescribing practices to reduce harm and enhance benefits, (c) training stakeholders regarding risks of opioid use disorder and how to reduce stigma, (d) identification and screening of people at high risk of developing opioid use disorders, and (e) reducing the harms of substance use disorders. The evidence-based recommendations provide a structure for integrating substance abuse treatment across the acute care continuum and provides case studies and cost savings information to help hospital leaders recognize the feasibility of improving care for people with substance abuse disorders.

Nurses' Role and Hospital Care of People with Opioid Use Disorders

One modality to build the knowledge for effective solutions is research within and about the hospital care system. Nurses are one of the most likely members of the hospital team to interact with patients who have opioid use disorder and/or inject opioids and to provide daily care. Thus, understanding nurses' current experiences and practices may provide insight for developing future interventions that will ensure hospitals meet the challenge of the opioid crisis. Little is currently known regarding the experiences of nurses and their role in caring for this

population. In addition, there is little known regarding how hospitals are responding to the increasing number of people with OUDs seeking acute care in emergency departments and hospitals.

Summary

The current and ongoing opioid crisis has led to a significant increase in hospitalizations and emergency department visits for people with opioid use disorders and/or history of self-injection of opioids. While scientific evidence supports that addiction (including opioid use disorder) is a disease of the brain, stigma regarding addiction persists. Historically, the criminalization of drug use and abstinence-based treatments have prevailed in the management of addiction disorder. Despite the development of effective treatments for addiction and opioid use disorder, little is known about how hospitals are combatting the opioid crisis. Nurses often spend the most time interacting with hospitalized people with opioid use disorders, yet there is little known regarding nurses' experiences of hospital treatment of this population.

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Purpose of the Study

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The purpose of this study is to examine nurses' experiences of care for hospitalized patients with a history of opioid use disorder and/or self-injection of opioids. For this study, quality care is defined by the Institute of Medicine's (IOM) Six Domains of Health Care Quality. The Six Domains of Health Care Quality is one of the most influential analytic frameworks for quality assessment and has guided measure development in public and private sectors (Agency for Healthcare Research and Quality [AHRQ], 2018). Specifically, the aim of the study is to (a) describe nurses' experiences of hospital policies and practices for acutely ill patients with opioid use disorder or a history of self-injection of opioids and (b) explore impact of hospital, unit, and nurse characteristics on nurses' experiences of hospital policies and practices for acutely ill

patients with a history of opioid use disorder or a history of self-injection of opioids. A secondary aim of this study is to explore nurses' experiences regarding how care for this population has been impacted by the COVID-19 pandemic.

Significance

In general, the number of emergency department visits and hospitalizations related to opioid drug use is increasing significantly at the national level in the U.S. Several studies describe the increasing number emergency department visits and hospitalizations related to opioid use (Guy et al., 2018; Hsu et al., 2017; Salzman et al., 2020; Singh & Cleveland, 2020; Tedesco et al., 2017). In a study seeking to describe the epidemiology of opioid-related visits to emergency departments, Salzman et al. (2020) included 1,072 visits, representing 2,731,000 weighted nationwide emergency department encounters from 1999 to 2013 National Hospital Ambulatory Medical Care Survey. During this time period, opioid-related emergency department visits increased from 125,000 in 1999 to over 300,000 visits in 2013, a 170% increase. Opioid-related emergency department visits resulting in hospital admissions increased by over 240%, with the proportion of emergency department visits related to opioids doubling from 1999 to 2013.

In another study, researchers examined opioid- related outcomes at the state level in West Virginia, which has been most impacted by the opioid crisis compared to any other state in the U.S. (Warfield et al., 2019). Utilizing the National Vital Statistics System's multiple cause of death files, the study included 833 total admissions related to opioid overdoses and 152 patients with at least one repeat overdose in a 12-month period (in any West Virginia University medical facility). The rate of admission for opioid-related overdoses increased by 181% between 2008 and 2016. The percentage of patients with a repeat overdose in a 12-month period increased by

175% (from 10.2% in 2008 to 28% in 2016), representing an annual increase of 13%. Between 2008 and 2016, West Virginia experienced 4,430 deaths attributable to opioid overdose; over the study period, the rate of opioid overdose deaths increased by 107%.

Utilizing the Nationwide Inpatient Sample, which includes 20% stratified sample of discharges from U.S. community hospitals (and excludes rehabilitation and long term acute care hospitals), researchers estimated 781,767 hospitalizations related to opioid use disorders from 1998 to 2016 (Singh & Cleveland, 2020). Based on the retrospective analysis, Singh et al. estimated an increase in the rate of hospitalizations related to opioid use disorders from 59.8/100,000 in 1998 to 190.7/100,000 in 2016.

Hsu et al. (2017) also performed a secondary analysis of the National Inpatient Sample to examine trends from 2001 through 2012 in opioid-related admissions, outcomes and hospital costs, including differences in admissions for prescription opioid overdoses and heroin overdoses. The researchers included all admissions among patients 18 years and older who were diagnosed with an opioid or heroin overdose. Based on the results, there were 663,715 prescription opioid and heroin overdose admissions in the U.S. over the study period. Heroin overdose admissions increased 1.9-fold, from 1.7/100,000 in 2001 to 3.3/100,000 in 2012. Prescription overdose cases increased 2.5-fold, from 8.9 admissions/100,000 in 2001 to 22.3 admissions per 100,000 in 2012. The number of hospital days for heroin overdoses increased from 19,463 total days in 2001 to 39,390 in 2012, reflecting a twofold increase. Prescription overdose hospital days increased from 87,663 in 2001 to 280,080 in 2012, a 3.2-fold increase. The cumulative hospital costs for opioid related hospitalizations were $5.5 billion for the study period; costs for heroin overdose hospitalizations increased an average of $4.1 million per year (from $35.4 million in 2001 to 95.6 million in 2012) and the cumulative costs for prescription

overdose hospitalizations increased by $46 million per year (from $143.8 million in 2001 to 653.7 million in 2012).

While Hsu et al. (2017) suggested an overall increase in the number of prescription overdose cases from 2001 to 2012, another study suggested in increase in prescription opioid poisoning discharges from 1997 to 2010, but a decrease in discharges for prescription opioid poisoning from 2010 to 2014. Tedesco et al. (2017) analyzed national trends in inpatient and ED discharges for opioid abuse, dependence and poisoning using Healthcare Cost and Utilization project data from 1997 to 2014. The researchers used census data for the same time period to calculate rates for the entire U.S. population. General opioid-related discharge rates increased significantly by 10.5% annually in 2006-2014 in the emergency department and 4.9% annually from 1997 to 2014 in the inpatient setting. Discharge rates for prescription opioid poisoning increased significantly by 8% annually from 1997 to 2010 in the inpatient setting and 5% annually from 2006 to 2010 in the ED. In these same settings, the discharge rates for prescription opioid poisoning decreased significantly from 2010 to 2014, with inpatient setting discharges decreasing by 5.1% annually, and by 5% in emergency department discharges. Discharge rates for heroin poisoning increased significantly after 2008, at an annual rate of 31.4%. Discharge rates for poisoning by unspecified opioids increased significantly, rising 12.3% annually in 1997–2011 in the inpatient setting and 10.6% annually in 2006–2014 in the emergency department. In general, emergency department discharges and inpatient discharges for opioid dependence, abuse and poisoning increased significantly during the study period; however, rates for opioid prescription-related inpatient and emergency department discharges have decreased in recent years, while the rates of heroin and non-prescription opioid related discharges have continued to significantly increase.

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In another study suggesting a similar trend, researchers utilized the Nationwide Emergency Department Sample from 2010 to 2014 to analyze trends in overdoses for heroin and non-heroin opioids and related medical costs. During that time frame, there were 81,631 emergency department visits for non-heroin opioid overdoses, 66,023 emergency department visits for heroin overdoses, and medical costs of $95.2 million (non-heroin overdose) and $57.5 million (heroin overdoses; Guy et al., 2018). Visit rates for non-heroin opioid overdoses decreased by 4% from 2010 to 2014, but visits for heroin overdoses increased by 222.2% during the same timeframe. Researchers concluded that for every opioid-related overdose death in 2014, there were 5.2 emergency department visits.

In the U.S., there is evidence of a shift from the number of hospitalizations related to prescription opioids compared to non-prescription opioids, such as heroin. Specifically, recent data suggests the number of emergency department visits and hospitalizations related to prescription opioids may be decreasing, while the number of emergency department visits and hospitalizations related to non-prescription opioid is increasing. Heroin is typically diluted and injected into veins or muscles under the skin (NIDA, 2021), and can increase the likelihood that a person using opioids will transmit infections (Wurcel et al., 2016). There is strong evidence that the rate of emergency department visits and hospitalizations related to self-injecting opioids is also increasing.

Several studies illustrate an increase in the number of hospitalizations and emergency department visits related to injection drug use (Capizzi et al., 2020; Collier et al., 2018; Meisner et al., 2020; Miller & Polgreen, 2019); while recent studies suggest that the overall number of hospitalizations related to serious infections such as endocarditis, central nervous system abscesses and soft tissue infections are not increasing at a national level, the proportion of people

with injection drug use-related serious infections is increasing. There is also evidence that suggests that current estimates of hospitalizations for injection drug use-related infections may underestimate the actual number of hospitalizations (Miller & Polgreen, 2019).

In order to analyze trends in hospitalizations for serious complications (infective endocarditis, osteomyelitis, and central nervous system abscess) related to injection drug use, researchers used a retrospective descriptive design to study characteristics of patients admitted for hospitalizations utilizing the National Inpatient Sample from 2009 to 2013 (Collier et al., 2018). The researchers included hospital discharge weights to extrapolate total hospitalizations nationally, analyzing three principal diagnoses: infective endocarditis, osteomyelitis, and central nervous system abscesses. The researchers described the characteristics, secondary diagnoses and outcomes of persons within each group, studying trends over the 5-year study period. In general, infective endocarditis hospitalizations did not change over the study period, but the age of people with infective endocarditis who were 39 years old or younger increased significantly, while the number of people with infective endocarditis 65 years or older decreased significantly. The secondary diagnoses of Hepatitis B, C, D and substance use disorders increased among those hospitalized for infective endocarditis. The overall number of hospitalizations for central nervous system abscesses increased slightly, but the increase was higher for people with secondary diagnoses of Hepatitis B, C, or D or substance use disorders. The total number of hospitalizations for osteomyelitis decreased slightly, but there was an increase in hospitalizations for people diagnosed with hepatitis or a substance use disorder.

In a population-based retrospective cohort descriptive study, researchers studied 4,084,743 hospitalizations (2,090,359 patients) to estimate the number of hospitalizations for patients with injection drug use-related serious bacterial infections in Oregon from 2008 through

2018 (Capizzi et al., 2020). During this timeframe, hospitalizations for injection drug-use related serious bacterial infections increased significantly in Oregon, from 980 in 2008 to 6,265 in 2018. The number of unique patients with injection drug use-related serious bacterial infections increased from 839 to 5,055. Hospitalizations for bacteremia/sepsis rose most rapidly compared to other serious bacterial infections (included soft tissue infections, osteomyelitis, bacteremia/sepsis, and endocarditis) with an 18-fold increase. Opioid-use diagnoses accounted for the highest percentage of hospitalizations for injection-drug-use related serious bacterial infections. Researchers estimated that the total cost of hospitalizations for injection drug use related serious bacterial infections increased from $16,305,129 to $150,879,237 over the study period.

In a study aimed at examining trends in length of stay and disposition in patients with infective endocarditis related to opioid use disorder compared to patients with infective endocarditis without opioid use disorder, researchers utilized a retrospective cohort design to examine adult residents in Pennsylvania hospitalized from January 1, 2013 through March 2017 in an acute care hospital (Meisner et al., 2020). Out of 17,224 acute care hospitalizations, 15,303 were non-drug-users, and 1,921 were drug use related infective carditis. The total admissions increased from 923 in the first quarter of 2013 to 1112 for the first quarter of 2017, representing a 20% increase in hospitalizations from infective endocarditis. There was a 6.5% increase in infective endocarditis without opioid use disorder admissions and a 238% increase in drug-use related infective endocarditis. While examining the increase in hospitalizations for infective endocarditis was not the primary aim of this study, the results do lend to the overall trends associated with drug-related infective endocarditis.

While the number of serious infections related to injection drug use is increasing, the overall numbers represented in current studies may be underestimated due to limitations in charting and data collection (Miller & Polgreen, 2019). Researchers estimated the incidence of hospitalizations and emergency department visits attributable to injection drug use-related infections in a secondary analysis study of the Healthcare Cost and utilization project for California (2005–2011), Florida (2005–2014) and New York (2006–2013). Researchers included patients 12 years of age and older with an infection (possibly) related to injection drug use. In order to increase sensitivity of identifying injection drug use in the data, the researchers included situations in which injection drug use had been recoded within 6 months before or after the documented infection. Researchers included patients diagnosed with bacteremia, endocarditis, osteomyelitis, septic arthritis, and skin or soft tissue infections, resulting in 11,245,342 hospitalizations (all inpatient and emergency department visits with identified infections, regardless of injection drug use status). Of these hospitalizations, 370,830 had identified injection drug use, 543,321 had unrecorded injection drug use (no concurrent drug use diagnosis, but drug use within 6 months before or after infection), and 10,331,181 had no drug use during current hospitalization or within 6 months of infection. The number of injection drug use-related infections increased between 105% and 218% after including injections in which drug use was unrecorded (but injection drug use was recorded within 6 months of infection). This underestimate represents opportunities to record, diagnose and treat underlying drug abuse among patients with injection drug use-related infections. Additionally, it is important to recognize that statistics represented in studies may underestimate the actual number of injection drug use-related infections and hospitalizations.

The opioid crisis has contributed to an increase in hospitalizations and emergency department visits from opioid-related illnesses, including serious infections from the self-injection of opioids. While this increased utilization of the healthcare system has placed significant burden on hospitals, this burden is more complicated than estimates suggest; some studies reveal that this population may use illicit drugs while being treated in the hospital (L. C. Fanucchi et al., 2018; Grewal et al., 2015; McNeil et al., 2014). The use of illicit drugs is often facilitated by third party friends or family members of the inpatient with a history of illicit drug use. In response to in-hospital drug use, hospital administrations often employ abstinence-based policies specific to drug use while people who inject drugs are in the hospital (Grewal et al., 2015). Though it has been recommended that hospitals find and share effective solutions, there have been minimal solutions reported (Botticelli et al., 2019). It is vitally important that hospitals employ policies which provide safe, effective and ethical care for this patient population.

Theoretical Framework

The theoretical framework chosen for this study is the Institute of Medicine's Six Domains of Health Care Quality. In an effort to improve health care in the United States, in 2003, the IOM called for a major restructuring of the American health care system and recommended that all health care organizations, professional groups, and private and public purchasers should adopt the goal to reduce the burden of illness, injury, and disability and to improve health and functioning of people in the U.S. (Committee on Quality of Health Care in America et al., 2001). The Institute of Medicine's defined quality care with six specific aims and recommended these aims be used to guide the improvement of health in the U.S. These domains can be described at both the individual and population level and provide a structure to improve health care; these domains can also enhance individual and general public awareness regarding

what defines quality health care (Committee on Quality of Health Care in America et al., 2001). The six domains included in the framework are safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity. The framework in cited as 'one of the most influential guides for quality assessment' and is used across settings of care (AHRQ, 2018).

Principles

The Institute of Medicine recognizes the need to improve the quality of care for people with mental and or substance-use conditions and summarizes some important differences between mental and or substance-use and general health care. These differences include implications for decision-making, the common use of coerced treatment, variation in types of providers who work with people with mental and or substance-use illnesses, less developed quality measures than general medicine, and different consumer marketplaces than general medicine. Based on these differences, the Institute of Medicine identified that mental and or substance-use health care does not often meet the standards of quality care and requires fundamental changes. Because of how interrelated mental health, substance abuse and general health are, the Institute of Medicine stressed that health outcomes for any one of these areas is dependent on the others, and quality care cannot be achieved for one outcome if not met for the other outcomes.

The Institute of Medicine views nursing as central to improving quality in health care; the most important role nurses have in quality care is the ability to coordinate and integrate the attributes of quality health care into the care that is provided directly to patients and the care that is provided across health care settings. The Six Domains of Quality Health Care Quality provide a lens through which nurses and other disciplinary professionals can define quality care, set goals and implement quality improvement. Also, this framework can be used in research to understand

existing care that is delivered to patients and define whether the care meets the definitions of quality care (AHRQ, 2018). The framework focus is similar to recent work for ensuring no harm in health care (Gandhi et al., 2020).

Domains

Safety

According to the Institute of Medicine, patients have a right to safe care, meaning they should not be harmed by the care that is intended to help them (Committee on Quality of Health Care in America et al., 2001). This is consistent with the Joint Commission standards and most professional ethical standards. Additionally, the Institute of Medicine extends the definition of safety such that people who work in health care should not be harmed either. Specifically, the I Institute of Medicine defines safety as "freedom from accidental injury" (Institute of Medicine, 2000, p. 18). Accidental injury may be due to errors that result from the failure of a planned action to be completed as intended, or because the wrong plan was executed.

The Institute of Medicine identifies important components of safety in health care to include safe processes all the time, informed patients, transparency, and a system-approach (Committee on Quality of Health Care in America et al., 2001). Health care systems should aim to improve processes and ensure that the processes are consistent, regardless of the day of the week or the time of the day. Systems should support processes that are aimed at consistent and seamless care, ensuring that systems function as a unified whole, rather than in silos, functioning independently from one other.

Patients should be informed about the care they are receiving and should participate as much as they want and as much as they are able (Committee on Quality of Health Care in America et al., 2001). This includes being informed about treatment options, uncertainty,

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benefits, and risks. A key part of being informed includes the ethical obligation providers have when complications occur because of the provider's mistake or judgement. This transparency should be extended to including patients on review committees, as a method of learning how to improve the system and processes, and to avoid errors in the future; the Institute of Medicine stresses the importance of understanding safety and quality of care through the patients' lens.

Lastly, improving safety requires systemic efforts from a broad range of stakeholders (Committee on Quality of Health Care in America et al., 2001). Systemic efforts include better tracking, analyzation and interpretation of errors and how to improve them. Efforts to improve safety should aim to shift the culture of health care and provide a structure in which processes within the system are reviewed for improvement, rather than individuals being blamed when errors occur.

Effectiveness

Effectiveness is defined by the I Institute of Medicine as care that is based on the systematic evidence to determine if an intervention results in better outcomes than others (Committee on Quality of Health Care in America et al., 2001). Effectiveness includes the avoidance of underuse of effective care and the overuse of ineffective care. The Institute of Medicine defines evidence-based practice as the integration of the best research evidence with clinical expertise and patient values. Accordingly, providers of health care should seek out the best research evidence that is clinically relevant.

Patient-Centeredness

Patient-Centeredness focuses on the patient experience of illness and health care (Committee on Quality of Health Care in America et al., 2001). In order to meet this aim, systems should ensure that care meets the goal of the individual. The Institute of Medicine

identifies important dimensions of patient-centered care as respect for patient's values, preferences, and expressed needs, coordination and integration of care, information, communication and education, physical comfort, emotional support and inclusion of family and friends. Patient centered care should be tailored to the individual patient and include cultural competence. Understanding what each patient values, prefers and needs should be understood as central to shared decision making, but providers should also understand that these values, preferences and needs are dynamic and may change over time or in different situations, such that shared decision making is not a set point in time.

Timeliness

The Institute of Medicine recognizes that other consumer-centered systems outside of healthcare stress the importance of avoiding long waits and delays, but also recognizes that there are many opportunities for healthcare systems to enhance the timeliness of delivery of healthcare services (Committee on Quality of Health Care in America et al., 2001). Long waits for appointments, emergency department wait times, and lab and test results has become the norm in healthcare and contributes to emotional distress and can result in delays in diagnoses, treatments and ultimately, physical harm. This lack of timely delivery of care represents a lack of respect for the patient.

Efficiency

Efficiency is defined as the use of resources in a way that achieves the best value for the amount of money spent (Committee on Quality of Health Care in America et al., 2001). Efficiency can be improved by reducing quality waste and reducing production costs. While improving efficiency typically includes cutting resources (that have been deemed wasteful), the

IOM emphasizes that achieving efficiency can be done in conjunction with achieving simultaneous aims of safety, timeliness, effectiveness, equity and patient-centeredness.

Equity

Equity refers to the provision of care that does not vary because of access or personal characteristics that are unrelated to the condition for which a person requires care. Equity implies the securement of benefits for all people through universal access to health care (Committee on Quality of Health Care in America et al., 2001). People expect to be treated fairly, and care should be delivered based on the needs of an individual, not based on personal characteristics that do not have anything to do with the reason the person is seeking care. Some of the characteristics that do influence care (but should not) in health care are gender, age, race, ethnicity, income, disability, sexual orientation and homelessness. Lack of access to care or differences in care to certain individuals or populations contribute to barriers in achieving quality of care for all people in the U.S.

The focus for this study will be domains of safety, and effectiveness, but all domains will be addressed. Based on current research, these domains have been investigated through qualitative or quantitative studies for patients with a history of opioid use disorder or self-injection of opioids. Specifically, this study will examine the domains from the perspective of nurses caring for this population.

Research Questions

1. What are nurses' experiences of hospital policies or practices for patients with a history of opioid use disorder or history of self-injection of opioids (focus on safety, effectiveness)

2. What hospital and unit characteristics influence nurses' experiences of hospital policies or practices for patients with a history of opioid use disorder or history of self-injection of opioids (hospital size, hospital type, unit type)?

3. What nurse characteristics influence nurses' experiences of hospital policies or practices for patients with a history of opioid use disorder or history of self-injection of opioids (age, education level, number of years in practice, role, knowledge regarding substance use disorder, knowledge regarding harm reduction strategies)?

4. What are nurses' experiences of how care for this population has been impacted by the COVID-19 pandemic?

Chapter Summary

The number of hospitalizations for patients with opioid-related acute illness has increased significantly amidst the opioid crisis. These hospitalizations represent opportunities to engage people with addiction disorders in treatment for underlying substance use disorders. In addition to treating the opioid-related acute care illness, it is essential that hospital providers be prepared to address and treat substance use disorders. There is strong evidence to support medication assisted recovery and harm reduction strategies for people with substance use disorders. There is a gap in the knowledge regarding hospital policies and practices for patients with a history of opioid use disorder or history of self-injection and whether these policies and practices guide quality care for these patients. Understanding nurses' experiences with hospital policies and practices for this patient population can not only increase the overall knowledge about these policies, but can also increase the understanding regarding whether nurses perceive that these policies effectively guide quality care.

The Six Domains of Health Care Quality provides a framework for defining quality care and includes safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity. The Institute of Medicine recognizes that health care for people with substance use disorders often does not meet the standards of quality of care and the framework is highly applicable to defining, measuring, and improving patient care for this population. This study seeks to examine nurses' experiences of current hospital care of acutely ill patients with a history opioid use disorder or a history of self-injection of opioids. Specifically, this study will examine nurses' experiences of current hospital response and interventions in all domains, with a focus on safety and effectiveness. Due to the recent COVID-19 pandemic, a secondary aim of the study is to explore nurses' experiences of how care for this population has been impacted by the pandemic. Findings should provide insight for future interventions and quality care.

CHAPTER II: LITERATURE REVIEW

This literature review includes an analysis of research about hospital care for people who are acutely ill with substance use disorders, focusing on people with a history of opioid use disorder and/or a history of self-injecting opioids. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guides the identification of studies included in this review (Page et al., 2021). Studies that include descriptions of the characteristics of this population, patients' perceptions of quality of care, health care providers' (including nurses') perceptions of quality of care, and interventions aimed at improving care for this patient population are analyzed in this literature review. The goal of this review is to synthesize current research regarding the quality of hospital care people with opioid use disorders or a history of self-injecting opioids receive.

The literature presented in this review is selected from the following EBSCO databases: Academic Search Complete, CINAHL, Health Source Nursing/Academic Edition, and APA Psych. Search terms included "hospital care and self-injection and endocarditis," "hospital care and self-injection and substance use disorder," "hospital care and self-injection and opioid use disorder," "hospital care and opioid use disorder," "hospital care and substance use disorder," "acutely ill and self-injection and endocarditis," "acutely ill and self-injection and opioid use disorder," "acutely ill and self-injection and substance use disorder," "acutely ill and opioid use disorder," and "acutely ill and substance use disorder"; studies with the terms "alcohol" and "alcoholism" were excluded from the initial search. Studies with multiple types of health professionals (including nurses) that provide care for patients with opioid use disorder were included in the review. Studies not written in English were also excluded. Only studies with full

text were included. The keyword search was initiated in May, 2021 and included studies published from 2017 to 2021.

<div align="center">**Patient and Hospital Stay Characteristics**</div>

Patients with Opioid Use Disorders

The review includes eight studies that describe the characteristics of patients (and/or characteristics regarding hospital stay) who are hospitalized for acute illness and opioid use disorders, with six of the studies in the U.S. Three of the studies conducted in the U.S. utilized national samples with the remaining studies utilizing samples from multi-site or single sites. One of the studies utilized a sample representing a subpopulation of patients over the age of 50 years old with opioid use disorders. The literature suggests that people with opioid use disorders tend to be young, White, male, and at risk of morbidity, mortality, overdose, emergency department utilization, and leaving the hospital against medical advice. There is also evidence of an increasing number of young women with opioid use disorders.

Several of the studies in the literature review include patient characteristics for people with opioid use disorders. In a study utilizing the National Inpatient Sample, researchers included 781,767 opioid use disorder hospitalizations from 1998 to 2016 (Singh & Cleveland, 2020). The mean age of the patients was 43.7 years, 52% of the patients were male, 67% were White, 28.58% had Medicaid, 27.19% had Medicare, 23.07% had private insurance, and 15.68% were self-pay. Researchers found similar gender, age and racial demographics in another study utilizing a national sample (National Survey on Drug Use Health) from 2005 to 2014, which included 4,412 patients with non-medical prescription opioid use disorder (John & Wu, 2019). The majority of adults with past year non-medical prescription opioid use disorder were male (58.8%), 18–25 years old (35%), and White (74%). In a state-level study, researchers utilized

hospital discharge records from 239 hospitals and 284 free-standing ambulatory surgery centers in Pennsylvania from 2000 to 2014 to collect demographics, opioid-related diagnoses, and medical characteristics (Liu et al., 2019). Patients with opioid use-related admissions were more likely to be White (76%), male (56%) and from large central metropolitan counties (41%) compared to patients without an opioid-related diagnoses. In a single site study, researchers found similar demographics for patients with opioid use disorders presenting to the emergency department of a large urban safety-net hospital, in which researchers reviewed 10,081 unique patients with opioid use disorders between January 2013 and December 2016 (S. Choi et al., 2019). The majority of the patients were between the ages of 26 and 45 (53.3%), with young adults 18–25 years) being more likely to be female (51.2%) and older adults (56–64) more likely to be male (68.5%).

While the majority of the studies considered adults over the age of 18 years, in one of the studies included in the review, researchers examined emergency department visits and hospitalizations among people who were 50 and older who self-reported opioid misuse, opioid use but no misuse and no opioid use within the last year (B. Choi et al., 2019). In this secondary analysis of the National Survey of Drug Use and health, B. Choi et al. included 17,608 respondents and determined that the respondents who reported misuse of opioids tended to be younger, divorced/separated, never married, and compromised the largest proportion of women and racial minorities (compared to the respondents who reported no use or use without misuse). Additionally, the respondents who misused opioids had the highest proportion of people without a high school education or health insurance, and the highest proportion of people at below poverty income.

The literature review also includes studies that examined healthcare utilization (emergency department visits and hospital length of stay), and mortality for patients with opioid use disorders who utilize the emergency department or are hospitalized. Emergency department utilization was utilized as an outcome in several of the studies (B. Choi et al., 2019; S. Choi et al., 2019; John & Wu, 2019). In one study including 4,421 people who reported nonmedical opioid use disorder, over half of the adults with non-medical prescription opioid use disorder reported past-year emergency department utilization (John & Wu, 2019). Of the adults who reported past year emergency department utilization, 38% reported one emergency department encounter, 45.1% reported 2-4 encounters, and 11.2% reported five or more emergency department encounters. In another study including 17,608 respondents from the National Survey of Drug Use and health, results suggest that people over the age of 50 years who report opioid misuse are more likely to have a past-year emergency department visit compared to people over the age of 50 who do not report opioid misuse, with 37% of those who reported misuse having a past-year emergency department visit, compared to 19% of those who reported no use of opioids (B. Choi et al., 2019). In a study describing patients with opioid use disorders presenting to an emergency department in a large urban hospital, researchers reported that young adults (aged 18–25) were more likely to have at least one emergency department visit with a primary diagnosis of opioid use disorder (44.5%) compared to older patients, aged 56–64 (14%; $p < 0.001$).

Other characteristics included in the studies were discharge against medical advice, hospital length of stay, and mortality, including overdose death. Only one study in the literature examined discharge against medical advice or hospital length of stay for people with opioid use disorders; based on 781,767 opioid use disorder hospitalizations from the National Inpatient Sample (1998–2016), the average length of stay for the hospitalizations was 3.6 days, 9.89% of

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the hospitalizations resulted in discharge against medical advice (Singh & Cleveland, 2020). One of the studies included in the literature review compared hospital overnight stay in people over the age of 50 who use opioids compared to people who do not (use opioids) and determined that 22% of those who used opioids (with and without misuse) had any overnight hospitalization compared to 7% of those who reported no opioid use (n = 17,608) (B. Choi et al., 2019).

Several of the studies included mortality as an outcome, suggesting that people with opioid use disorders who present to the emergency department and/or are hospitalized have an increased risk of death. Singh and Cleveland (2020) determined that 2.89% of 181,767 opioid use disorder-related hospitalizations resulted in death. Researchers in two other studies included in the literature review sought to determine factors that contribute to an increased risk of death for people who have opioid use disorder who are hospitalized or who present to the emergency department. In a study aimed at developing a basis for predictive risk models that can be used by emergency departments to identify patients with substance-use related emergency department encounters who are at high risk of overdose deaths, researchers utilized an administrative hospital database of emergency department services from Maryland acute care, nonfederal hospitals from 2014 to 2015 to measure opioid overdoses and determine risk factors (Krawczyk et al., 2020). During 2014 and 2015, 1,251,535 persons had an emergency department visit and 139,252 met criteria for a substance related disorder. There was a total of 1,452 opioid overdose deaths when considering all persons who presented to the emergency department during the study period (n = 1,251,535; case fatality rate of 11.6 per 10,000) compared to 963 opioid overdose deaths when considering the patients who met criteria for a substance related disorder (139,252; case fatality rate 69.2/10,000). People who had a previous experience of a nonfatal

overdose had the highest rate of fatal overdose (183.3/10,000), followed by persons with opioid use disorders (164.1/10,000).

In a retrospective cohort study, Liu et al. (2019) described patient-level characteristics associated with opioid-related morbidity and mortality, researchers utilized hospital discharge records from 239 hospitals and 284 free-standing ambulatory surgery centers in Pennsylvania from 2000 to 2014 to analyze 439,569 opioid-related hospitalizations. Of the total opioid-related hospitalizations, 85% were attributable to opioid use disorders, with some of the hospitalizations related to heroin overdose (2%) or non-heroin opioid overdose (6%). Based on latent class analysis, researchers identified five possible high-risk subgroups for opioid-related morbidity and mortality with one latent class representing the majority of all discharges (58%). The discharges in this latent class were associated with opioid use disorders (100% probability), White race, psychiatric disorder diagnoses and co-occurring tobacco, marijuana, and barbiturate use disorders (Liu et al., 2019).

Two of the studies included in the literature review were conducted in countries outside of the U.S., including Korea and Denmark (Munch et al., 2018; Oh et al., 2019). Both of these studies examined the impact of opioid use on critically ill hospitalized patients' mortality. In the Korean study, researchers analyzed patient records of adult patients who were admitted to a tertiary academic hospital between January 2012 and December 2017 who had been taking opioids regularly for more than 4 weeks before intensive care unit admission (Oh et al., 2019). Researchers performed propensity matching to balance the patient groups and included 2,990 patients (757 people who used opioid and 2,233 people who were opioid naïve). The odds of 90-day mortality were higher in chronic opioid users (28.8%) than in opioid naïve patients (17%).

Based on generalized estimating equation model for the propensity matched cohort, the chronic opioid group were at a 1.9-fold higher odds of 90-day mortality that the opioid naive group.

Similarly, researchers examined the impact of opioid use before hospitalization on mortality by comparing all-cause mortality following non-surgical intensive care unit admission for opioid users compared to non-opioid users (Munch et al., 2018). Out of 118,388 non-surgical ICU patients, 15% were current opioid users, 15% were recent opioid users, 30% were former opioid users and 40% were opioid nonusers. The absolute risk for 30-day all-cause mortality was 34.8% for current opioid users, compared to 20.6% for non-users. In adjusted models, only current users remained at elevated risk of all-cause mortality. At greater than 30 days post discharge, the risk for all-cause mortality rate remained high for current and recent users, suggesting that people with opioid use disorders who are critically ill are at higher risk of a poor prognosis.

Based on the current literature included in this review, patients with opioid use disorders who are hospitalized or who present to the emergency department tend to be White, male, young and have a higher risk of mortality than their non-opioid use disorder counterparts. This mortality risk includes a higher risk of overdosing compared to people who do not have a history of opioid use. In addition, people with self-reported opioid misuse frequently utilize the emergency department and may have increased hospitalizations and risk of discharging the hospital against medical advice.

Patients Who Inject Drugs

The review includes seven studies that describe the characteristics of hospitalized people who inject drugs. One of the studies utilizes a national sample, five were conducted at a single site, and one of the studies was conducted outside of the U.S. The studies suggest that people

who inject drugs and require hospitalization tend to be young, male, White, and are often on medication assisted recovery and often require surgery. The studies also suggest that this patient population tends to have serious infections, including skin infections, right-sided endocarditis, osteomyelitis, Hepatitis C Virus (HCV) and Human Immunodeficiency Virus (HIV). The majority of the studies in this review compare people who have drug-use related infective endocarditis to people who have endocarditis that is not related to drug use; despite the fact that patients who inject drugs and have infectious endocarditis tend to be younger and have less comorbidities than their non-drug-use related infective endocarditis counterparts, people with a history of drug-use related infective endocarditis and people with non-drug-use related infective endocarditis have similar mortality rates.

Current studies of people with injection drug use who require hospitalization suggest that this population tends to be young, White, male, and sometimes on medication replacement therapy, including methadone or suboxone. In addition, some socioeconomic characteristics have been described in some of the studies, including health insurance status, employment, education, and living conditions. In a descriptive study of hospitalized patients with active IV drug use and infections, researchers performed a retrospective chart review of 198 people who were actively injecting heroin and had been admitted to a single site hospital between 2009 and 2013 with a complicated infection (Gonzalez et al., 2019). The researchers reported that most of the patients were White, male, young (median age 33), and had health insurance (90%). They also reported that many of the patients lived with others at home and were unemployed. Of the 198 included patients, 33 were on methadone and 28 were on suboxone.

In studies that compared patients with infections related to injection drug use to patients without injection drug use, patients with a history of injecting drugs tended to be younger, with

evidence that people who inject drugs with serious infections are more likely to be female compared to people who have serious infections that are not related to drug use. June-Ho et al. (2020) utilized the National Inpatient Sample to compare hospitalizations for serious infections related to opioid use disorder and serious infections not related to drug use and found that patients with a secondary diagnosis of opioid use disorder tended to be younger, were more likely to be female, White, to have Medicaid or be uninsured, and tended to be the in the lowest quartile of household income compared to the non-opioid use disorder group. Similarly, Leahey et al. (2019) also compared patients with drug use related infective endocarditis to people with non-drug use related infective endocarditis at a large tertiary care center and reported that the median age of the patients with injection drug use related infective endocarditis was 33, compared to 63 for patients with non-injection drug use related infective endocarditis. In this study, there was a significantly higher proportion of women in the injection drug use related infective endocarditis group compared to the non-injection drug use related infective endocarditis group, with no significant difference in race between the two groups. In a study of 17,224 acute care hospitalizations in a single hospital from 2013 to 2017 comparing patients with drug use-related infective endocarditis and non-drug use-related infective endocarditis, patients who were admitted with drug use related infective endocarditis were significantly younger than the patients admitted with non-drug use related infective endocarditis (interquartile range = 33 versus 69; Meisner et al., 2020). The people in the drug use related infective endocarditis group were more likely to be covered by Medicaid (68.3%) whereas the people with non-drug use related infective endocarditis were more likely to be covered by Medicare (65.5%).

In a study aimed at understanding the impact of the opioid epidemic on the incidence of right heart endocarditis, researchers identified 126 patients with tricuspid valve endocarditis at a

single hospital site between the years of 2011 and 2017 (Wallen et al., 2018). The average age of

the patients decreased from 52.85 years in 2011 to 39.2 years in 2017; Caucasians made up 71%

of the patients in 2011 and 75% in 2016. While the researchers did not specifically identify the

cases that were related to injection drug use, the researchers noted that tricuspid endocarditis is

often associated with drug use, and suggested that the opioid epidemic has contributed to the

growing number of young people who are developing right-sided heart failure. The cohort had a

high percentage of surgical interventions with 58.73% ($n = 74$) of the patients receiving tricuspid

valve replacement and 41.27% ($n = 52$) of the patients receiving tricuspid valve repair. Another

study included in the review compared various outcomes for people with drug use related

infective endocarditis to people with non-drug use related infective endocarditis and reported that

patients with drug use related infective endocarditis had significantly more tricuspid valve

replacements (30.4%, $n = 1,921$) compared to people with non-drug use related infective

endocarditis (5.2%, $n = 15,303$). Leahey et al. (2019) studied 381 patients who were admitted for

infective endocarditis to a large tertiary care facility between 2007 and 2015 and found that the

patients with drug use related infective endocarditis more commonly had right-sided infective

endocarditis (compared to the patients with non-drug use related infective endocarditis), and

were more likely to have vegetations larger than 1 cm. While it is not completely understood

why right-sided heart failure is so much more common among people who inject drugs, it is

speculated that the increased incidence is related to the injection of particles (contaminating

illicit drugs) into the venous system that damage the valves in the right side of the heart (Shmueli

et al., 2020). Right-sided endocarditis only accounts for 15–20% of all endocarditis cases and is

commonly associated with injection drug use.

In addition to the incidence of right-sided endocarditis, several of the studies in the review considered other types of infections associated with injection drug-use that contribute to acute illness. Gonzalez et al. (2019) studied 198 people with active heroin use and complicated infections and found that cellulitis was the most common infection diagnosed among the patients (58%); 12% were diagnosed with endocarditis, 10% with osteomyelitis, and 6.5% with sepsis. In another study aimed at understanding the differences in factors associated with hospitalized patients with infections related to opioid use disorders (compared to hospitalized patients with infections not related to opioid use disorders), researchers included 96,470 hospitalizations for serious infections from the 2016 National Inpatient Sample (June-Ho et al., 2020). Among the hospitalizations, endocarditis was among the most common for those without opioid use disorders. In two of the studies included in the review, staphylococcus aureus was reported as the most common microbial agent for infective endocarditis, regardless of history of injection drug use, however, one of the studies reported that staphylococcus was responsible for twice the percentage of cases in the patients with drug use related infective endocarditis, compared to patients with non-drug use related infective endocarditis ($n = 381$) (Leahey et al., 2019; Wallen et al., 2018). Based on the results from two of the studies included in the review, patients with drug use related infective endocarditis are more likely to have Hepatitis C Virus and Human Immunodeficiency Virus. Leahey et al. (2019) reported that out of 381 patients with endocarditis, patients with a history of injecting drugs were more likely to have Hepatitis C Virus (70%) compared to people without a history of injecting drugs (16%). Similarly, researchers reported that patients with drug use related infective endocarditis, were more likely to have comorbid infections, including Human Immunodeficiency Virus and Hepatitis C Virus ($n = 17,224$).

Several studies investigated mortality among hospitalized persons with a history of injecting drugs. In a study aimed at investigating the incidence of right-sided endocarditis, the 30-day mortality rate among 126 patients with tricuspid valve endocarditis was 11.11% (Wallen et al., 2018). Gonzalez et al. (2019) calculated the number of deaths that occurred for patients admitted with serious infections who were actively using heroin; out of 198 included patients, five of the patients died during hospitalization. Meisner et al. (2020) calculated a 4.5% mortality rate for 1,921 patients who were admitted to an acute care hospital with drug use related infective endocarditis. The remaining studies included in this review, that considered mortality, including the previously mentioned study conducted by Meisner et al., compared results to the mortality rates of people with endocarditis who do not have a history of drug use.

Several of the studies in the review compared mortality rates among patients with drug use related infective endocarditis compared to patients with non-drug use related infective endocarditis. In one study comparing outcomes for hospitalized patients with drug use related infective endocarditis to hospitalized patients with non-drug use related infective endocarditis, despite the fact that people with drug use related infective endocarditis were significantly younger (media age = 33 years) than their non-drug use related infective endocarditis counterparts (median age = 63), there was no difference in the all-cause mortality between the two groups. In another study of 107 people with possible or definite infective endocarditis being admitted to a large tertiary care center, the patients with drug use related infective endocarditis were significantly younger (median age = 33.5 years) and had less documented comorbidities than the non-drug use related infective endocarditis patients (median age = 65 years) in the study, however, the two groups had similar hospital mortality rates (10% versus 14%, p-value = 0.30). The 90-day mortality rate among the people with a history of injecting drugs (19%) was less

compared to people without a history of drug-use (39%, *p*-value = 0.05). Meisner et al. (2020) also reported similar mortality rates among people with drug- use- related infective endocarditis compared to people with non-drug use related infective endocarditis, despite patients with drug use related infective endocarditis being significantly younger than the patients with non-drug use related infective endocarditis.

Evidence also suggests that patients with drug- use- related infective endocarditis may have some differences in hospitalization factors compared to people with non-drug- use- related infective endocarditis including length of stay and discharge status. In a secondary analysis of the National Inpatient Sample (*n* = 96,470), researchers reported that people with infections and opioid use disorders were more likely to be discharged home (particularly with home health services), were more likely to have patient-directed discharge or to be transferred to another acute care hospital compared to the people with infections and no opioid use disorder diagnosis (June-Ho et al., 2020). The mean length of stay for the opioid use disorder group was 12.5 days compared to 8.1 days for the non-opioid use disorder group. Researchers found similar results in another study comparing outcomes for people with drug use related infective endocarditis compared to people with non-drug use related infective endocarditis (*n* = 17.224); the discharge dispositions differed significantly between the groups, with patients in the drug use related infective endocarditis group more frequently discharged to home without services (28.8%) compared to non-drug use related infective endocarditis (20.2%) (Meisner et al., 2020). People with drug use related infective endocarditis more frequently left the hospital against medical advice (15.7%) compared to the people with non-drug use related infective endocarditis (1.1%). The length of stay was longer for people with drug use related infective endocarditis (IQR = 10 days [4–21]) compared to the people in the non-drug use related infective endocarditis group

(IQR = 7 days [4–13 days]), but in a multivariable model, a history of opioid use disorders was not significantly associated with an increased length of stay.

One of the studies included in the review that did not compare outcomes for people who inject drugs to people who do inject drugs, reported discharge status and length of stay for hospitalized people with a history of injection drug use and infections (Gonzalez et al., 2019). The researchers reported the median length of stay for this population as 4.7 days (range = 1–140 days; n = 198). A total of 29% of the patients left the hospital against medical advice.

One of the studies included in the review was conducted in Australia in which researchers sought to identify longitudinal correlated of cumulative and frequent emergency department use from a cohort of people who inject drugs. The researchers included 612 participants in the study, and found that the median age of the participants was 28 years old. In addition, 67% of the included participants were male, and less than 20% of the cohort had completed high school of higher education. Only 13% of the participants were employed, approximately 20% had unstable living conditions, and 33% were currently taking opioid substitution treatment (medication assisted recovery). The results of the study suggested that people who inject drugs in Australia are high utilizers of the emergency department and suggest that the opioid crisis extends beyond the United States.

Perception of Hospital Care

There are seven studies in the review of the literature studying the perception of hospital care for people with substance use disorders, including people with opioid use disorders or people who self-inject opioids (Bearnot et al., 2019; Biancarelli et al., 2019; Horner et al., 2019; Jaiteh et al., 2019; King et al., 2021; Summers et al., 2018; Velez et al., 2017). All of the studies included perceptions of people who have opioid use disorders or people who self-inject opioids,

and two of the studies included provider perceptions of the care that people with opioid use disorder-associated endocarditis receive. Six of the studies were conducted in the U.S. and one was conducted in Switzerland. Six of the studies were qualitative and one was a mixed-methods study. Based on the included literature, hospitalized patients who use illicit drugs may feel that they receive inequitable, delayed, and inadequate care in the hospital, they may feel stigmatized and judged by hospital healthcare providers who may have a limited understanding of addiction, and they fear undertreatment of pain and opioid withdrawal when hospitalized. These perceptions may lead to avoidant health-seeking behaviors for people who use illicit drugs. However, hospitalization may represent a reachable moment for people who use illicit drugs.

Results from several studies included in the review suggest that people with opioid use disorders (or who inject opioids) who are hospitalized perceive inequities and delays in care, and care that does not adequately address the needs of this population. In one qualitative study, researchers performed semi-structured interviews of 32 people who reported substance abuse (65% reported opioid abuse) and had been hospitalized on a medical or surgical unit (Velez et al., 2017). One of the emergent themes of the study was that hospital care did not adequately address stress, trauma, mental heal needs (including underlying substance use disorders), housing and basic needs, and limited access to peers. In a study that included 11 people with opioid use disorder-associated endocarditis who had been hospitalized, researchers performed semi-structured interviews and identified stigma related inequity and delays in care compared to people without addiction. Another theme that emerged in the study was a perceived lack of care integration in hospitals and discontinuation of long-term care that contributes to poor outcomes. The results of this study were supported by similar themes that emerged from 12 healthcare provider participants (four social workers, two nurses, one nurse practitioner, five physicians). In

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another qualitative study, researchers included 33 people who inject drugs to explore stigma against drug use on healthcare utilization among people who inject drugs (Biancarelli et al., 2019). One of the themes that emerged from the semi-structured interviews was that dehumanization on healthcare is common, and the majority of participants perceived they had been treated unfairly based on their history of injecting drugs.

In the only study that exclusively studied nurses' experiences caring for patients with opioid use disorders, 22 nurses were included to qualitatively assess their attitudes, perceptions, and training needs caring for inpatients with opioid use disorders. Six themes were identified, including feelings of burn out, needs for change, communication with providers, assessment and treatment plans, and safety and security. In the study, the nurses discussed how patient struggles with opioid use placed strain on nurses, and offered recommendations for standardizing care for this population, including the use of standard policies to address care.

One of the studies was specific to perceptions of how the COVID-19 pandemic has impacted the care that people who use illicit drugs are receiving in hospitals (King et al., 2021). In this qualitative study, researchers conducted semi-structured interviews of 27 participants who most commonly had opioid use disorders, methamphetamine use disorder or alcohol disorder and identified four themes, including one theme that reduced community resources had increased reliance of this population on hospitals for care. However, other themes provided suggest that policy changes in hospitals may be decreasing the time allowed for this population to stay in the hospital, and that the COVID-19 pandemic had contributed to care transitions (from hospital to community) that were highly uncertain.

Another study that addressed perceptions of care was performed in Switzerland, and while the results provide evidence that the opioid crisis is not just limited to the U.S., the results

of this qualitative study suggest a difference in the perception of the care that this population received in this country (Jaiteh et al., 2019). Among several themes identified in this qualitative study in which researchers interviewed 12 participants who all had opioid dependency and reported poly-substance use within the last 2 years, and had been admitted into acute care for treatment at least once (most commonly for infections such as endocarditis, skin infections, pneumonia), one theme identified was that for the most part, acute care interactions were good and interactions with providers were good.

Two of the studies included in the literature specifically identified that people who have a history of substance use disorders who need hospitalization have fear regarding potential Inadequate pain and opioid withdrawal they may experience in the hospital setting. Velez et al. (2017) interviewed 32 participants with substance use disorders about their hospital experiences and all of the participants reported an overpowering compulsion to use drugs and pain that complicated care while in hospital, which creates barriers to accessing care. Similarly, researchers explored care-seeking behaviors of people who inject heroin and have a history of soft-tissue infections in a mixed-methods study (Summers et al., 2018). In the qualitative portion of the study, 12 persons who inject heroin were included and two themes were identified: experiences of inadequate management of acute pain in healthcare settings and aversion to concerns about opioid withdrawal.

Four of the studies included in the review discussed perceptions of the impact of stigma on care that hospitalized people with substance use disorders receive. In one of the qualitative studies of 32 hospitalized patients with substance use disorders, thematic analysis was performed; researchers identified provider judgement as a recurring theme discussed in semi-structured interviews (Velez et al., 2017). Bearnot et al. (2019) conducted a qualitative study

aimed at understanding the experiences of care for people with opioid use disorder-associated endocarditis from the perspective of people with opioid use disorder-associated endocarditis and healthcare workers providing care to this population. Utilizing semi-structured interviews and ground theory, the researchers included 23 participants, 11 of which were people with opioid use disorder-associated endocarditis and identified the theme that inequities and delays in care tend to occur because of stigma against substance use disorders. Biancarelli et al. (2019) performed semi-structured interviews with 33 people who inject drugs to explore stigma against drug use on healthcare utilization. Most of the participants perceived that they had been treated unfairly by healthcare providers based on their drug use. Although the participants in the qualitative study performed in Switzerland did perceive that the care they received was overall positive, all of the participants did acknowledge that they had felt they were treated differently based on their drug use by some provider(s) (Jaiteh et al., 2019).

Studies included in the review also suggest that people with opioid use disorders perceive that they may develop healthcare-avoiding behaviors in response to stigma, and fears of inadequate pain and opioid withdrawal management in the hospital setting (Biancarelli et al., 2019; Summers et al., 2018). In one study, researchers performed semi-structured interviews of 33 persons who injected heroin and identified avoiding healthcare as a theme among the participants to help avoid stigma they perceived they faced in hospitals (Biancarelli et al., 2019). Specific avoidant behaviors identified among participants included delaying care, not disclosing drug use to healthcare providers, and seeking care in other places such as the community, where they felt more accepted. In a mixed-methods study in which researchers identified themes of fear of opioid withdrawal and inadequate pain management in the initial qualitative portion of the study ($n = 12$), researchers performed a structured interview (created from the results of

qualitative study) of 145 participants who inject heroin from two urban cities (Summers et al., 2018). Based on the results, 66% of the participants experienced at least one serious skin tissue infection, 38% reported waiting two weeks to seek care, 57% reported leaving hospital against medical advice, 54% reported undergoing drainage procedure performed by a non-medical person in order to avoid care, 32% reported not taking all prescribed antibiotics all efforts to avoid seeking healthcare related to negative experiences with poorly managed pain and withdrawal symptoms.

Two of the studies included in the review suggest that hospitalization may be a reachable moment for people with substance use disorders (Bearnot et al., 2019; Velez et al., 2017). Velez and peers performed semi-structured interviews of 32 patients with substance use disorders and identified a theme that hospitalization served as a wake-up call for participants and interrupted their drug-use. One of the themes that emerged in a qualitative study of 11 people with opioid use disorders-associated endocarditis and 12 healthcare providers was that hospitalizations often compounded serious social and medical comorbidities with new physical and cognitive impairments brought on by the acute illness (Bearnot et al., 2019). These complicated circumstances are often overwhelming for patients and providers to deal with, but offer an opportunity to link patients to addiction services and long-term substance use disorder treatment after discharge from hospital.

The current evidence regarding perceptions of care for hospitalized patients with substance use disorders, including people with opioid use disorders and people inject drugs suggests that people who are acutely ill and have a history of substance use disorders may face stigma and subsequent delays and inequity in care. In order to avoid stigma, people with substance use disorders may exhibit care-avoiding behaviors, which may contribute to worse

outcomes for this population. Hospitalization often represents a critical time for a person with a substance use disorders, a time in which they are interfacing with healthcare and have an opportunity to access care for not only their acute illness, but also their underlying substance use disorders. The current research suggests a need for a cultural shift in the understanding of addiction and a holistic approach to providing care for this population.

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Interventions

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Interventions Aimed at Improving Care for People with Opioid Use Disorders

The review of literature includes 12 studies aimed at understanding or improving care for people with opioid use disorders. Studies that include general quality improvement, implementation of harm reduction strategies, and implementation of addiction medicine consults aimed at improving hospital care of patients with opioid use disorders are discussed in this section of the literature review.

Addiction Treatment

There are two studies included in the review that address the implementation of general addiction treatment for hospitalized patients (Blanchard et al., 2019; Cronin et al., 2019). These services include drug detoxification, drug rehabilitation, and offerings of substance use disorder services (referral to dependency inpatient care or dependency outpatient services). In one study, researchers utilized data from the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project from 2010–2013 ($n = 329,037$) to evaluate the relationship between receipt of inpatient detoxification and/or rehabilitation services and subsequent opioid-related readmissions (Blanchard et al., 2019). Only 19.4% of the patients with identified opioid-related conditions received treatment for drug use during their hospitalization. The patients who did receive drug rehabilitation (but not drug detoxification) had lower offs of an opioid-related

readmission during the 90 days post discharge period (OR = 0.60, 95% CI = 0.54–0.67) compared to patients who did receive inpatient rehabilitation or detoxification.

In a study utilizing the 2015 American Hospital Association Survey, researchers assessed hospitals' offerings of substance use disorder services to better understand what factors predict the presence of services within hospitals (n = 3365) (Cronin et al., 2019). Despite an overall increase in overdose deaths from 2010-2015 (based on Centers for Disease Control and Prevention data), the number of hospitals offering inpatient services decreased during the same time frame, from 334 hospitals offering inpatient addiction services in 2010 to 327 hospitals offering those services in 2015. Similarly, outpatient services offered by hospitals decreased from 588 in 2010 to 577 in 2015. Multilevel logistic regression models were fitted to compute the fixed effects odds ratios; for the inpatient dependent variable, bed number had a significant and positive relationship with inpatient offerings, critical access status, for-profit ownership, and number of psychiatric facilities and average overdose rate (2010–2015) in the county where hospital was located had a significant and negative relationship with inpatient services. For the outpatient services model, academic medical center status, bed number, critical care access status, public status, for-profit ownership, and medical home model had significant and positive relationships with outpatient services.

Harm Reduction Strategies

There are four studies included in the review in which researchers evaluate harm reduction strategies in the care of people with opioid use disorders (D'Onofrio et al., 2019; Jakubowski et al., 2019; Lee et al., 2017; LeSaint et al., 2020). All of these studies evaluate the implementation of medication assisted recover in hospitalized patients with opioid use disorders. D'Onofrio et al. (2019) and peers evaluated the long-term outcomes for people with opioid use

disorders at 2, 6, and 12 months following initiation of buprenorphine/naloxone in the

emergency department between 2009 and 2013 ($n = 290$). All participants were randomized to

one of three study groups: (a) referral (referred to an outpatient addiction service), (b) brief

intervention (10-15 minute) manual-driven audio-taped Brief Negotiation Interview with a

discussion of treatment options based on patient characteristics, or (c) Buprenorphine initiation

in the emergency department (if they had moderate to severe opioid withdrawal) with follow-up

hospital's primary care center within 72 hours. Patients in the buprenorphine group were

receiving formal addiction treatment at a significantly higher rate at the 2-month assessment

[69/92 (74%)] compared to the patients in the referral [42/79, (53%)] or the brief intervention

[39/83, (47%)]. The difference in the percentage of patients receiving formal addiction treatment

did not persist at 6 months.

In a study aimed at exploring the predictors of entry and retention in buprenorphine

following linkage from an acute medical hospital, researchers included 72 participants who

were placed on buprenorphine induction and dose stabilization followed by post-discharge

transition to office-based buprenorphine treatment (Lee et al., 2017). Participants who had ever

been on buprenorphine treatment had 3.5 times the odds of entry into the office based opioid

treatment program (OR = 3.50, 95% CI 0.41; 29.65) than those who had never been on

buprenorphine treatment. Patients with longer hospital days had more than double the odds of

entering office-based buprenorphine treatment compared to patients with shorter hospitalization

stays (OR = 2.37, 95% CI 0.11; 50.92). Patients with a history of buprenorphine treatment also

tended to have more days of office-based buprenorphine treatment than those with no history of

buprenorphine treatment (b = 0.52, 95% CI – 0.16; 1.19). Additionally, older age (b = 0.34, 95%

CI – 0.10; 0.78) and non-Latino Caucasians (b = 0.55, 95% CI -0.25, 1.35) tended to have higher

adjusted mean number of office-based buprenorphine treatment days compared to their counterparts.

In another study considering buprenorphine administration in acute care, researchers sought to describe the main adverse events associated with emergency department-initiated buprenorphine and rates of linkage to care in a Level I trauma center (LeSaint et al., 2020). A total of 77 patients who were started on buprenorphine in the emergency department were included for analysis, with tracking of subsequent follow-ups in a chart review. During the follow-up period, 33 (43%) of the participants returned to the emergency department without a chief complaint of opioid withdrawal (12 reported localized pain, four reported psychiatric complaints such as suicidal ideation or anxiety, three presented after being assaulted, two presented with abscesses, and two presented with generalized weakness). There was one case of documented precipitated opioid withdrawal in the cohort, with his last heroin use reported as four hours prior to the follow-up emergency department visit.

In the only study included in the review to evaluate naloxone distribution, researchers developed and evaluated a pilot overdose education and naloxone distribution program for hospitalized medical patients on two general medical units in one hospital (Jakubowski et al., 2019). During the development phase, physician residents selected a consult team model who rotated a pager to respond to calls for patients referred to the program. Naloxone kits were provided to the hospital consult team from the state Department of Health and Human Services and staff were trained on how to make consults. During the implantation phase, 80 consults were received from April 2016 through March, 2017. Of these consults, 74 of the patients were eligible for training and receipt of naloxone kits, and 50 of those were trained.

Addiction Medicine Consults

There were five studies that evaluated the use of addiction medicine consults in the hospital care of people with opioid use disorders (L. Fanucchi & Oller, 2019; Gorfinkel et al., 2019; Lintzeris et al., 2020; Priest & McCarty, 2019; Trowbridge et al., 2017). Addiction medicine consults are a strategy utilized by some hospitals to reduce the mortality and morbidity of people with substance use disorders by offering access to addiction treatment and improving the transition of people with substance use disorders from the hospital to community settings (Weinstein et al., 2018). These studies considered different aspect of addiction medicine consults, including outcomes (hospital length of stay, linkage to outpatient services, medication initiation), provider knowledge of addiction, and provider perception of implementing addiction medicine consults. Two of the studies are quantitative, one study is a mixed-methods, and one of the studies included is qualitative.

Two of the studies evaluate the implementation and outcomes of addiction medicine consults in hospitals outcomes (L. Fanucchi & Oller, 2019; Trowbridge et al., 2017). In one study, researchers performed a retrospective chart review in a large academic hospital during the initial implementation of an addiction medicine consult (L. Fanucchi & Oller, 2019). During the study period (October 2018–December 2018), the newly implemented Addiction Medicine Consultation service saw 92 patients. Of these patients, 73 met DSM-5 criteria for OUD, and 82 had a medical complication of their substance use disorder. The average length of stay for the patients referred to the service was 19.5 days. Out of the patients who met DSM-5 criteria for OUD, 71% of the patients underwent buprenorphine/naloxone induction, and 9% were started on methadone. Just under 6% of the patients who were started on medication replacement therapy left the hospital against medical advice.

In another similar study, researchers sought to describe the initial experience of an addiction consult service at a large urban hospital from July 2015–January 2016 by describing the number of consults, diagnoses of patients, and the use of medications and linkages to outpatient care (Trowbridge et al., 2017). During the study timeframe, there were a total of 337 recorded encounters referred by general medicine teaching service (47%), hospital services (11%), subspecialty services (19%), intensive care services (7%), family medicine services (7%), and surgical services (6%). The number of reported substance use disorders for an individual ranged from 1 to 4 (mean = 1.6); 78% of the individuals reported an opioid use disorder. Among the patients with an opioid use disorder who were not engaged in treatment, methadone maintenance was initiated in 70 patients and buprenorphine in 40 patients. Addiction consult-services evaluated 41 patients already on methadone maintenance and 20 patients on buprenorphine, advising referring team about medication management during hospitalization. Approximately 76% of the patients started on methadone came to the methadone clinic post discharge, 54%, 39% and 29% continued to receive medicine at 30-, 60-, and 90-days post discharge. Of those started on buprenorphine, 49% attended their post-hospital discharge clinic visit, 39%, 27% and 18% continued receiving buprenorphine at 30-, 60-, and 90-days post discharge.

While these studies suggest the implementation of an addiction consult service is feasible and provides an opportunity to initiate medication assisted recovery for patients with opioid use disorders it is unclear from the results how the addiction consult service impacted the care the patients with opioid use disorders received. One of the studies reports the average length of stay and rate of discharge against medical advice for patients referred to the consultation service, however the researchers did not report what those outcomes were for patients who were not

referred to the service (or what the average length of stay or discharge against medical advice rate was before the implementation of the addiction consult service).

In another study in which researchers evaluate addiction consult services, Gorfinkel and et al. (2019) utilize a mixed-methods approach to evaluate whether a dedicated training elective with a hospital-based addiction medicine consult impacts knowledge of addictions care among medical trainees in an academic hospital. In the initial and quantitative portion of the study, 156 medical trainees elected to participate in the program (medical students, residents, fellows and scholars) with 142 of the participants completing a pre-rotation self-assessment and a post-rotation self-assessment. Of the trainees who completed the rotation in addiction medicine, 18 trainees agreed to participate in the qualitative portion of the study, which consisted of a 50-minute semi-structured interview aimed at better understanding their experiences in the program (Gorfinkel et al., 2019). There was a significant improvement in the self-assessment (of knowledge regarding addiction) scores (median score of pre-rotation assessment = 33, median score for post-rotation assessment = 45.45, $p < 0.001$). Three key themes emerged from the qualitative interviews, including improvement in (a) examination, identification and diagnosis of addiction, (b) treatment and care of people with addiction, and (c) research experience. Some participants responded that they were unaware of the medications available to treat people with SUDs and unaware of their own stigma associated with substance use disorders before completing the rotation.

Priest and McCarty (2019) performed a qualitative study which included 15 board-certified or board-eligible addiction medicine physicians from 14 hospitals to explore and describe how addiction medicine physicians created and presented business propositions to hospital administrators to support the development of addiction medicine consult services.

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Utilizing semi-structured interviews and direct content analysis, the researchers identified four themes that were key in making the business case for administrators: (a) describing the prevalence of substance use disorder or opioid use disorder in the hospital, (b) Identifying the negative financial impacts of not treating substance use disorders during hospitalizations, (c) highlighting the ongoing care quality treatment gap for hospitalized patients with substance use disorders, and (d) noting the success of other institutional addiction consult services.

In general, the evidence regarding how addiction consult services impact the care that hospitalized people with opioid use disorders receive is unclear. Based on the included literature, it may be feasible to implement this type of intervention, and there are important issues that should be addressed when making a case to hospital administrators for initiating this consult service. Additionally, this service line may improve provider understanding of addiction when medical trainees complete a rotation in addiction medicine (by working with an addiction consult team).

Interventions Aimed at Improving Care for People Who Inject Drugs

There are a total of 10 studies in the literature review that include implementations aimed at improving care for hospitalized patients with a history of injecting drugs. These studies evaluate a cascade of care for people with infective endocarditis and opioid use disorders, antibiotic management, addiction medicine consults and harm reduction interventions.

Addiction Treatment

In a quantitative study included in the review, researchers describe a cascade of care for people with infective endocarditis and opioid use disorders which included four key steps during treatment for this patient population: (a) evaluation by an addiction treatment team, (b) prescribed medication replacement treatment while inpatient, (c) prescribed medication

replacement therapy at discharge, and (d) continued medication replacement therapy at 90 days after discharge (Saldana et al., 2019). The researchers performed a retrospective chart review in a large urban medical center between July 2007 and January 2015 and calculated the proportion of patients who received any of the identified steps of the cascade of care. There were 273 patients included in the study; 134 (49%) were evaluated by an addiction treatment service; 45 (17%) were prescribed medication replacement therapy while in the hospital; 22 (8%) were prescribed medication replacement therapy at discharge; and 22 (8%) patients were still engaged in medication replacement therapy at 90 days after discharge.

Antibiotic Administration

Several studies emerged in the literature regarding efficient management of antibiotic therapy for patients with a history of injecting drugs (or with a history of substance use disorders) who are being treated for infections (Ashley Appa et al., 2019; Eaton et al., 2018; L. C. Fanucchi et al., 2020; Morrisette et al., 2019). People who inject drugs and are being treated for complicated infections such as endocarditis are often treated with intravenous antibiotics in the hospital for extended periods of time; the transition of these patients from inpatient to outpatient treatment with intravenous access is complicated by concerns that they will use intravenous access intended for antibiotics to inject illicit drugs (Visconti et al., 2019). Providers have the challenge of assessing the pros and cons of keeping the patient in the hospital for several weeks while patient is receiving IV antibiotics (an intervention that can typically be performed at home for patients who are not at risk of illicit drug use with more cost-effective services) compared to the risk of the patient resuming unsafe self-injection practices.

The studies included in this review that evaluate efficient antibiotic use in people with a history of injection drug use and opioid use disorders with concurrent infections consider long-

acting antibiotics, the utilization of an Intravenous Antibiotic and Addiction Team, home

antibiotic administration, and outpatient antibiotic administration. Morrisette et al. (2019)

performed a secondary analysis from a previously published study to assess the clinical use of

long acting lipoglycopeptides in people who use drugs and had serious infections compared to

people with serious infections who do not use drugs. Long-acting lipoglycopeptides are a class of

antibiotics that possess prolonged tissue exposure and excellent antimicrobial activity against

gram-positive bacteria, and only require one to two parentally administered doses (Cooper et al.,

2021), allowing people who inject drugs to be treated, and discharged without intravenous access

(Morrisette et al., 2019). In this study, patients included in the study were those who were not

offered outpatient antibiotic therapy due to clinician concern for misuse of IV access and patients

with serious infections who did not use drugs. A total of 56 patients were included in the study

(17 people who use drugs and 39 people who do not use drugs) and the most commonly treated

infections were acute bacterial skin and skin structure infections, osteomyelitis, and endocarditis.

Ten of the patients did not return for follow-up (four people who sue drugs and 6 people who do

not use drugs). From the group of people who use drugs, there were 13 clinical successes (77%)

(defined as no further evidence of infection), and one clinical failure (6%) (defined as lack of

clinical response, signs of re-emergence of primary infection within 60 days of last dose of long

acting lipoglycopeptides, need for alternative antibiotic therapy due to clinical worsening, or

death); however, the clinical failure was also considered a clinical success after requiring a

second long acting lipoglycopeptides (due to clinical failure of initially administered long acting

lipoglycopeptides There were no reported deaths or adverse effects of long-acting

lipoglycopeptides in the group of people who use drugs. The estimated length of stay for the

people who use drugs was 20 days compared to 11 days for the non-drug users. The estimated

hospital savings for people who use drugs was $40,455.00 versus $19,555.08 for people who do not use drugs.

Eaton et al. (2018) performed a cost analysis to examine the cost of care for people who inject drugs before and after the implementation of an Intravenous Antibiotics and Addiction Team. The Intravenous Antibiotics and Addiction Team intervention included utilization of a 9-point risk assessment tool that identified patients with a history of injection drug use who were safe for discharge; patients who were considered low-risk (of subsequent injection drug use) were discharged with outpatient antibiotics, and patients who were considered higher risk of subsequent injection drug use received inpatient antibiotic treatment (Eaton et al., 2018). The risk assessment tool evaluated cravings, home environment, dual psychiatric diagnoses, history of overdose, relapse, trauma, use of multiple drugs, family history of addiction, and willingness to change. Patients admitted to a large tertiary care center were included in the study if they had a history of intravenous drug use and had an indication for long-term antibiotics. Thirty-seven patients were included in the study during the pre-Intravenous Antibiotics and Addiction Team period (January 2015–February 2016) and 100 patients were included during the post-Intravenous Antibiotics and Addiction Team period (October 2016–January 2018). Researchers evaluated cost and length of stay for the patients and found that the mean was 42 days for the pre-Intravenous Antibiotics and Addiction Team group compared to 22 days for the post-Intravenous Antibiotics and Addiction Team group. A total of 25 patients (27%) of the patients in the post-Intravenous Antibiotics and Addiction Team group were considered low risk. During the pre-Intravenous Antibiotics and Addiction Team period, hospital costs per day per admission were $922, compared to $1,182 during the post-Intravenous Antibiotics and Addiction Team period. Despite increased daily hospital costs, direct costs per admission in the post-Intravenous

Antibiotics and Addiction Team group ($26,014) were 33% lower than in the pre-Intravenous Antibiotics and Addiction Team period ($38,716).

While the other studies included in the literature review regarding antibiotic use focused on people who inject drugs, Ashley Appa et al. (2019) described early safety and efficacy outcomes for outpatient parenteral antibiotic therapy among individuals without active injection drug use but with a high rate of substance use and comorbid issues. The study included 45 patients (and 47 courses of antibiotics) who were enrolled in a new program to administer antibiotics at home after discharge from a large urban medical center between September 2017 and January 2019. Of the patients included, 83% ($n = 39$) received parenteral antibiotics in a residential setting and 17% ($n = 8$) received antibiotics in an outpatient infusion center. The researchers also calculated 30- and 90-day readmission rates for infection, vascular access complications, illicit drug use, death, and efficacy (completion of antibiotics). Recent or illicit drug use was reported in 24% of the patients and the efficacy of the outpatient parenteral antibiotic therapy program was 94%, with 44 of the patients completing the antibiotics. The 30-day and 90-day readmission rates were 13% and 20%.

In another study evaluating the administration of antibiotics to patients with a history of injecting drugs (or substance use disorder) outside of the hospital, researchers evaluated an outpatient model that combined outpatient parenteral antibiotic treatment with buprenorphine/naloxone, and counseling for severe injection related infections (L. C. Fanucchi et al., 2020). The researchers compared the outcomes for these patients to outcomes for patients who received usual care, defined as completing IV antibiotics in the hospital (L. C. Fanucchi et al., 2020). A total of 90 patients were screened with 10 randomized to the outpatient parenteral antibiotic therapy group and 10 randomized to usual care. The average length of stay for the

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outpatient parenteral antibiotic therapy group was 22.4 days compared to 45.9 days for the usual

care group. All of the patients in both groups completed the full IV antibiotic therapy, while the

proportion of negative urine samples (for presence of illicit opioids) was significantly greater in

the outpatient parenteral antibiotic therapy patients compared to the usual care participants.

Retention in treatment was similar in both groups.

The results of studies that evaluate antibiotic administration to people who inject or use

drugs and have infections suggest that there may be safe and effective alternatives to in-hospital

administration of long-term antibiotics for this population. Alternatives include outpatient

administration of antibiotics or long-acting antibiotics that allow for removal of intravenous

access before discharge. These alternatives may provide cost-savings to the healthcare system

and may reduce hospital length of stay.

Addiction Medicine Consult

There is one study that considered consultation of addiction medicine consults for people

with severe infections attributable to either injection drug use or opioid drug use (Marks et al.,

2019). Based on the results of this study, addiction medicine consults significantly increased the

odds that patients received medication replacement therapy significantly increased the likelihood

that patients completed antibiotic therapy and decreased the likelihood that patients left the

hospital against medical advice or were readmitted to the emergency department or the hospital

at 90-days post discharge ($n = 125$). Out of the 125 patients included in the study, 30.4%

received an addiction medicine consults ($n = 38$). Thirty-three (86.8%) of the patients in the

Addiction Medicine Consult group received medication replacement therapy compared to 15

(17.2%) of the patients in the non-Addiction Medicine Consult group (OR, 31.68 [95% CI,

10.25–81.29]). There were significantly less discharges against medical advice and elopements

in the Addiction Medicine Consults group compared to the non-Addiction Medicine Consults group and patients who received addiction medicine consults had a significantly higher rate of completion of parental antibiotic therapy. Additionally, patients who were in the Addiction Medicine Consults group were less likely than patients who did not receive an addiction medicine consult to be readmitted to the emergency department or hospital within 90 days of discharge.

While addiction medicine consults may provide improved outcomes for people who inject drugs (or people with opioid use disorders or substance use disorders), Gray and peers performed a chart review of 76 patients in an academic hospital from 2000 to 2016 and determined there were no documented discussion of addiction treatment in 52% of the cases. In addition, patients with complicated infections related to drug often receive an infectious disease consultation, with results of one study suggesting that the majority (78%) of infectious disease physicians ($n = 672$) reporting that they have treated people who inject drugs for infections (Rapoport et al., 2018). In a retrospective chart review of a study included in the review, infectious disease services were only consulted in 55% of the cases of 198 hospitalized patient with active intravenous heroin use who were admitted for a complicated infection (Gonzalez, 2019).

While the studies evaluating addiction medicine consults suggests that this intervention may improve outcomes for people who inject drugs, more research is needed to understand how this strategy may improve hospital care for this population. Considering the increased risk of infections people who inject drugs have, infectious disease is another consultation aimed at improving outcomes for this population. One study suggests that both of these consultations are under-utilized in at least one hospital site.

Harm Reduction Interventions

This literature review includes three studies that consider harm reduction strategies to improve care for hospitalized patients with a history of injecting drugs (Brooks et al., 2019; Oviedo-Joekes et al., 2021; Suzuki et al., 2020). The utilization of harm reduction strategies in persons with a history of injection drug use is endorsed by the World Health Organization and the Centers for Disease Control and Prevention as a mechanism to reduce the spread of infectious diseases that can be spread with the use of contaminated needles (CDC, 2021; WHO, n.d.). Harm reduction studies in this review include studies evaluating a bedside needle and syringe program, medication assisted recovery, and home administration of medications for a patient quarantined with COVID-19.

In one study conducted in a Canadian hospital, researchers performed a retrospective chart review after the implementation of a bedside needle and syringe program (Brooks et al., 2019). During the study period, 1,907 intakes were identified for potential program services, with 597 of the intakes reporting injection drug use. Out of the total intakes who reported injection drug use, 334 (56%) were offered syringes, with 124 (37%) accepting syringes. While age was not a factor for acceptance of syringes, females were more likely than males to accept syringes.

One of the studies in the review included evaluation of medication assisted recovery for hospitalized patients with a history of injection drug use. According to the results, patients on medication assisted recovery at the time of hospital admission may be less likely to leave the hospital against medical advice (Suzuki et al., 2020). This study included 84 patients admitted to a large tertiary hospital for infective endocarditis due to injection drug use between January 2016 and December 2018. A total of 34 patients admitted were actively engaged in medication

assisted recovery (either buprenorphine, methadone, or extended-release naltrexone). An additional 21 of the patients were started on medication assisted recovery once admitted to the hospital. Patients engaged in medication assisted recovery at the time of admission were significantly less likely to discharge against medical advice (5.9% of patients engaged in medication assisted recovery left against medical advice compared to 24% of patients not engaged in medication assisted recovery at time of admission).

The review also included a case study of a patient in Canada with long-term opioid use disorder who received medication assisted recovery and was diagnosed with COVID-19, and subsequently quarantined (Oviedo-Joekes et al., 2021) The patient had been receiving diacetylmorphine at a community clinic for 6 years and upon discharge from the hospital, required a period of isolation to reduce the spread of infection. The patient was able to self-administer his replacement therapy at home, with a pharmacist and nurse delivering medications (and witnessing self-injection) twice daily. While a case study is not generalizable to larger populations, the case study does highlight the difficulty in medication administration for people with COVID-19 who are engaged in medication assisted recovery; the study also provides an exemplar of patient-centered care that reduces the spread of COVID-19, while maintaining quality care for a patient with opioid use disorder.

The studies evaluating harm reduction strategies suggest that a bedside needle program is feasible in a Canadian hospital and that medication assisted recovery may reduce the risk of patients who inject drugs leaving the hospital against hospital advice. However, these studies are based on single sites and are may not be generalizable. A case study included in the review supports that it may be difficult to provide medication assisted recovery to patients with COVID-19, but that patient-centered care is possible.

Discussion and Summary of Literature Review

While there were no quantitative studies in the review of current literature that exclusively consider the nurses' role in caring for hospitalized people with a history of opioid use disorders and/or injecting opioids, there are two qualitative studies that considers the perception of health care providers; one study considered an interprofessional group, with two nurses, and the other study considered experiences of 22 nurses. Based on these and other studies that explored patients' perceptions of hospital care for this population, this population often feels stigmatized and perceives that inequities and delays in care occur because of stigma and judgement from healthcare providers; healthcare providers, including nurses, also perceive that care for this population is not equitable compared to the care of people without opioid use disorders or a history of injecting drugs. The COVID-19 may contribute to further marginalization of care for this population.

The current literature included in this review provides evidence that acutely ill people with opioid use disorders and/or a history of injecting drugs, who are hospitalized or seek care in an emergency department tend to be young, White, male, and have an increased risk of morbidity and mortality. While they tend to have high emergency department utilization, this population is also at increased risk of leaving the hospital against medical advice and returning within 90-days. People who inject drugs and are hospitalized have an increased likelihood of serious infections, including endocarditis (especially right-sided vegetation), skin infections, osteomyelitis, and Hepatitis C virus.

Based on the literature included in this review, interventions that have been studied in people with opioid use disorders (and/or a history of injecting drugs) include addiction services, medication replacement therapy, naloxone distribution, bedside syringe program, addiction

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medicine consults and alternatives to in-hospital antibiotic administration. While these studies provide insight into the strategies that may help improve the care that people with addiction may receive when hospitalized, there are considerable gaps in the literature regarding the state of care for hospitalized people with opioid use disorders and/or a history of injecting drugs.

The majority of the studies included in this review were conducted in single hospital sites, and a small number of studies utilized national, multi-state, or state databases to perform retrospective studies. Most of the studies that utilized national databases describe characteristics of people with opioid use disorders or people who inject drugs, and two of the studies that utilized national samples described the percentage of hospitals that offered inpatient addiction services, outpatient addiction services, inpatient detoxification or inpatient rehabilitation. All but one of the studies that focus on perceptions of care are from the patients' perspective, with one of the studies including both patient and provider perceptions; two of the studies are mixed-methods and the remaining studies are qualitative. While these studies provide valuable insight regarding patient and provider care experiences, in general, qualitative studies lack the ability to be generalizable.

The current literature included in this study provides a better understanding of this population and some of the hospital interventions aimed at improving care for this population, but the literature does not provide a comprehensive understanding of what the overall quality of hospitalized care is for people with opioid use disorders or people who inject opioids. A national sample of hospital policies regarding care of this population would provide significant insight into current hospital care for this population. Well-designed quantitative studies that consider a national sample of patients' or providers' perceptions or experiences of hospital care for people with opioid use disorders or a history of injecting drugs are also needed to have a better

understanding of the current state of care. Compared to other hospital care providers, nurses spend a significant amount of time interacting with hospitalized patients, providing daily care; nurses are in an ideal position to assess the care patients with opioid use disorders or a history of injecting opioids are receiving.

The current research supports the need for a quantitative study aimed at understanding nurses' experiences of hospital policies and practices for patients with a history of opioid use disorder or history of injecting opioids, using the domains of efficacy, patient centeredness, and equity. Despite the fact that nurses often spend the most time caring for patients, the literature did not include any quantitative studies that considered the nurses' experiences or perceptions of care for this population. According to the literature, people with opioid use disorders or who self-inject opioids often feel stigmatized and perceive that they receive inequitable care. One qualitative study in the review included a sample of healthcare providers (but not exclusive to nurses) who felt that people with opioid use disorders may receive inequitable care. In addition to understanding if the care this patient population receives is effective, it is also important to understand whether nurses believe current care of this population is patient-centered or equitable. Utilizing a national sample of nurses from different unit types (emergency department, medical-surgical units, and intensive care units) will also inform the literature, as none of the studies included in the review compare care for this population based on what area of the hospital the patient is receiving care.

CHAPTER III: METHODOLOGY

Purpose

The purpose of this study was to examine nurses' experiences of care for hospitalized patients with a history of opioid use disorder or self-injection of opioids. Quality care was defined by the Institute of Medicine's (IOM) Six Domains of Health Care Quality. The Six Domains of Health Care Quality is one of the most influential analytic frameworks for quality assessment and has guided measure development in public and private sectors (AHRQ, 2018). In this study, all aims are addressed, with an emphasis on safety and efficacy. Specifically, the aims of the study were to (a) describe nurses' experiences of hospital policies and practices for acutely ill patients with a history opioid use disorder or self-injection of opioids, (b) explore impact of hospital, unit and nurse characteristics on nurses' experiences of hospital policies and practices for acutely ill patients with a history of opioid use disorder or self-injection of opioids, and (c) to explore nurses experiences of how COVID-19 pandemic has impacted care for this population.

Research Design

A descriptive, correlational design and cross-sectional approach was used for this study. Descriptive correlational design is appropriate when systematically investigating and describing associations among variables (Polit & Beck, 2017). One of the primary aims of this study was to explore (and describe) whether relationships exist between nurses' experiences of hospital policies and practices for acutely ill patients with a history of opioid use disorder or self-injection of opioids and unit type, nurse characteristics and hospital characteristics. While some hospitals employ abstinence-based policies for acutely ill patients with a history of drug use or self-injection of illicit drugs (Grewal et al., 2015), it is important that hospitals employ policies that support safe, effective, patient-centered, timely, efficient and equitable care. Understanding the

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nurses' experiences of these policies is vitally important, as nurses have important roles in ensuring quality care for patients through the integration and coordination of the attributes of quality care (Committee on Quality of Health Care in America et al., 2001). There is a gap in the literature regarding nurses' experiences of hospital care for patients with opioid use disorder or a history of self-injection of opioids. A survey was utilized to understand nurses' overall experiences caring for this population. In order to better understand nurses' experiences of equitable and patient-centered care for this population, nurses participating in the survey had the opportunity to provide personal experiences caring for these patients. Due to the recent impact of COVID-19 pandemic on hospitals, nurses had the opportunity to provide their experiences caring for these patients during the pandemic.

Sample

The target population was nurses who worked in hospitals and were familiar with the policies and practices specific to patients with a history of opioid use disorders or self-injection of opioids. A national, random sample of nurses was utilized as the primary sampling plan, including registered nurses listed in the American Association of Critical Care Nurses (AACN) database, Emergency Nurses Association (ENA) database, and the Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). Inclusion criteria for participation was (a) at least 18 years of age, (b) membership in AACN, ENA, or AWHONN, (c) familiarity with the policies and practices for patients with a history of opioid use disorder or self-injection of opioids, (d) licensed as a nurse, (e) able to access the online survey and (f) English-speaking (a requirement for taking licensure exam in the U.S. is the ability to successfully complete exam in English). Nurses were excluded if they were licensed by the North Carolina Board of Nursing

and participated in a pilot survey (for nurses caring for patients with opioid use disorders) in 2019 (to avoid sampling bias from a previous pilot).

The total sample size (N) needed for the study was calculated with G*POWER software. Based on correlational bivariate normal model with a medium effect size and 80% power, the sample size needed was 84 participants. A 5% response rate for completed surveys was calculated based on the 2019 pilot study. Due to changes in the nursing workforce related to the COVID-19 pandemic, a 1.5-2% response rate was anticipated. In order to recruit a sample of 84 participants, a total of 4,992 nurses was selected from the sample frames, or 1,664 nurses from each of the three sample frames.

Recruitment

The AACN, ENA, and AWHONN provided mailing addresses for members. A total of 4,992 postcards were mailed via U.S. mail to the AACN, ENA, and AWHONN nurses, with 1,664 postcards mailed to randomly selected members from each association (Figure 1). The 4,992 postcards were mailed at one time, one postcard per randomly selected member of the associations. Each postcard included study information, an invitation to participate in the study, and a QR code for survey. There were 214 potential participants who accessed the survey, which was a 4.3% response rate. Of the 214 potential participants who accessed the survey, 179 met the inclusion criteria and consented to participate in the study.

Figure 1. Study Flowchart


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│  4,992 nursing association members invited to participate  │
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        ┌──────────────────────────────────────┐
        │  214 respondents accessed the survey  │
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        ┌──────────────────────────────────────┐
        │  179 met inclusion criteria and consented  │
        └──────────────────────────────────────┘
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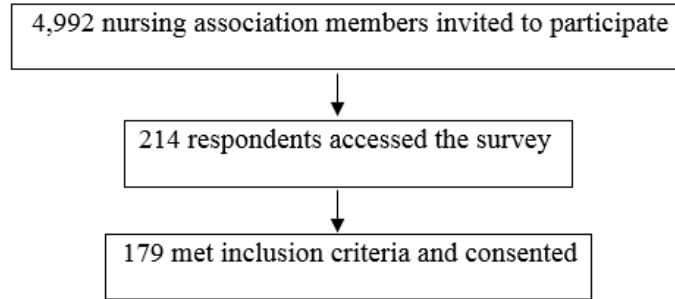
Measurement

In order to implement an effective survey with an optimal return rate, components of the tailored design-approach were utilized to design and implement the survey (Dillman et al., 2014). The development of the survey was guided by a conceptual model and a review of the literature. The Institute of Medicine's Six Domains of Health Care Quality (AHRQ, 2018) includes safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity. These quality aims can be utilized by health systems to guide quality initiatives or by consumers to better understand the meaning of quality care. The blueprint for the survey utilized all domains, with a focus on safety and effectiveness. These questions were scored to provide a value that corresponded with the nurse's experiences regarding care for patients with a history of opioid use disorders or injection of opioids. Open-ended questions further addressed equity, patient centeredness, timeliness, and the impact of COVID-19 on care experiences. In addition to questions that addressed the aims of quality care, the survey contained questions specific to nurses' satisfaction, education regarding substance use disorders and harm reduction, and demographics (hospital, unit, and nurse).

Safety

Seven questions about nurses' experiences of policies/practices that place restrictions on patients with opioid use disorders to maintain safety were used. Participants had the option to answer "yes," "no" or "unsure" for each question. In order to calculate scores for restrictive

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safety, recoding was performed from three categories to two categories: "yes=1" and "not-yes=0" (no and unsure). The score for this set of questions ranged from zero to seven, with a lower score indicating a nurse's experience of less restrictions in place to maintain patient safety, and a higher score indicating that there were more restrictions in place to maintain patient safety (Yes = 1, Not yes [no or unsure] = 0). These questions were formed based on current literature that indicates that hospitals incorporate strategies to prevent patients from using opioids (not administered by hospital staff) during their hospitalization. These data were analyzed as continuous data after item analysis and reliability supported a sum score.

To further assess safety, five questions were used regarding nurses' experiences with adverse events related to patients with opioid use disorders. These experiences were not specific to hospital policies or practices. Participants had the option to answer "yes," "no," or "unsure" for the adverse events. To calculate scores for adverse events, recoding was performed from three categories to two categories: "yes=1" and "not yes=0" (no and unsure). Scoring of this portion of the survey ranged from zero to five, with a lower score indicating a nurse's experience of a low number of adverse events caring for acutely ill patients with a history of opioid use disorders or self-injection of opioids, and a higher number indicating an experience of more adverse events related to caring for this population. These data were analyzed as continuous data after item analysis and reliability supported a sum score.

Effectiveness

Seven questions were used to assess nurses' experiences of specific policies/practices aimed at effective care. These questions were based on strategies identified in the literature that contribute to effective care of acutely ill patients with opioid use disorders. These questions used a Likert scale for responses and were scored from a zero to a 28. A lower score indicated a

nurse's experience of fewer strategies implemented to provide effective care to this population, and a higher score indicated the nurse's experience of more interventions aimed at providing effective care (*Always* = 4, *Most of the time* = 3, *Sometimes* = 2, *Rarely* = 1, *Never* = 0). These data were analyzed as continuous data after item analysis and reliability supported a sum score.

Quality of Care

Six questions about the nurses' experiences of whether the policies and practices promoted quality of care and were on a Likert scale. These questions were specifically based on the Six Domains of Health Care Quality, with one question addressing each domain. Responses to each question were scored as: *Strongly Agree* = 4, *Agree* = 3, *Neither agree or disagree* = 2, *Disagree* = 1, and *Strongly Disagree* = 0. A sum score was created that ranged from a zero to a 24, with a lower score indicating that the nurse's experience was that the care was lower quality, and a higher score indicating that the nurse's experience was that the care was higher quality. These data were analyzed as continuous data after item analysis and reliability supported a sum score.

Satisfaction and Education

There was one question regarding nurses' satisfaction caring for people with opioid use disorders (score ranges from 0 to 10, with 0 indicating lowest level of satisfaction and 10 indicating highest level of satisfaction), which was analyzed as continuous data. The survey also contained four questions about whether nurses have participated in education related to patients with substance use disorders and harm reduction strategies. Participants could answer "yes," "unsure," or "no" for each question. These data were analyzed as categorical data.

Demographics

Nurse

Nurse characteristics were measured using 11 questions. Most of these questions were sociodemographic in nature, including race, gender, ethnicity, age group, and educational level, all of which are categorical data. Questions assessed the number of years in practice (as nurse and in current work area), whether the nurse worked day shift, night shift, 12-hour shifts, 8-hour shifts, the average number of hours worked per week, and the nurse's role in the hospital. All of these variables were analyzed as categorical with the exceptions of number of years working in current hospital and in current primary care area. The years were analyzed as continuous data.

Hospital and Unit Characteristics

Six questions were used to gather data regarding hospital or unit characteristics, available to all survey participants. These questions included hospital size, location of hospital (urban or rural), academic status, unit type and unit size. These data were analyzed as categorical data.

Open-Ended Questions for Additional Thoughts by Nurses

Four open-ended questions were included in the survey regarding equity, timeliness, patient-centeredness, and experiences caring for patients with a history of opioid use disorder or self-injection of opioids during the COVID-19 pandemic. Responses were type into text boxes. All open-ended questions were verified with Qualtrics [XM] responses, read twice by the investigator, then interpreted and coded utilizing the Colaizzi methodology of descriptive phenomenology. The first five steps of the Colaizzi method were used to analyze content; results were not verified by the participants, which is the final step in the Colaizzi method. A senior scholar randomly selected results and read and coded to determine similarities or differences in coding for final agreement.

Survey Flow

Based on a skip pattern, participants who answered that their hospital did not have formal policies or informal practices for caring for people with opioid use disorders skipped the 20 questions regarding specific policies or practices for patients with opioid use disorders (restrictive safety, effectiveness, quality). All participants had an opportunity to participate in the ten questions pertaining to satisfaction, adverse events (part of safety questions), and education, as these questions did not pertain to specific policies or practices, such that participants who responded their hospital did not have formal or informal policies or practices (for patients with opioid use disorders) could address these questions. All participants were able to access questions regarding demographics.

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Reliability and Validity

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To establish content and face validity, the survey was piloted in a sample of 36 nurses from the North Carolina Board of Nurses. The nurses were provided with the objective of the survey and provided opportunities to evaluate each question in the survey. Based on the results from the survey, several questions were added to the survey, including questions about effective care for patients with opioid use disorders, whether nurses had participated in substance use disorder and harm reduction education, and nurses' satisfaction caring for this population. Four open-ended questions were added to the survey regarding equitable care, timely care, patient-centered care, how care has been impacted by the pandemic. Additionally, based on a survey response from a nurse working in Labor & Delivery, the Association of Women's Health, Obstetric, and Neonatal Nurses was added to the sample frame. After making changes to the survey based on the feedback, the survey was piloted in a small group of nurses who work with patients who care for acutely ill patients with a history of opioid use disorders or self-injection of

opioids to further evaluate content validity. Subjective feedback from the nurses supported the validity of the content in the survey.

For each set of questions that corresponded to nurses' experiences (restrictive safety, effective safety, quality care, and adverse events) item analyses were performed; internal consistency of the nurses' experience scales was estimated with either Cronbach's alpha (Likert scale questions) or Kuder-Richardson #20 (KR-20) (categorical). Considering these scoring scales had never been used, a coefficient value greater than 0.60 was considered acceptable to support the reliability of the internal consistency of the questions (Ursachi et al., 2015); if the same scales were to be used in future studies, a researcher should consider adding questions to any scale where the coefficient value was estimated to be less than 0.8.

For the restrictive safety and adverse event scores, the items with the highest and lowest respondents who answered "yes" were reported. For the effective and quality scores, the items with the highest and lowest means were reported. Item discrimination was estimated utilizing the corrected item-total correlations; removal of items was considered where the KR-20 or Cronbach's alpha values would have significantly increased with the deletion of any single item. Distributions and outliers were reviewed.

Data Collection

Qualtrics ^{XM} was used to collect data through a web survey modality. Participants received the postcard invitation to the survey by mail with an anonymous QR code for accessing the survey. The survey was only available online. The anonymous response feature of Qualtrics ^{XM} was enabled to maintain the confidentiality of participants. Once a participant accessed the survey, the first page of the survey contained an information letter about the study. Consent to participate was required in order for participants to advance to the survey. Based on results of the

pilot survey, the survey completion time for most participants was anticipated to be less than ten minutes. It was anticipated that the survey may take longer for nurses who chose to answer the open-ended questions regarding equity, patient-centeredness, timeliness, and the COVID-19 pandemic. The average time for survey completion in the dissertation study was 12 minutes and 23 seconds; the completion time ranged from 28 seconds to 2 hours and 33 minutes. Most persons opened and completed in the initial setting. Only 2.2% of the respondents took over an hour to complete the survey. Once deployed, the survey remained open for three weeks.

Data downloaded from Qualtrics was stored on a computer that was password protected, and was stored in Box, a UNCG cloud based secure server space. Data was transferred from Box to SPSS for subsequent analysis. Open-ended questions were transferred to a Microsoft Word file and stored in Box.

Data Management

Data were reviewed for accurate completion of surveys, missing data and spam respondents. Missing data was analyzed for amounts and patterns of missingness. Incomplete surveys were considered based on percentage of survey completed. Data transformation was utilized when necessary. Imputations were considered, and not necessary.

The data were coded for each variable; some data were recoded for correlational analysis. Specifically, the variable "unit type" was recoded, such that the original eight categories were coded into four categories: emergency department, critical care unit, medical-surgical unit (includes medical-surgical, stepdown/intermediate and four "other" responses), women-baby unit (includes labor & deliver, mother baby, and one "other" response). The variable "educational level" was recoded from five categories to three new categories: Bachelor's degree, Associate's degree or diploma degree, and Graduate degree (includes master's degree and doctoral degree).

The variable for number of years on practice was recoded from four categories to three: five or less years (included less than 5 years and 1–5 years), 6–10 years, 11–20 years, and greater than 20 years. The variable "role" was recoded from eight to two categories: staff nurse and non-staff nurse. The variable for knowledge and education of substance use disorders (two variables) and harm reduction strategies (two variables) was recoded from three categories to two categories: "yes" and "not yes" (includes unsure and no).

Data Analysis

Descriptive statistics were utilized to describe hospital characteristics, unit characteristics, and nursing characteristics. The descriptive statistics included measures of central tendency such as mean and median, as well as measures of variation such as range and standard deviation. Assumptions were empirically examined prior to specific analysis for each research question.

Research Question 1

Descriptive statistics were utilized to describe the nurses' experiences of hospital care for people with opioid use disorders. Sum scores were created for nurses' experiences of care and analyzed as continuous data. Mean scores were reported for each of the nurses' experiences of care. Standard deviations and distribution of scores were examined.

Responses for the open-ended questions regarding equity, patient centeredness, and timeliness, responses were typed into text boxes by participants. These responses were verified with Qualtrics XM, read twice by the investigator, then interpreted and coded utilizing the Colaizzi methodology of descriptive phenomenology. The first five steps of the Colaizzi method were used to analyze content and develop the themes (Beck, 2019; Praveena & Sasikumar, 2021). As this was an online survey, the results were not verified with the participants, which

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was the final step in the Colaizzi method. A senior scholar randomly selected results and read and coded data to determine agreement with analysis across steps. This provided rigor and credibility.

Research Questions 2 and 3

Bivariate analyses were performed to analyze associations between hospital, unit, and nurse characteristics and nurses' experiences of care sum scores. Depending on analysis assumption checking and the level of measure being analyzed, independent *t*-test, ANOVA, Spearman rho, Mann-Whitney U, or Kruskal-Wallis H testing were performed to analyze for associations between nurses' experiences and hospital, unit, and nurse variables. Linear or median multivariable regression analysis was performed to further test research questions of whether variables (hospital, unit and nursing characteristics) impacted nurses' experiences caring for patients with opioid use disorder or history of self-injection of opioids). Specifically, regression analysis was performed for each experience adjusting for (a) hospital and unit characteristics, (b) adjusting for nursing characteristics, and (c) adjusting for both hospital and unit characteristics. Median regression was performed when assumptions of linearity, homoscedasticity, or residual normality were not satisfied through analysis of regression residuals.

Research Question 4

Lastly, participants types responses into text boxes for the open-ended question regarding the impact of COVID-19 on care for patients with opioid use disorders. These responses were interpreted and coded using Colaizzi's methodology of descriptive phenomenology. The findings were not verified by the participants. A senior scholar verified results by reading and coding data from randomly selected results.

Human Subjects Protection

To ensure the protection of participants, the study protocol was submitted to and reviewed by the University of North Carolina at Greensboro's Institutional Review Board for approval. The letters to all potential participants contained information for a drawing for one of four $50 Amazon gift cards as incentive to participate in the study; all participants had the option to participate in the drawing at the end of the survey (if the participant opted to participate in the drawing, the participant was further directed to another un-linked survey to keep study data anonymous). There were 119 survey participants who elected to participate in the drawing. Data were deidentified and stored in secure cloud storage and password protected computers.

Chapter Summary

This descriptive, correlational design and cross-sectional study explored nurses' experiences of caring for hospitalized patients with a history of opioid use disorder or self-injection of opioids. A random sample of nurses from a target population of nurses who worked in hospitals was utilized to recruit nurses to participate in the online survey.

The survey was developed using the tailored design-approach, and was based on a review of the literature and a conceptual framework, the Six Domains of Health Care Quality. In addition to the survey questions that measured all domains, with a focus on safety and efficacy, nurses had the option to participate in four open-ended questions. These questions provided participants with an opportunity to discuss their experiences of equitable, patient-centered, and timely care for acutely ill patients with a history of opioid use disorder or self-injection of opioids, and how quality care has been impacted by the COVID-19 pandemic.

Data analysis included descriptive statistics to describe nurses' experiences of hospital care of people with opioid use disorders or people who inject opioids, and described hospital,

unit, and nurse characteristics. Bivariate analysis was utilized to examine pairwise relationships

between nurses' experiences of hospital care of people with opioid use disorders or who self-

inject opioids with hospital/unit characteristics and nurse characteristics. Regression analyses

were utilized to examine multivariable relationships among study measures. Open-ended

questions were analyzed with basic content analysis.

CHAPTER IV: RESULTS

Sample Characteristics of Nurse Participants, Hospitals, and Units

Nurse Participant Characteristics

The 179 study participants included nurses who worked in hospitals. The majority of

participants were female (77.1%), White (76.0%), staff nurses (69.8%), and between the ages of

30 and 64 (75.5%) (see Table 1). The majority of the nurses held a bachelor's degree (52.5%)

and the largest percentage of participants had been a nurse for greater than 20 years (33.0%),

with only 2.2% of the participants in practice for less than a year.

A small number of participants who selected "other" as their work role identified they

worked as a charge nurse, clinical mentor, nursing assistant, part-time Labor & Delivery RN,

part time Women's Health Nurse Practitioner, trauma program manager, travel nurse, and wound

care and pressure injury prevention nurse clinician.

Table 1. Characteristics of the Nurse Participants ($N = 179$)

	n	*%*
Age (years)		
18-29	13	7.3
30-49	81	45.3
50-64	54	30.2
65+	6	3.4
Missing	25	14.0
Education level		
Associates Degree	14	7.8
Diploma	2	1.1
Bachelor's Degree	94	52.5
Master's Degree	36	20.1
Doctoral Degree	8	4.5
Missing	25	14.0

	n	*%*
No. years practice		
Less than 1	4	2.2
1-5	15	8.4
6-10	26	14.5
11-20	47	26.3
Greater than 20	59	33.0
Missing	28	15.6
Role		
Staff Nurse	125	69.8
Clinical Nurse Specialist	3	1.7
Educator	9	5.0
Nurse Manager	18	10.0
Nurse Executive	1	0.6
Nurse Supervisor	8	4.5
Nurse Practitioner	3	1.7
Other	7	3.9
Missing	5	2.8

Hospital and Unit Characteristics

The majority of participants worked in urban hospitals (70.4%) and non-profit hospitals (73.7%) (see Table 2). Over 80% (83.8%) of respondents worked in hospitals with 100 or more hospital beds. Approximately half of participants either worked in academic medical centers (25.1%) or non-teaching hospitals (27.4%), and over one third (35.8%) of the participants worked in teaching hospitals without medical schools.

The largest proportion of nurse participants stated they worked in critical care units (37.4%). Emergency department nurses made up 29.1% of the sample, and 21.8% of participants worked in either labor and delivery units or mother baby units. Just under 3% of the participants stated they worked in other areas. The participants who chose "other" for the areas where they worked listed anesthesia-operating room, former critical care nurse/currently wound care, maternal child health, risk manager acute care and post-acute care, and trauma services. Unit

sizes were indicated by the number of beds, with the largest percentage of nurses responding that

they worked on a unit with between 11–20 beds (38.0%).

Table 2. Characteristics of Hospitals and Units (*N* = 179)

Characteristic	*n*	%
Hospital		
Hospital size (# beds)		
< 100	26	14.5
100-249	48	26.8
250-449	53	29.6
450+	49	27.4
Missing	3	1.7
Hospital type		
Rural	50	27.9
Urban	126	70.4
Missing	3	1.7
Academic medical center	45	25.1
Non-teaching hospital	67	27.4
Teaching hospital	64	35.8
Missing	3	1.7
For profit	44	24.6
Non-profit	132	73.7
Missing	3	1.7
Unit		
Unit size		
10 or less	20	11.2
11-20	68	38.0
21-30	42	23.5
Greater than 30	46	25.7
Missing	3	1.7
Unit type		
Emergency Department	52	29.1
Critical Care Unit	67	37.4
Medical/Surgical	5	2.8
Stepdown	11	6.1
Labor & Deliver	33	18.4
Mother Baby	10	3.4
Missing	6	2.8

Education Regarding Substance Use Disorders or Harm Reduction

Overall, 41.9% of participants stated they had ever received education from their employers regarding substance use disorders, addiction, or opioid use disorders; 47.0% indicated they had either not received education (from employer) or were unsure whether they had received education (Table 3). More than 45% of the participants stated they had participated in recent (as defined by participant) education regarding substance use disorders, addiction or opioid use disorders, with 43.6% stating they were unsure or had not participated in any education. In regard to knowledge of harm reduction strategies for people with substance use disorders, addiction, or opioid use disorders, 38.0% of the participants responded they had participated in recent education, while 49.7% of respondents stated they were unsure or had not received any education. Approximately 45% of participants responded that they were familiar with harm reductions strategies; 42.4% of the nurses were either unsure or not familiar with harm reduction strategies.

Table 3. Education and Knowledge regarding Substance Use Disorders and Harm Reduction (*N* = 179)

Education/Knowledge	*N*	*%*
Substance Use Disorders (Employer provided education)		
Yes	75	41.9
Unsure	13	7.3
No	71	39.7
Missing	20	11.1
Substance Use Disorders (Recent education as defined by participant)		
Yes	81	45.3
Unsure	10	5.6
No	68	38.0
Missing	20	11.1
Harm Reduction Strategies (Any education)		

Education/Knowledge	N	%
Yes	68	38.0
Unsure	10	5.6
No	79	44.1
Missing	22	12.3
Harm Reduction Strategies (Knowledge)		
Yes	80	44.7
Unsure	19	10.6
No	57	31.9
Missing	23	12.8

Research Question 1

What are nurses' experiences of hospitals or practices for patients with a history of

opioid use disorder or a history of self-injecting opioids?

To address Research Question #1, we present findings for each of the five experience

scores next.

Quantitative Findings

Restrictive Safety Score

The restrictive safety mean scores ranged from zero to seven, which spanned the full

theoretical range of scores. The mean score was 1.5 ($n = 179$) with a standard deviation of 1.6,

meaning the nurses experiences a low number of restrictive safety interventions (see Table 4).

The distribution of the scores was skewed to the right and there were no extreme outliers. In

other words, more nurses experienced a small number of restrictive safety interventions, and

fewer nurses experienced a higher number of restrictive safety interventions. The KR-20 of the

restrictive safety scale was 0.67 (see Table 5).

The fourth item, "the policies or practices include continuous observation of patient by

security camera" and seventh item, "the policies or practices include dedicated unit(s) that

provide care of patients with a history of OUD or self-injection of drugs" in the restrictive safety items had the lowest number of respondents who answered yes (6.9%), meaning, less than 7% of the respondents experienced continuous observation of their patients with opioid use disorders or dedicated units for patients with opioid use disorders. The fifth item, "the policies or practices include removal of patients' belongings from room" had the highest number of respondents who answered yes (33.1%). In this case, over one third of the respondents had experienced removal of patients' belongings from room for patients with opioid use disorders.

Effective Care Score

The mean score for the effective care was 16.8, with a standard deviation of 3.8. The score for this section ranged from six to 26 in the data, with a theoretical range of one to 28. The scores appear to be distributed symmetrically with no extreme outliers. Based on these results, the average effective care scores were midrange; there were only a small number of nurses who experienced a lot of effective care interventions or a small number of effective care interventions. The Cronbach's α for the effective care scale was 0.579.

The first item, "patients are seen by an addiction medicine specialist (or receive an inpatients addiction medicine consult)" had the lowest mean of all the items (1.4), thus addiction medicine consults were experienced the least of all the items. The fourth item, "patients receive treatment for pain," had the highest mean (2.9), meaning, pain treatment was the most common effective care intervention nurses experienced.

Quality Care Score

The mean score for the quality care questions was 13.5, with a standard deviation of 4.8. The scores ranged from one to 24, which spanned the full theoretical scale range. The distribution of the scores were fairly symmetrical. That is, most of the respondents rated the

quality of care as average. The respondents most commonly agreed that the policies or practices promoted the safety of patients, with a mean value of 2.4. Nurses most commonly disagreed that the policies or practices were efficient; this item had a mean of 2.0.

Adverse Events Score

The mean score for the adverse events questions was 2.9 with a standard deviation of 1.4. The scores ranged from zero to five, which was the spanned the full theoretical range of the scale. The KR-20 for the scale was estimated to be 0.69. Based on these results, most of the participants experienced an average number of adverse events. The highest number of participants who answered yes for any single item on the scale was 97.5%, which was the third item, "patients have left the hospital against medical advice," such that nearly all of the respondents had experienced this adverse event. The fourth item, "patients have retained medications administered by staff for later use," had the lowest percentage of participants who answered yes (22.6%); in other words, of all the adverse events, retaining medications for later use was experienced by the least number of respondents.

Satisfaction Score

The mean score for the satisfaction question was 5.0 and a standard deviation of 1.8. The scores ranged from one to nine in the data (theoretical range of 0-10). Most of the respondents rated their satisfaction caring for patients with opioid use disorders as neutral. None of the nurses rated their satisfaction as a ten, meaning, none of the nurses responded that they were very satisfied caring for patients with opioid use disorders.

Table 4. Nurses' Experiences of Hospital Policies/Practices Caring for Patients with OUDs

Experience	Theoretical Range	$M \pm SD$ [*Med*] (*Min, Max*)

Restrictions for safety (KR-20=0.67) Yes = Not yes (Unsure/no)	0-7	1.5 ± 1.6 [1.0] (0, 7)	
Effective care strategies (α=0.58) Always Most of the time Sometimes Rarely Never	1-28	16.8 ± 3.8 [17.0] (6, 26)	
Quality of care (α=0.92) Strongly agree Agree Neither agree/disagree Disagree Strongly Disagree	1-24	13.5 ± 4.8 [14.0] (0, 24)	
Adverse events (KR-20=0.69) Yes Not yes (unsure/no)	0-5	3.0 ± 1.4 [3.0] (0, 5)	
Satisfaction (caring for patients with OUD) Not at all satisfied Very satisfied	0-10	5.0 ± 1.8 [5.0] (1.0, 9.0)	

Table 5. Item Analysis of Nurses' Experiences Scores

Scale item	Cronbach's α if item deleted	Corrected item-total correlation
Restrictions for Safety (KR-20 = 0.67)		
1.	0.594	0.497
2.	0.667	0.276
3.	0.592	0.509
4.	0.638	0.389
5.	0.589	0.559
6.	0.670	0.265
7.	0.671	0.202
Effective care (Cronbach's α = 0.58)		
1.	0.544	0.306
2.	0.540	0.304
3.	0.536	0.320
4.	0.575	0.194
5.	0.487	0.451
6.	0.548	0.279
7.	0.553	0.266
Quality care (Cronbach's α = 0.92)		

Scale item	Cronbach's α if item deleted	Corrected item-total correlation
1.	0.913	0.763
2.	0.909	0.799
3.	0.905	0.822
4.	0.910	0.790
5.	0.916	0.739
6.	0.911	0.781
Adverse events (KR-20 = 0.69)		
1.	0.576	0.564
2.	0.600	0.521
3.	0.711	0.231
4.	0.648	0.416
5.	0.607	0.508

Qualitative Findings

In order to analyze three open-ended questions in the survey, Colaizzi's method of data analysis was utilized for basic content analysis. These questions were aimed at understanding the nurses' experiences of equitable, patient-centered, and timely care of patients with a history of opioid use disorders or self-injection of opioids. For the first question regarding equity, 94 of the participants responded. For the second question regarding patient-centeredness, there were 100 responses. For the third question (timeliness), there were 105 responses. Significant statements were extracted and listed for each question (Tables 6, 7, 8). These statements were interpreted into formulated meanings (See Tables 9, 10, and 11). These formulated meanings were sorted for each question into clusters of themes. The cluster of themes were compared to original answers to validate themes and then further categorized as themes. These results were validated by a second researcher. The results were not validated by the participants. The following themes were identified from analysis for each question:

Themes regarding equitable care:

1. Unrecognized provider stigma

2. Recognized provider stigma

3. System issues that influence equitable care

4. Impact of inequitable care

Themes regarding patient-centered care

1. Non-patient centered care goals

2. Patient centered care goals

3. Factors that contribute to lack of patient centered care

Themes regarding timely care:

1. Medication delays

2. System-related delays

3. Delays related to unrecognized stigma

4. Impact of delays in care

Table 6. Formulated Meanings of Equitable Care ($N = 94$)

Significant statements	Formulated meanings
"Antepartum and intrapartum patients are often willing to seek help and want to overcome the addiction. They usually need support and assistance with getting into inpatient treatment"	Providing equitable care is influenced by patient factors, such as motivation. Equitable care is partly defined as treating underlying addiction.
"I believe the individual care is good. Whether the patient wants the help is another question"	Patient's lack of desire to get better can have a negative impact on equitable care.
"Very hard to take care of, very manipulative"	Equitable care is difficult due to factors associated with addiction (manipulation)
"From an emergency department nursing perspective and for emergency department providers, I feel that the greater "we" have a way to go in better caring for this population. There is a need for more equitable care, that is	Equitable care is impacted by provider stigma and bias

Significant statements	Formulated meanings
for sure. There is still stigma around these patients and some make unprofessional comments"	
"I feel this is completely dependent upon the provider for each patient. Each case is different and based more on patient's attitude. Medications given are typically non-narcotic until source of pain is proven or opioid doses are minimized until so"	Equitable care is impacted by provider factors, including provider's perception of patient's attitude
"As a general rule, they have weak coping and adaptation, so caring for them in house becomes a stress to the staff"	Equitable care is difficult due to factors associated with addiction (Weak coping, poor adaptation)
"Care is primarily based on clinician comfort and knowledge"	Equitable care is impacted by clinician factors
"I feel as this care in most cases is a waste of time since the patient rarely if ever truly wants to change and the hospital staff is overtasked and held responsible for the patients' actions and decisions that are out of the staff's control"	Not only is equitable care difficult because of patient factors/behaviors, but there is a negative consequence to staff
"I have found that a history of substance use will render a patient exempt from meaningful pain management by the primary team, even when they have undergone invasive therapies and procedures, especially if patient is Black or indigent"	Patients with a history of opioid use do not receive equitable care
"I think some policies separate and stigmatize the patient, and I have seen the policies not work and patients not be given pain meds. I wish policies were more patient focuses, meeting them (patients) where they are, instead of focused on decreasing liability (for organization)"	Hospital policies contribute to inequitable care
"I wish we had standards of care and the treatment plans were uniformly practiced"	There is a need for standards of care for this patient population, which may help improve equitable care

Significant statements	Formulated meanings
"This patient population is extremely difficult to care for. There is a lot of manipulation from the patient, makes it hard for nurses to trust the patient"	Lack of nurse trusting patient can prevent equitable care
"Anything nurses know is from our own research and bringing it to the job"	System factors (lack of education) can impact equitable care
"We could use more education on best practices and it seems like their pain is not easy to control"	System factors can impact equitable care
We don't have the resources to meet them, and the patient, and our community, pay the price for this blatant lack of treatment"	Equitable care is negatively impacted by lack of resources available.
"Suboxone and methadone are not started in the acute care setting unless they have an active prescription from an authorized prescriber. The patients themselves are very difficult to deal with (demanding, manipulative, inpatient, and disrespectful), however, having the proper med doses and frequencies help."	Providing appropriate medications helps to provide equitable care and can decrease occurrence of patient behaviors that can prevent equitable care

Table 7. Developing Clusters of Themes and Themes From Formulated Meanings

(Equitable Care)

Formulated meanings	Cluster of themes	Emergent themes
Providing equitable care is influenced by patient factors, such as motivation.	Patient lack of motivation	
Equitable care is difficult due to factors associated with addiction (Weak coping, poor adaptation)	Patient factors associated with addiction	Unrecognized Stigma
Equitable care is difficult due to factors associated with addiction (manipulation)	Patient factors associated with addiction	

Formulated meanings	Cluster of themes	Emergent themes
Lack of compliance prevents equitable care	Patients' lack of compliance	
Equitable care is impacted by clinician factors	Clinician practice variation	Recognized Stigma
Equitable care is impacted by provider stigma and bias	Provider judgement	
Equitable care is impacted by provider factors, including provider's perception of patient's attitude	Provider's perception of patient attitude	
Lack of nurse trusting patient can prevent equitable care	Provider trust of patient	
Equitable care is negatively impacted by lack of resources available.	Lack of resources	System issues that influence equitable care
Equitable care is impacted by system factors	Hospital policies	
There is a need for standards of care for this patient population, which may help improve equitable care	Standardized approaches	
Inequitable care can prevent adequate pain management	Pain management	Impact of inequitable care
Lack of equitable care contributes to negative outcomes for patient and community	Impact to patient	
Providing appropriate medications helps to provide equitable care and can decrease occurrence of patient negative behaviors	Opioid replacement medications	
Lack of equitable care has a negative consequence to staff	Staff	

Table 8. Formulated Meanings of Patient-Centered Care (*N* = 100)

Significant statements	Formulated meanings
"The system offers little in the way of individualized care. Nurses have little formal training to assist these people"	System goals do not align with patient goals. Nurses do not have training to provide patient centered care
"I don't think enough providers ask, and listen to what the patient's goals are. What would the reaction be to 'I just don't want to lose my arm, and I plan to continue to use because I don't want to stop'? I have seen providers shut down to similar statements because the help the patient wants is not what the provider thinks they should help with. I have also seen providers truly discuss options in a nonjudgmental way, and sometimes the outcome is actually better"	Providers' goals of care do not align with patients' goals of care. The outcomes for these patients may be better of delivery of care is patient centered
"So, their goals are different from ours sometimes. It seems they want a quick band-aid or a stop to the pain they are in without really getting to the bottom of their issues"	Patient goals do not always align with provider/team goals. Patient goals are sometimes focused on immediate needs
"Care is always directed toward the goal for the individual, however getting the patient in an inpatient/outpatient situation for help with substance abuse is difficult"	Patient centered care can be impacted by lack of resources
"Our closest methadone clinic is an hour away. Most of us have little idea how to get them connected to this clinic"	Patient centered care can be impacted by lack of resources
"I have seen many patients leave AMA because their demands were not being met, or because they would rather choose drugs over treatment. It is saddening, because we were unable to stop them, but just document their choices. We have not received enough education or best practice on how to talk with patients who want to leave AMA"	Lack of patient centered care can lead to patients leaving against medical advice. Staff do not have education to know how to address patient centered care
"Our hospital is not very open to deviating from a policy to meet the needs of the patient"	The hospital policies are not patient-centered/hospital priorities do not align with patient goals

Significant statements	Formulated meanings
"Unwilling to participate unless they get their drug of choice first"	Patients require management of withdrawal/cravings in order to participate in care
"I feel like the patients' expectations of pain do not align with the palliative team's goals, and/or are not discussed realistically"	Patients have expectation for pain management that is different from team goals.
"I feel we tend to strive to provide the patient with resources and treatment to allow them to address their disorders, although they are not always wanted"	The resources and treatments provided that address disorders do not always align with patients' goals
"Some patients it is easier to meet their care goals. Others, no. If you are not giving some form of mind-altering pain medication, they are not satisfied with the care, even when you have been respectful, caring and empathetic"	Patient centered care is defined by patient's goals being the same as provider goals

Table 9. Clusters of Themes and Themes From Formulated Meanings (Patient-Centered Care)

Formulated meanings	Cluster of themes	Emergent themes
The hospital policies are not patient-centered/hospital priorities do not align with patient goals	Hospital policies	Non-patient centered goals
Current care of patients and patient goals do not align	Current care	
System goals do not align with patient goals. Nurses do not have training to provide patient centered care	System goals	
Providers' goals of care do not align with patients' goals of care. The outcomes for these patients may be better of delivery of care is patient centered	Provider goals	

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Formulated meanings	Cluster of themes	Emergent themes
Care team goals and patient goals do not align	Care team goals	
Patient goals are focused on immediate needs	Immediate needs	Patient centered goals
Patients require management of withdrawal/cravings in order to participate in care.	Management of withdrawals and cravings	
Patients have expectation for pain management that is different from team goals.	Management of pain	
The resources and treatments provided that address disorders do not always align with patients' goals	Recommended treatment and resources	
Staff do not have education to know how to address patient centered care	Lack of education	Factors that contribute to lack of patient centered care
Patient centered care can be impacted by lack of resources	Lack of resources	
Patient centered care is defined by patient's goals being the same as provider	Lack of definition of patient-centered care	

Table 10. Formulated Meanings of Timely Care (*N* = 105)

Significant statements	Formulated meanings
"We have a horrible problem with patients not getting the meds ordered or delivered in a timely manner. Withdrawals run rampant … patients go into withdrawal after heart surgery!"	There are delays in care for medication administration, which can contribute to negative health outcomes, including withdrawal
"Unnecessary delays can be from numerous issues within a healthcare system. The best prevention would be establishing protocols and order sets that reflect best practices and empowering nurses with effective strategies to promote safety"	Timely care is impacted by multiple issues in a healthcare system and standardized care (based on best practices) may help improve delivery of timely care/avoidance of delays

Significant statements	Formulated meanings
"They are usually on the call light more than other patients when they have meds due. I believe they receive timely care"	Delays in care occur because of patient behaviors related to opioid use disorder
"Care is sometimes fragmented due to limited resources, and/or adequate staffing to provide 1:1 care, expertise with the patient population and lack of family support"	Delays in care occur because of lack of resources/system issues
"Delays in care tend to make these situations worse. Patients get agitated, feel like they aren't being listened to. It's not uncommon that I've had people leave against medical advice. Sometimes these delays are avoidable, while other times we may not have medications easily available"	Delays in care can contribute to patients leaving against medical advice, patient agitation
"Always delays getting pain team involved-only team in our hospital who can write for methadone"	Delays in care occur with getting patient opioid replacement
"It's always a long wait time for their medications for pain"	There are delays in care for treating pain issues
"Caregiver specific. Some people hold higher priority than others"	Delays in care are impacted by provider-related difference
"They are usually on the call light more than other patients when they have meds due. I believe they receive timely care"	Delays in care perceived by patient due to factors related to opioid use disorder
"Frustrations often occur regarding the mother's lack of understanding of necessary guidelines for their newborns, which often entail a longer hospital stay"	Delays in care occur because of patient factors lack of understanding
"Once a timeline is blown, it can destroy patient trust and cause a massive escalation of agitation"	Loss of patient-provider trust
	Delays can cause patient agitation

Table 11. Clusters of Themes and Themes From Formulated Meanings for Timely Care

Formulated meanings	Cluster of themes	Emergent themes
Delays in care occur with getting patient opioid replacement	Opioid replacement therapy	Medication delays
There are delays in care for treating pain issues	Pain management	
There are delays in care for medication administration	Medication administration	
Delays in care are impacted by provider-related difference	Provider-related delays	System-related delays
Timely care is impacted by multiple issues in a healthcare system	Hospital-related delays	
Delays in care occur because of lack of resources/system issues	Delays related to lack of resources	
Delays in care perceived by patient due to factors related to opioid use disorder	Patient perception of delays	Patient-related delays
Delays in care occur because of patient factors lack of understanding	Patient lack of understanding	
Delays in care occur because of patient behaviors related to opioid use disorder	Patient behaviors that cause delays	
Patients leaving against medical advice related to delays	Leaving hospital	Impact of delays in care
Loss of patient-provider trust	Loss of trust	
Delays can cause patient agitation	Patient agitation	

Research Question 2

What hospital and unit characteristics influence nurses' experiences of hospital policies

or practices for patients with a history of opioid use disorder or history of self-injection

of opioids (hospital size, hospital type, unit type, unit size)?

To address Research Question 2, we present findings for each of the five nurses'

experiences of care scores next.

Restrictive Safety

Bivariate analysis of hospital characteristics and restrictive safety scores were performed;

where only unit type was statistically significantly associated with restrictive safety scores (H [4]

= 17.97, p = 0.001) (see Table 12). To further assess, Mann-Whitney tests were performed and

restrictive care scores in emergency department units were not significantly different from

critical care or medical-surgical/stepdown units. There was a significant difference in the

restrictive safety scores between emergency department units and mother-baby units (p = 0.008),

where the median safety score was significantly lower on mother-baby units than it was in

emergency department units (mother-baby *med* = 0.00 vs. emergency department *med* = 1.00).

Restrictive safety scores on mother-baby units were significantly different from critical care

units; the median restrictive safety score was significantly lower for mother baby units than

critical care units (mother-baby *med* = 0.00 = vs. critical care unit *med* = 2.00, p < 0.001).

Restrictive safety scores on mother baby units were also significantly different from medical-

surgical/stepdown units, where the mother baby unit restrictive safety score median value (*Med* =

0.00) was significantly lower than median for the medical-surgical/stepdown unit (*Med* = 2.00, *p*

< 0.001). Restrictive safety scores on critical care units and medical-surgical/stepdown units

were not significantly different (p =0.672). In summary, respondents on mother baby units

experienced less restrictive safety interventions than nurses in other areas, including emergency departments, critical care units, and medical-surgical/stepdown units.

Table 12. Bivariate Analyses of Hospital Characteristics and Experience Scores

Characteristic	Experience	Analysis	Value *	*P*-value
Hospital				
Hospital size	Restrictive Safety	Spearman's rho	0.03	0.685
	Effective Care	Spearman's rho	0.15	0.081
	Quality Care	Spearman's rho	-0.37	0.658
	Adverse Events	Spearman's rho	0.17	0.029
	Satisfaction	Spearman's rho	-0.77	0.340
Location	Restrictive Safety	Mann Whitney U	-0.02	0.987
(Rural/Urban)	Effective Care	Independent t test	-1.75	0.023
	Quality Care	Independent t test	1.21	0.192
	Adverse Events	Mann Whitney U	-0.45	0.654
	Satisfaction	Mann Whitney U	-1.67	0.095
Academic/	Restrictive Safety	Kruskal-Wallis H	3.63	0.163
Teaching Status	Effective Care	One way ANOVA	2.13	0.123
	Quality Care	Kruskal-Wallis H	0.98	0.612
	Adverse Events	Kruskal-Wallis H	14.28	0.001
	Satisfaction	Kruskal-Wallis H	0.81	0.668
Profit Status	Restrictive Safety	Mann Whitney U	-1.51	0.131
(for profit, non-	Effective Care	Independent t test	-1.20	0.094
profit)	Quality Care	Independent t test	-0.55	0.546
	Adverse Events	Mann Whitney U	0.61	0.543
	Satisfaction	Mann Whitney U	-0.60	0.546
Unit				
Unit size	Restrictive Safety	Spearman's Rho	0.14	0.104
	Effective Care	Spearman's Rho	0.11	0.211
	Quality Care	Spearman's Rho	0.02	0.786
	Adverse Events	Spearman's Rho	0.11	0.161
	Satisfaction	Spearman's Rho	-0.09	0.279
Unit type	Restrictive Safety	Kruskal-Wallis H	17.97	0.001
	Effective Care	Kruskal-Wallis H	3.05	0.384
	Quality Care	Kruskal-Wallis H	7.08	0.069
	Adverse Events	Kruskal-Wallis H	8.75	0.033
	Satisfaction	One way ANOVA	2.46	0.065

Based on evidence of linear regression assumption violations when modeling restrictive safety scores using hospital and unit characteristics, median regression was performed (see Table 13). The only characteristic significantly related to restrictive safety scores was for critical care unit vs. maternal baby ($b = 1.00$, 95% CI= [0.03, 1.97], $p = 0.043$). The predicted median restrictive safety score was 1.00 point higher for critical care unit nurses versus maternal baby nurses, adjusting for the other variables considered. These results indicate that unit type is associated with restrictive safety scores, specifically, critical care units are associated with higher restrictive safety scores than mother baby units.

Table 13. Restrictive Safety Score Median Regression Using Hospital and Unit Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	0.67	(-0.68, 2.02)	0.330
Hospital size			
< 100	1.00	(-0.70, 2.70)	0.247
100-249	0.33	(-0.77, 1.44)	0.553
250-449	0.33	(-0.64, 1.31)	0.500
450+ RC	-	-	-
Rural vs. Urban	0.00	(-1.04, 1.04)	1.000
Teaching Status			
Academic Med. center	0.33	(-0.63, 1.29)	0.493
Non-teaching hospital	0.33	(-0.59, 1.25)	0.475
Teaching hospital RC	-	-	-
For profit vs. Non-profit	0.00	(-0.80, 0.80)	1.000
Unit type			
Emergency Dept.	0.33	(-0.82, 1.48)	0.568
Critical Care Unit	1.00	(0.03, 1.97)	0.043
Med-Surg/Stepdown	0.67	(-0.80, 2.13)	0.369

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Maternal Baby [RC]	-	-	
Unit size			
10 or less	0.00	(-1.67, 1.67)	1.000
11-20	-1.00	(-2.09, 0.09)	0.072
21-30	-0.67	(-1.74, 0.41)	0.221
Greater than 30 [RC]	-	-	-

Note. RC = Reference category.

Effective Care

Based on bivariate analysis of effective care scores and hospital characteristics, effective care scores were associated with hospital location (rural/urban), with a mean difference between effective scores of 1.75 points ($p = 0.023$) between respondents working in rural hospitals compared to respondents working in urban hospitals. Based on these results, effective care scores were higher for respondents working in urban hospitals, compared to nurses working in rural hospitals. Overall, there were no violations of regression assumptions for restrictive safety scores and hospital characteristics, thus multivariable linear regression was performed (see Table 14). None of the hospital characteristics were significantly related to restrictive safety scores. The adjusted R^2 was 0.054, implying that approximately 5.4% of the variation in effective care scores was explained by this model with hospital and unit characteristics, thus the model was minimally helpful at explaining the effective care scores.

Table 14. Effective Care Score Regression using Hospital and Unit Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	17.88	(15.44, 20.33)	<0.001
Hospital			
Hospital size			
< 100	-1.44	(-4.43, 1.56)	0.345
100-249	0.24	(-1.71, 2.18)	0.811
250-449	0.77	(-0.95, 2.50)	0.376
450+ RC	-	-	-
Rural vs. Urban	-0.78	(-2.62, 1.06)	0.403
Teaching Status			
Academic Med. Center	1.60	(-0.10, 3.30)	0.065
Non-teaching Hospital	0.89	(-0.72, 2.50)	0.277
Teaching Hospital RC	-	-	-
For Profit vs. Non-Profit	-0.97	(-2.40, 0.46)	0.182
Unit			
Unit type			
Emergency Dept.	-1.10	(-3.20, 1.01)	0.306
Critical Care Unit	-0.99	(-2.77, 0.78)	0.270
Med-Surg/Stepdown	-0.69	(-3.32, 1.93)	0.601
Maternal Baby RC	-	-	-
Unit size (no. beds)			
10 or less	0.35	(-2.56, 3.23)	0.819
11-20	-1.33	(-3.27, 0.62)	0.181
21-30	-1.40	(-3.31, 0.52)	0.152
Greater than 30 RC	-	-	-

Adjusted R^2 = 0.054

Note. RC = Reference category.

Quality Care

Bivariate analysis of quality care scores and hospital/unit characteristics revealed there were no statistically significant associations. Results from linear regression are given in Table 15, where only unit type (critical care unit vs. maternal baby) was significantly related to quality

care scores (b = -2.70, 95% CI = [-4.94, -0.46], p = 0.018). The quality care scores were lower on

the critical care units compared to the maternal baby units. The model adjusted R^2 was 0.023,

implying that approximately 2.3% of the variation in quality care scores was explained by this

model with hospital and unit characteristics, thus the model was minimally helpful in explaining

quality care scores.

Table 15. Quality Care Scores Regression using Hospital and Unit Characteristics

Independent variable	Estimate (b)	95% CI for b	*P*-value
Intercept	14.89	(11.80, 17.97)	< 0.001
Hospital			
Hospital size			
< 100	1.23	(-2.65, 5.11)	0.531
100-249	0.09	(-2.44, 2.60)	0.947
250-449	0.54	(-1.69, 2.76)	0.634
450+ RC	-	-	-
Rural vs. Urban	1.24	(-1.12, 3.60)	0.300
Teaching Status			
Academic Med. Center	1.36	(-0.85, 3.57)	0.225
Non-teaching Hospital	0.44	(-1.63, 2.52)	0.673
Teaching Hospital RC	-	-	-
For profit vs. Non-profit	-0.63	(-2.48, 1.22)	0.500
Unit			
Unit type			
Emergency Dept.	-2.14	(-4.79, 0.50)	0.112
Critical Care Unit	-2.70	(-4.94, -0.46)	0.018
Med-Surg/Stepdown	-0.43	(-3.85, 3.00)	0.805
Maternal Baby RC	-	-	-
Unit size			
10 or less	0.87	(-2.85, 4.60)	0.643
11-20	-1.40	(-3.95, 1.15)	0.280
21-30	-0.95	(-3.41, 1.52)	0.448
Greater than 30 RC	-	-	-
Adjusted R^2 = 0.023			

Note. RC = Reference category

Adverse Events

Bivariate analysis was performed for adverse event scores and hospital/unit characteristics and suggested associations between adverse event scores and three characteristics. A positive correlation for hospital size and the adverse event scores was found ($r_s = 0.17$, $p = 0.029$), meaning there was a significant difference in adverse event scores for nurses based on the size of the hospitals where they worked. Kruskal-Wallis analysis was performed, and there was an association between hospital type (academic/teaching status) and adverse event scores (H[3] = 14.28, $p < 0.001$). To better understand the relationship, a Mann Whitney U test was performed between academic medical centers (AMCs) and non-teaching hospitals and was significant ($p<0.001$). AMCs and teaching hospitals were also significantly different in adverse events experiences ($p = 0.001$). Non-teaching and teaching hospitals were not significantly different from each other ($p = 0.574$). The median adverse events scores for AMCs were higher than the scores for non-teaching hospitals and teaching hospitals, meaning, nurses who worked in AMC's experienced more adverse events with patients with opioid use disorders compared to nurses who worked in non-teaching or teaching hospitals.

Kruskal-Wallis testing also revealed an association between unit type and adverse event scores (H[4] = 17.97, $p = 0.033$). A Mann Whitney U test was performed to assess for significant differences between pairs of different unit types. Here, critical care unit nurses and mother baby unit were significantly different in adverse event scores ($p = 0.015$), as well as medical-surgical/stepdown and mother baby units ($p = 0.010$). The median adverse event scores for the critical care (*med* =3.00) and medical-surgical stepdown units (*med* = 4.00) were higher than the median values for the mother baby unit (*med* = 2.50), meaning, nurses who worked in critical

care units and medical-surgical stepdown units experienced more adverse events related to patients with opioid use disorders, compared to nurses on maternal baby units.

Multivariable linear regression for adverse event scores was performed after checking all assumptions, which were satisfied (Table 16). Hospitals with less than 100 beds versus hospitals with beds with 450 or greater beds ($b = -1.10$, $p = 0.035$), academic medical center vs. teaching hospital ($b = 0.88$ $p = 0.006$), and unit type (critical care vs. mother baby [$b = 0.61$, $p = 0.049$], medical-surgical/stepdown vs. mother baby [$b = 1.0$, $p = 0.030$]) were significantly related to adverse event scores. In other words, nurses working in hospitals with less than 100 beds experienced less adverse events related to patients with opioid use disorders, compared to nurses working in hospitals with greater than 450 beds. Nurses working in academic medical centers experienced more adverse events, compared to nurses working in teaching hospitals, and nurses working in critical care units experienced more adverse events compared to nurses working in maternal baby units. The adjusted R^2 was 0.087, implying 8.7% of the variation in adverse event scores was accounted for by modeling hospital and unit characteristics, therefore, the model was minimally helpful at explaining the adverse event scores.

Table 16. Adverse Event Regression Using Hospital and Unit Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	2.01	(1.16, 2.85)	< 0.001
Hospital			
Hospital size			
< 100	-1.10	(-2.12, -0.08)	0.035
100-249	-0.06	(-0.75, 0.64)	0.877
250-449	-0.02	(-0.63, 0.59)	0.944
450+ RC	-	-	-
Rural vs. Urban	0.62	(-0.01, 1.25)	0.052
Teaching Status			
Academic Med. Center	0.88	(0.26, 1.49)	0.006

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Non-teaching Hospital	-0.03	(-0.58, 0.52)	0.924
Teaching Hospital [RC]	-	-	-
For profit vs. Non profit	0.04	(-0.47, 0.55)	0.877
Unit			
Unit type			
Emergency Dept.	0.59	(-0.11, 1.30)	0.098
Critical Care Unit	0.61	(0.00, 1.22)	0.049
Med-Surg/Stepdown	1.00	(0.10, 1.90)	0.030
Maternal Baby [RC]	-	-	-
Unit size			
10 or less	0.52	(-0.48, 1.52)	0.308
11-20	0.27	(-0.38, 0.93)	0.415
21-30	0.15	(-0.53, 0.83)	0.663
Greater than 30 [RC]	-	-	-
Adjusted R^2 = 0.087			

Note. RC = Reference category

Satisfaction

Bivariate analysis was performed for satisfaction scores and hospital/unit characteristics, where there were no statistically significant associations. Multivariable linear regression was performed after checking all assumptions, which were satisfied (see Table 17). There were no characteristics that were significantly related to satisfaction scores. The adjusted R^2 was 0.016, thus this model only accounted for a minimal amount of variance in the satisfaction scores.

Table 17. Satisfaction Scores Regression Using Hospital and Unit Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	4.51	(3.42, 5.60)	< 0.001
Hospital			
Hospital size			
< 100	-0.69	(-2.03, 0.65)	0.310
100-249	-0.29	(-1.21, 0.63)	0.532
250-449	-0.04	(-0.85, 0.77)	0.921
450+ [RC]	-	-	-

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Rural vs Urban	0.79	(-0.02, 1.60)	0.054
Teaching Status			
Academic Med. Center	0.10	(-0.70, 0.90)	0.812
Non-teaching Hospital	0.12	(-0.59, 0.84)	0.733
Teaching Hospital [RC]	-	-	-
For profit vs Non-profit	0.38	(-0.29, 1.05)	0.268
Unit			
Unit type			
Emergency Dept.	-0.30	(-1.2, 0.61)	0.517
Critical Care Unit	-0.51	(-1.31, 0.28)	0.206
Med-Surg/Stepdown	1.02	(-0.15, 2.18)	0.086
Maternal Baby [RC]	-	-	-
Unit size (no. beds)			
10 or less	0.95	(-0.33, 2.32)	0.144
11-20	0.68	(-0.19, 1.54)	0.125
21-30	0.40	(-0.49, 1.29)	0.377
Greater than 30 [RC]	-	-	-
Adjusted R^2 = 0.016			

Note. RC = Reference category.

Research Question 3

What nurse characteristics influence nurses' experiences of hospital policies or practices

for patients with a history of opioid use disorder or history of self-injection of opioids

(age, education level, number of years in practice, role, education regarding substance

use disorder, education and knowledge regarding harm reduction strategies)?

To address Research Question 3, we present findings for each of the five nurses'

experience scores.

Restrictive Safety

Bivariate analysis was performed for restrictive safety scores and nursing characteristics

(see Table 18). Age group, substance use disorder education (both employer and recent) and

education and knowledge of harm reduction strategies were associated with restrictive safety scores. For age group, Spearman's rho revealed a positive correlation between restrictive safety scores and age group ($r_s = 0.23$, $p = 0.007$). Mann Whitney U test were performed for restrictive safety scores and employer-provided substance use disorder education ("yes" group *med* = 15.00 vs. "not yes" group *med* = 12.00, $p = 0.009$); nurses who had received substance use disorder education experienced more restrictive safety interventions, compared to nurses who had not. Mann Whitney U tests were also performed to evaluate group differences on restrictive safety scores by those who have had harm reduction education versus not ("yes" group *med* =2.00 vs. "not yes" *med* = 1.00, $p < 0.001$) and harm reduction knowledge vs. not ("yes" *med* = 2.00 vs. "not yes" *med* = 1.00, $p = 0.003$). Nurses who had education or knowledge of harm reduction strategies experienced more restrictive safety interventions, compared to nurses who did not have education or knowledge of harm reduction strategies.

Table 18. Bivariate Analysis of Nurse Characteristics and Nurse Experiences

Characteristic	Experience	Analysis	Value[*]	*P*-value
Age group (years)	Restrictive Safety	Spearman's rho	0.23	0.007
18-29	Effective Care	Spearman's rho	0.07	0.394
30-49	Quality Care	Spearman's rho	0.18	0.043
50-64	Adverse Events	Spearman's rho	0.01	0.925
65+	Satisfaction	Spearman's rho	0.05	0.513
Level of Education	Restrictive Safety	Spearman's rho	0.04	0.665
Diploma/Associates	Effective Care	Spearman's rho	0.14	0.100
Bachelor degree	Quality Care	Spearman's rho	0.12	0.166
Masters/Doctoral	Adverse Events	Spearman's rho	0.15	0.071
	Satisfaction	Spearman's rho	0.04	0.611
Experience (years)	Restrictive Safety	Spearman's rho	-0.16	0.069
5 or less	Effective Care	Spearman's rho	0.06	0.515
6-10	Quality Care	Spearman's rho	0.67	0.453
11-20	Adverse Events	Spearman's rho	0.07	0.375
Greater than 20	Satisfaction	Spearman's rho	0.12	0.845

Characteristic	Experience	Analysis	Value*	P-value
Role	Restrictive Safety	Mann Whitney U	-1.75	0.080
Staff vs. non-staff	Effective Care	Independent t test	-0.65	0.357
	Quality Care	Independent t test	-0.10	0.921
	Adverse Events	Mann Whitney U	-1.16	0.246
	Satisfaction	Mann Whitney U	-1.33	0.183
Substance Use	Restrictive Safety	Mann Whitney U	-2.62	0.009
Disorder Education	Effective Care	Independent t test	2.28	<0.001
(Employer provided)	Quality Care	Mann Whitney U	-2.57	0.010
	Adverse Events	Mann Whitney U	-0.28	0.773
	Satisfaction	Mann Whitney U	-2.78	0.006
Substance Use	Restrictive Safety	Mann Whitney U	-1.94	0.053
Disorder Education	Effective Care	Independent t test	1.68	0.009
(Recent)	Quality Care	Independent t test	0.05	0.949
	Adverse Events	Mann Whitney U	-2.94	0.003
	Satisfaction	Mann Whitney U	-0.45	0.655
Harm Reduction	Restrictive Safety	Mann Whitney U	-3.99	< 0.001
Strategies Education	Effective Care	Independent t test	1.77	0.005
	Quality Care	Mann Whitney U	-2.62	0.009
	Adverse Events	Mann Whitney U	-2.37	0.018
	Satisfaction	Mann Whitney U	-3.04	0.002
Harm Reduction	Restrictive Safety	Mann Whitney U	-2.95	0.003
Strategies Knowledge	Effective Care	Independent t test	1.60	0.013
	Quality Care	Mann Whitney U	-1.52	0.129
	Adverse Events	Mann Whitney U	-2.76	0.006
	Satisfaction	Mann Whitney U	-2.04	0.041

Note. Values reported: Mann Whitney U (Z score); Independent *t*-test (mean difference); Spearman's rho (correlation coefficient); Kruskal-Wallis (H)

Based on checking linear regression assumptions through analysis of residuals, there was evidence of heteroscedasticity, and therefore median regression of restrictive safety with nurse characteristics was performed (see Table 19). Age group was the only characteristic that was significantly related to restrictive safety scores for 30–49-year-old nurses vs. 65+ years old (b = -2.00, 95% CI=[-3.91, -0.09], p = 0.040), where for the predicted median restrictive safety score was two points lower for 30–49-year-old compared to 65+ year old, adjusting for the other

nurse characteristics included in the modeling. In other words, nurses who were 30-49 years of age experienced less restrictive safety interventions compared to nurses who were 65 years of age or older.

Table 19. Restrictive Safety Median Regression for Nurse Characteristics

Independent variable	Estimate (b)	95% CI for b	P-value
Intercept	2.00	(-0.55, 4.55)	0.124
Age group (years)			
18-29	-2.00	(-4.41, 0.41)	0.103
30-49	-2.00	(-3.91, -0.09)	0.040
50-64	-1.00	(-2.81, 0.81)	0.276
65+ [RC]	-	-	-
Education level			
Associates degree/Diploma	-1.00	(-2.53, 0.53)	0.197
Bachelor's degree	0.00	(-0.90, 0.90)	1.000
Master's/Doctoral degree [RC]	-	-	-
No. years practice			
5 or less RC	-	-	-
6-10	1.00	(-0.43, 2.43)	0.168
11-20	1.00	(-0.41, 2.41)	0.162
Greater than 20	0.00	(-1.52, 1.52)	1.000
Staff vs. Non-staff nurse	0.00	(-0.91, 0.91)	1.000
SUD education (Employer)	0.00	(-0.86, 0.86)	1.000
SUD education (Recent)	0.00	(-0.82, 0.82)	1.000
HRS Education	1.00	(-0.15, 2.15)	0.089
HRS knowledge	0.00	(-1.09, 1.09)	1.000

Note. RC = Reference category.

Effective Care

Based on bivariate analysis, there were significant associations between substance use disorder education (both employer-provided and recent) and knowledge and education of harm

reduction strategies with effective care scores. Independent *t*-tests revealed differences among those reporting having employer provided substance use disorder education relative to otherwise ("yes" group *mean* = 17.97 vs. "no" group *mean* = 15.69, $p < 0.001$), recent substance use disorder education ("yes" group *mean* = 17.60 vs. "no" group *mean* = 15.92, $p = 0.009$), harm reduction strategies education ("yes" group *mean* = 17.86 vs. "no" group *mean* = 16.08, $p < 0.001$), and knowledge of harm reduction strategies ("yes" group *mean*=17.46 vs. "no" group *mean* = 15.86, $p = 0.013$).

After checking linear regression assumptions and all were satisfied, multivariable modeling of effective care scores with nurse characteristics was performed and findings are reported in Table 20. Substance use disorder employer-provided education was the only characteristic that was significantly related to effective care scores, where those with this education had significantly higher predicted effective care scores, adjusting for the other nurse characteristics in the model ($b = 1.51$, 95% CI = $[0.03, 2.99]$, $p = 0.045$). The adjusted R^2 was 0.129, implying 12.9% of the variation in effective care scores was accounted for in this modeling with nurse characteristics, suggesting that the model provides a small amount of insight into the effective care scores.

Table 20. Effective Care Linear Regression for Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	19.07	(14.78, 23.36)	<0.001
Age group (years)			
18-29	-6.11	(-10.17, -2.04)	0.004
30-49	-1.77	(-5.01, 1.46)	0.279
50-64	-2.56	(-5.63, 0.51)	0.101
65+ RC	-	-	-
Education level			
Associates degree/Diploma	-2.45	(-5.05, 0.16)	0.065

Independent variable	Estimate (b)	95% CI for b	P-value
Master's/Doctoral degree	-1.20	(-2.75, 0.35)	0.127
Bachelor's degree [RC]	-	-	-
No. years practice			
5 or less [RC]	-	-	-
6-10	-0.33	(-2.69, 2.03)	0.781
11-20	-1.22	(-3.53, 1.08)	0.295
Greater than 20	-0.87	(-3.38, 1.64)	0.494
Staff vs. Non-staff nurse	0.68	(-0.89, 2.24)	0.394
SUD education (Employer)	1.51	(0.03, 2.99)	0.045
SUD education (Recent)	0.26	(-1.14, 1.65)	0.713
HRS Education	0.97	(-0.99, 2.93)	0.327
HRS knowledge	0.18	(-1.68, 2.04)	0.850

Adjusted R^2 = 0.129

Note. RC = Reference category.

Quality Care

Bivariate analysis was performed for quality care scores and nursing characteristics and were significant for age group (r_s = 0.18, p = 0.04), employer-provided substance use disorder education ("yes" group *med* = 15.00 vs. "not yes" group *med* = 12.00, p = 0.01) and for harm reduction education ("yes" group *med* 15.00, vs. "not yes" group *med* = 12.00, p = 0.009). Nurses who received substance use disorder education from their employers had higher quality care scores compared to nurses who had not received education from their employers. Nurses who participated in harm reduction education experienced higher quality scores compared to nurses who had not.

Linear regression assumptions were satisfied for modeling quality care scores with nurse characteristics, where regression findings are reported in Table 21 below. Age group (18-29 vs. 65+ [b = -9.19, p = 0.002], number of years in practice (11-20 years vs. greater than 20 years [b = -3.24, p = 0.046]) and recent substance use disorder education (b = -2.17, p = 0.024) and employer-provided substance use disorder education (b = 2.03, p = 0.046) were significantly related to quality care scores. Younger nurses (18-29) rated their experiences of quality care lower than older nurses (65+), and nurses who had been in practice for less time (11-20 years) rated their quality care experiences lower than nurses who had been in practice for longer (greater than 20 years). Nurses who had received substance use education from their employer rated their quality care experienced higher than nurses who had not received education from their employer. Nurses who had participated in recent substance use disorder education rated their quality care experiences lower than nurses who had not participated in recent substance use disorder education. The adjusted R^2 was 0.120, thus the model explained 12.0% of the variance in quality care scores, which is minimally helpful at explaining quality care scores.

Table 21. Quality Care Linear Regression for Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	18.30	(12.48, 24.12)	<0.001
Age group (years)			
18-29	-9.19	(-14.83, -3.55)	0.002
30-49	-3.40	(-7.77, 0.97)	0.126
50-64	-3.63	(-7.78, 0.52)	0.086
65+ RC	-	-	-
Education level			
Associates degree/Diploma	-2.90	(-6.40, 0.59)	0.103
Bachelor's degree	-1.87	(-3.92, 0.19)	0.075
Master's/Doctoral degree RC	-	-	-

Independent variable	Estimate (b)	95% CI for b	P-value
No. years practice			
5 or less [RC]	-	-	-
6-10	-0.50	(-3.81, 2.81)	0.765
11-20	-3.24	(-6.41, -0.07)	0.046
Greater than 20	-1.39	(-4.84, 2.06)	0.427
Staff vs. Non-staff nurse	1.74	(-0.35, 3.83)	0.102
SUD education (Employer)	2.03	(0.04, 4.01)	0.046
SUD education (Recent)	-2.17	(-4.06, -0.29)	0.024
HRS Education	2.28	(-0.38, 4.94)	0.092
HRS knowledge	-0.19	(-2.69, 2.32)	0.882

Adjusted $R^2 = 0.120$

Adverse Events

Bivariate analyses were performed for adverse event scores and nursing characteristics; associations were found between adverse event scores and recent substance use disorder education ("yes" group *med* = 3.00, "not yes" group *med* = 3.00, p = 0.003), harm reduction education ("yes" group *med* = 3.00, "not yes" group *med* = 3.00, p = 0.018) and harm reduction strategies knowledge ("yes" group *med* = 3.00, "not yes" group *med* = 2.5, p = 0.006).

Assumptions based on analysis of residuals were satisfied so that multivariable linear regression modeling of adverse event scores are presented in Table 22. Recent substance use disorder education was the only characteristic that was significantly related to adverse event scores (b = 0.56, 95% CI = [0.03, 1.09], p = 0.039). Specifically, nurses who participated in recent substance use disorder education had higher adverse event scores than nurses who did not participate in recent education. The adjusted R^2 was 0.066, implying that approximately 6.6% of

the variation in adverse event scores is accounted for in a model with the included nurse

characteristics. Thus, this model was minimally helpful a explaining the adverse event scores,

Table 22. Adverse Events Linear Regression for Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	1.18	(-0.45, 2.81)	0.155
Age group (years)			
18-29	1.52	(-0.05, 3.09)	0.058
30-49	1.05	(-0.22, 2.31)	0.104
50-64	1.15	(-0.06, 2.37)	0.063
65+ RC	-	-	-
Education level			
Associates degree/Diploma	-0.60	(-1.50, 0.31)	0.197
Bachelor's degree RC	-0.23	(-0.80, 0.34)	0.430
Master's/Doctoral degree	-	-	-
No. years practice			
5 or less RC	-	-	-
6-10	0.42	(-0.46, 1.31)	0.347
11-20	0.72	(-0.16, 1.61)	0.106
Greater than 20	0.60	(-0.32, 1.52)	0.201
Staff vs. Non-staff nurse	0.00	(-0.60, 0.60)	0.992
SUD education (Employer)	-0.38	(-0.93, 0.17)	0.170
SUD education (Recent)	0.56	(0.03, 1.09)	0.039
HRS Education	0.14	(-0.59, 0.86)	0.702
HRS knowledge	0.42	(-0.24, 1.08)	0.214
Adjusted R^2 = 0.066			

Note. RC = Reference category.

Satisfaction

Based on bivariate analysis of satisfaction and nursing characteristics, there were several nursing characteristics that were associated with satisfaction scores. A Mann Whitney U test was performed and suggested employer-provided substance use education was associated with satisfaction scores ("yes" group med = 6.00, "not yes" group med = 5.00, p = 0.006). Harm reduction education ("yes" group med = 6.00, "not yes" group med = 5.00, p = 0.002) and harm reduction strategies knowledge ("yes" group med = 5.00, "not yes" group med = 5.00, p = 0.042) were associated with satisfaction scores. Nurses who participated in employer-provided substance use disorder education and harm reduction education had higher satisfaction scores. While the median value of the satisfaction scores were the same for nurses who had knowledge regarding harm reduction strategies, compared to nurses who did not, the distribution of the scores was different, in that there were more nurses who had knowledge of these strategies who rated their satisfaction as being higher, compared to those who did not (see Figure 1).

Linear regression modeling of satisfaction scores was performed after assumptions were checked and met (see Table 23). Recent substance use disorder education was the only characteristic that was significantly related to satisfaction scores (b = -0.73, p = 0.042). Only 1.9% of the variation in satisfaction was explained by modeling nurse characteristics (Adjusted R^2 = 0.019), thus the model was minimally helpful in accounting for variance in the satisfaction scores.

Table 23. Satisfaction Linear Regression for Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	5.01	(2.88, 7.15)	< 0.001
Age group (years)			
18-29	-1.06	(-3.12, 1.00)	0.310
30-49	-0.45	(-2.09, 1.19)	0.589
50-64	-0.34	(-1.93, 1.24)	0.668
65+ RC	-	-	-
Education level			
Associates degree/Diploma	-0.32	(-1.50, 0,86)	0.871
Bachelor's degree	-0.06	(-0.81, 0.69)	0.593
Master's/Doctoral degree RC	-	-	-
No. years practice			
5 or less RC	-	-	-
6-10	0.23	(-0.93, 1.40)	0.693
11-20	0.05	(-1.12, 1.20)	0.935
Greater than 20	0.16	(-1.04, 1.36)	0.790
Staff vs. Non-staff nurse	0.13	(-0.65, 0.92)	0.735
SUD education (Employer)	0.42	(-0.30, 1.15)	0.251
SUD education (Recent)	-0.73	(-1.43, -0.03)	0.042
HRS Education	0.69	(-0.27, 1.65)	0.157
HRS knowledge	0.14	(-0.74, 1.02)	0.735

Adjusted R^2 = 0.019

Note. RC = Reference category.

Figure 2. Satisfaction Scores Related to Harm Reduction Knowledge
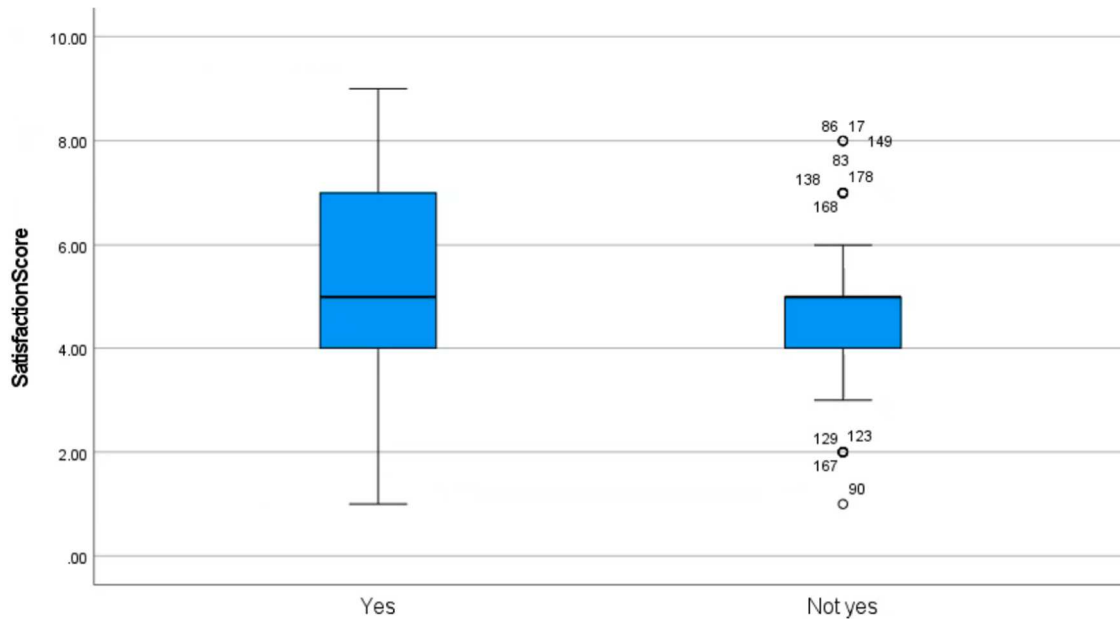
Additional Findings for Research Questions 2 and 3

To further address Research Question 2 and 3, we present findings from modeling the five experience scores with hospital, unit, and nurse characteristics combined.

Restrictive Safety

Median regression was performed after linear regression assumptions were not met (see Table 24). Unit type was significantly related to restrictive safety, specifically, emergency department when compared to maternal-baby units (b = 1.406, p = 0.005) and critical care unit when compared to maternal-baby units (b = 1.25, p = 0.003). Nurses who worked in emergency departments and critical care units experienced more restrictive safety interventions than nurses on maternal baby units. Age group was also significantly related to restrictive safety score, specifically for comparing the age groups 18-29 vs. 65+ (b = -2.37, p= 0.001) and 30-49 vs. 65+ (b = -1.47, p = 0.042), adjusting for the other included variables. In this model, younger nurses (18-49) experienced lower restrictive safety scores than nurses who were older (65+). Harm reduction education was also related to the restrictive safety scores (b=1.35, p = 0.003). Nurses

who had participated in harm reduction education experienced more restrictive safety

interventions than nurses who had not, when adjusting for other variables.

Table 24. Restrictive Safety Median Regression of Hospital, Unit, and Nurse

Characteristics

Independent variable	Estimate (b)	95% CI for b	P-value
Intercept	1.132	(-0.91, 3.17)	0.273
Hospital			
Hospital size (no. beds)			
< 100	-0.09	(-1.46, 1.29)	0.903
100-249	-0.52	(-1.40, 0.36)	0.243
250-449	-0.21	(-0.95, 0.53)	0.575
450+ [RC]	-	-	-
Rural vs. Urban	0.62	(-0.25, 1.49)	0.160
Teaching Status			
Academic Medical Center	0.09	(-0.66, 0.83)	0.813
Non-teaching Hospital	0.09	(-0.68, 0.85)	0.823
Teaching Hospital [RC]	-	-	-
For profit vs. Non profit	-0.95	(-0.72, 0.53)	0.763
Unit			
Unit type			
Emergency Dept.	1.41	(0.43, 2.38)	0.005
Critical Care Unit	1.25	(0.45, 2.06)	0.003
Med-Surg/Stepdown	0.92	(-0.27, 2.11)	0.128
Maternal Baby [RC]	-	-	-
Unit size (no. beds)			
10 or less	0.52	(-0.87, 1.91)	0.457
11-20	-0.17	(-1.04, 0.71)	0.706
21-30	-0.18	(-1.04, 0.67)	0.669
Greater than 30 [RC]	-	-	-
Nurse			
Age group (years)			
18-29	-2.37	(-4.18, -0.56)	0.011
30-49	-1.47	(-2.88, -0.05)	0.042
50-64	-1.04	(-2.43, 0.34)	0.138

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
65+ RC	-	-	-
Education level			
Associates degree or Dipl.	-1.11	(-2.30, 0.09)	0.069
Bachelor's degree	-0.07	(-0.74, 0.60)	0.832
Master's/Doctoral degree RC	-	-	-
No. years practice			
5 or less RC	-	-	-
6-10	0.73	(-0.37, 1.82)	0.189
11-20	0.49	(-0.61, 1.58)	0.385
Greater than 20	0.31	(-0.87, 1.49)	0.608
Staff vs. Non-staff nurse	0.06	(-0.64, 0.77)	0.860
SUD education (Employer)	0.12	(-0.52, 0.76)	0.702
SUD education (Recent)	-0.76	(-0.69, 0.54)	0.807
HRS Education	1.35	(0.48, 2.23)	0.003
HRS knowledge	-0.38	(-1.20, 0.44)	0.363

Note. RC = Reference category.

Effective Care

Multivariable linear regression was performed after checks of assumptions were satisfied (see Table 25). Age group was significantly related to effective care scores: for the age group 18-29 (b = -6.84, p = 0.001) and 50-64 (b = -3.81, p = 0.019) when compared to the age group 65 and older. When adjusting for the other variables, younger nurses (18–29 and 50–64) experienced fewer effective care interventions being utilized less often than older nurses (65+). Results for substance use disorder education (from employer) were also significant (b=1.83, p = 0.016), meaning that nurses who participated in employer-provided education about substance use disorders experienced more effective care interventions, more often, when adjusting for the other variables. Only 17.8% of the variation in effective care scores was accounted for in this

model with hospital, unit, and nurse characteristics (Adjusted R^2 = 0.178), thus the model was

minimally helpful in explaining effective care scores.

Table 25. Effective Care Linear Regression of Hospital, Unit, and Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	21.37	(26.67, 26.06)	< 0.001
Hospital			
Hospital size (no. beds)			
< 100	-2.17	(-5.35, 1.0)	0.178
100-249	-0.81	(-2.82, 1.20)	0.426
250-449	-0.31	(-2.02, 1.40)	0.719
450+ RC	-	-	-
Rural vs. Urban	-0.05	(-2.04, 1.95)	0.964
Teaching Status			
Academic Medical Center	1.68	(-0.02, 3.39)	0.053
Non-teaching Hospital	0.79	(-0.90, 2.50)	0.357
Teaching Hospital RC	-	-	-
For profit vs. Non profit	-0.52	(-1.96, 0.91)	0.470
Unit			
Unit type			
Emergency Dept.	-0.54	(-2.86, 1.78)	0.645
Critical Care Unit	-1.23	(-3.12, 0.66)	0.200
Med-Surg/Stepdown	-0.43	(-3.86, 0.20)	0.754
Maternal Baby RC	-	-	-
Unit size (no. beds)			
10 or less	-0.58	(-3.69, 2.53)	0.713
11-20	-1.25	(0.80, 0.02)	0.229
21-30	-1.83	(0.20, 0.03)	0.077
Greater than 30 RC	-	-	-
Nurse			
Age group (years)			
18-29	-6.84	(-11.0, -2.70)	0.001
30-49	-2.67	(-5.91, 0.56)	0.104
50-64	-3.81	(-6.98, -0.64)	0.019
65+ RC	-	-	
Education level			
Associates degree/Diploma	-1.65	(-4.41, 1.10)	0.237
Bachelor's degree	-1.39	(-2.96, 0.18)	0.083
Master's/Doctoral degree RC	-	-	-

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
No. years practice			
5 or less [RC]	-	-	-
6-10	-0.10	(-2.57, 2.37)	0.936
11-20	-0.72	(-3.23, 1.78)	0.568
Greater than 20	-0.25	(-2.93, 2.44)	0.855
Staff vs. Non-staff nurse	0.85	(-0.77, 2.47)	0.301
SUD education (Employer)	1.83	(0.35, 3.31)	0.016
SUD education (Recent)	0.12	(-1.29, 1.53)	0.866
HRS Education	0.97	(-1.03, 2.98)	0.338
HRS knowledge	-0.44	(-2.32, 1.44)	0.645

Adjusted R^2 = 0.178

Note. RC = Reference category.

Quality Care

Table 26 provides findings from multivariable linear regression modeling of quality care scores by hospital, unit, and nurse characteristics after checking regression assumptions, which were met. Critical care unit nurses were significantly different from maternal-baby nurses on quality care scores (b = -2.68, p = 0.035), meaning, nurses on critical care units scored quality care lower than nurses on maternal-baby units. There were also significant differences in the quality care scores between the age groups, 18-24 vs. 65+ (b = -9.19, p = 0.002) and 50-64 vs. 65+ (b = -5.02, p = 0.024). Younger nurses (18-24 and 50-64) had lower quality care scores compared to nurses who were older (65+). Staff nursing versus non-staff nursing was also significantly different in quality care scores (b = 2.29, p = 0.041), such that staff nurses rated quality care higher than nurses who were non-staff. Results for substance use disorder were significant for both employer-provided education (b = 2.12, p = 0.039) and recent education (b = -2.29, p = 0.020). Nurses who had participated in employer-provided substance use disorder

education had higher quality care scores than those who did not have this education, while nurses

who participated in recent substance use disorder education had lower quality care scores than

those who did not have recent substance use disorder education. Lastly, harm reduction strategies

education was significantly related to quality care scores ($b = 2.30$, $p = 0.034$), meaning nurses

who participated in harm reduction education had higher quality care scores than those who did

not. About 15.3% of the variation in quality care scores was explained by the hospital, unit, and

nurse characteristics (Adjusted $R^2 = 0.153$). The adjusted R^2 suggests the model is, minimally

helpful in explaining quality care.

Table 26. Quality Care Linear Regression of Hospital, Unit, and Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	20.22	(13.82, 26.62)	< 0.001
Hospital			
Hospital size (no. beds)			
< 100	-0.92	(-5.22, 3.38)	0.672
100-249	-1.36	(-4.08, 1.36)	0.322
250-449	-0.19	(-2.50, 2.12)	0.872
450+ RC	-		
Rural vs. Urban	2.60	(-0.10, 5.30)	0.059
Teaching Status			
Academic Medical Center	0.77	(-1.57, 3.11)	0.514
Non-teaching Hospital	-0.10	(-2.40, 2.21)	0.935
Teaching Hospital RC	-	-	-
For Profit vs. Non profit	-0.83	(-2.78, 1.12)	0.402
Unit			
Unit type			
Emergency Dept.	-0.90	(-3.91, 2.12)	0.555
Critical Care Unit	-2.68	(-5.16, -0.19)	0.035
Med-Surg/Stepdown	-1.56	(-3.51, 3.94)	0.908
Maternal Baby RC	-		

Independent variable	Estimate (b)	95% CI for b	P-value
Unit size (no. beds)			
10 or less	0.47	(-3.69, 4.63)	0.823
11-20	-0.78	(-3.57, 2.02)	0.583
21-30	-1.56	(-4.24, 1.13)	0.253
Greater than 30 [RC]	-		
Nurse			
Age group (years)			
18-29	-9.19	(-14.9, -3.56)	0.002
30-49	-4.01	(-8.43, 0.41)	0.075
50-64	-5.02	(-9.34, -0.69)	0.024
65+ [RC]	-		
Education level			
Associates degree or Dipl.	-3.26	(-6.99, 0.47)	0.086
Bachelor's degree	-2.22	(-4.30, -0.14)	0.037
Master's/Doctoral degree [RC]	-	-	-
No. years practice			
5 or less [RC]	-	-	-
6-10	-0.36	(-3.79, 3.07)	0.837
11-20	-2.22	(-5.63, 1.20)	0.201
Greater than 20	-0.28	(-3.97, 3.40)	0.879
Staff vs. Non-staff nurse	2.29	(0.10, 4.48)	0.041
SUD education (Employer)	2.12	(0.11, 4.12)	0.039
SUD education (Recent)	-2.29	(-4.21, -0.38)	0.020
HRS Education	2.30	(0.24, 5.76)	0.034
HRS knowledge	-1.08	(-3.66, 1.49)	0.405

Adjusted R^2 = 0.153

Note. RC = Reference category.

Adverse Events

Multivariable linear regression findings for modeling adverse event scores are reported in

Table 27, after checking all assumptions and finding adequacy. Hospital teaching status was

significantly related to adverse event scores, specifically for academic medical centers compared to teaching hospitals ($b = 0.69$, $p = 0.041$). In this case, nurses who worked in academic medical centers experienced more adverse events related to patients with opioid use disorders, compared to nurses who worked in teaching hospitals. Unit type was also significantly related to adverse event scores, for critical care units ($b = 0.73$, $p = 0.036$) and medical-surgical/stepdown units ($b = 1.18$, $p = 0.022$) compared to maternal-baby units, thus nurses who worked in critical care and medical-surgical/stepdown units experienced more adverse events compared to nurses on maternal-baby units. Recent substance use disorder education was also significantly related to adverse event scores ($b = 0.58$, $p = 0.033$), meaning nurses who participated in recent substance use disorder education experienced more adverse events compared to nurses who did not participate in recent substance use disorder education. Eleven percent of the variation in adverse event scores was explained by modeling the hospital, unit, and nurse characteristics (Adjusted R^2 = 0.110). Based on the adjusted R^2, the model minimally explains the variance for the adverse event scores.

Table 27. Adverse Events Linear Regression of Hospital, Unit, and Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	0.48	(-1.31, 2.27)	0.598
Hospital			
Hospital size (no. beds)			
< 100	-0.76	(-1.88, 0.36)	0.179
100-249	0.64	(-0.69, 0.82)	0.866
250-449	0.07	(-0.58, 0.73)	0.822
450+ RC	-	-	-
Rural vs. Urban	0.51	(-0.19, 1.21)	0.152
Teaching Status			
Academic Medical Center	0.69	(0.03, 1.35)	0.041
Non-teaching Hospital	-0.06	(-0.66, 0.53)	0.832
Teaching Hospital RC	-	-	-

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
For profit vs. Non profit	0.02	(-0.53, 0.56)	0.957
Unit			
Unit type			
Emergency Dept.	0.70	(-0.11, 1.51)	0.090
Critical Care Unit	0.73	(0.05, 1.41)	0.036
Med-Surg/Stepdown	1.18	(0.17, 2.18)	0.022
Maternal Baby [RC]	-	-	-
Unit size (no. beds)			
10 or less	0.52	(-0.61, 1.65)	0.366
11-20	0.23	(-0.49, 0.95)	0.528
21-30	0.29	(-0.46, 1.04)	0.442
Greater than 30 [RC]	-	-	-
Nurse			
Age group (years)			
18-29	1.25	(-0.32, 2.82)	0.117
30-49	0.88	(-0.38, 2.13)	0.170
50-64	0.10	(-0.26, 2.25)	0.117
65+ [RC]	-	-	-
Education level			
Associates degree or Dipl.	-0.27	(-1.22, 0.67)	0.566
Bachelor's degree	-0.16	(-0.74, 0.42)	0.591
Master's/Doctoral degree [RC]	-	-	-
No. years practice			
5 or less [RC]	-	-	-
6-10	0.21	(-0.70, 1.12)	0.649
11-20	0.43	(-0.50, 1.36)	0.363
Greater than 20	0.37	(-0.61, 1.35)	0.456
Staff vs. Non-staff nurse	-0.02	(-0.64, 0.60)	0.946
SUD education (Employer)	-0.30	(-0.86, 0.26)	0.286
SUD education (Recent)	0.58	(0.05, 1.12)	0.033
HRS Education	0.14	(-0.59, 0.87)	0.708
HRS knowledge	0.25	(-0.42, 0.93)	0.461

Adjusted R^2 = 0.110

Note. RC = Reference category.

Satisfaction

Table 28 presents findings of joint modeling hospital, unit, and nurse characteristics of satisfaction scores after checking and meeting regression assumptions. Rural vs. urban hospital location ($b = 0.96$, $p = 0.047$) and recent substance use disorder education ($b = -0.73$, $p = 0.047$) were the only characteristics significantly related to satisfaction scores. Nurses who worked in rural hospitals had higher satisfaction scores than nurses in urban hospitals, and nurses who had participated in recent substance use disorder education had lower satisfaction scores than nurses who had not participated in recent education. Less than 1% of the variation in satisfaction scores was accounted for in this modeling (Adjusted $R^2 = 0.001$, thus, the model was not helpful in explaining variation in satisfaction scores.

Table 28. Satisfaction Linear Regression of Hospital, Unit, and Nurse Characteristics

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Intercept	4.93	(2.56, 7.30)	< 0.001
Hospital			
Hospital size (no. beds)			
< 100	-1.00	(-2.52, 0.53)	0.198
100-249	-0.47	(-1.49, 0.55)	0.365
250-449	-0.26	(-1.14, 0.63)	0.565
450+ RC	-	-	
Rural vs. Urban	0.96	(0.01, 1.90)	0.047
Teaching Status			
Academic Medical Center	-0.16	(-1.03, 0.72)	0.724
Non-teaching Hospital	-0.16	(-0.97, 0.65)	0.698
Teaching Hospital RC	-	-	-
For Profit vs. Non profit	0.33	(-0.42, 1.07)	0.388
Unit			

Independent variable	Estimate (*b*)	95% CI for *b*	*P*-value
Unit type			
Emergency Dept.	-0.36	(-1.43, 0.71)	0.510
Critical Care Unit	-0.71	(-1.63, 0.21)	0.129
Med-Surg/Stepdown	0.93	(-0.40, 2.26)	0.169
Maternal Baby [RC]	-	-	-
Unit size (no. beds)			
10 or less	0.53	(-0.98, 2.04)	0.488
11-20	0.80	(-0.18, 1.77)	0.108
21-30	0.16	(-0.85, 1.17)	0.752
Greater than 30 [RC]	-	-	-
Nurse			
Age group (years)			
18-29	-1.31	(-3.41, 0.79)	0.218
30-49	-0.52	(-2.17, 1.14)	0.538
50-64	-0.55	(-2.21, 1.10)	0.507
65+ [RC]	-	-	-
Education level			
Associates degree/Diploma	-0.43	(-1.68, 0.81)	0.491
Bachelor's degree	-0.43	(-0.83, 0.71)	0.881
Master's/Doctoral degree [RC]	-	-	-
No. years practice			
5 or less [RC]	-	-	-
6-10	0.02	(-1.19, 1.24)	0.969
11-20	0.11	(-1.14, 1.37)	0.857
Greater than 20	0.14	(-1.17, 1.45)	0.834
Staff vs. Non-staff nurse	0.40	(-0.43, 1.24)	0.341
SUD education (Employer)	0.58	(-0.17, 1.32)	0.128
SUD education (Recent)	-0.73	(-1.45, -0.01)	0.047
HRS Education	0.78	(-0.20, 1.76)	0.117
HRS knowledge	0.03	(-0.89, 0.95)	0.952

Adjusted R^2 = 0.001

Note. RC = Reference category.

What are nurses' experiences of how care for this population has been impacted by the COVID-19 pandemic?

In order to better understand nurses' experiences of how care for this population has been impacted, an open-ended question was included in the survey, soliciting nurses' insight regarding their experiences caring for this patient population during a pandemic. There were 92 responses for the question regarding impact of COVID-19 on experiences of caring for patients with a history of opioid use disorder or a history of injecting opioids. To analyze content, Colaizzi's method of data analysis was performed. Significant statements were extracted and listed. These statements were interpreted into formulated meanings. The formulated meanings were sorted into clusters of themes. These clusters were validated by comparing them to the original data. The cluster of themes were categorized as themes. These results were validated by another researcher. Based on the analysis, the following themes were identified:

1. Impact of COVID-19 on healthcare system
2. Impact of COVID-19 on patients with opioid use disorders

The data indicated than nurses often felt that the COVID-19 pandemic had a negative impact on the entire health care system, including time delays for all patients, impact of care for all patients, and impact of pandemic on staff. Further, the data suggested that nurses frequently felt that the pandemic had negatively affected outcomes for patients with opioid use disorders, specifically by increasing the number of patients with opioid use disorders in the hospital and associated complications, lack of resources, and that these patients were a lower priority in the hospital during the pandemic.

Table 29. Formulated Meanings of COVID-19 Impact (*n* = 92)

Significant statements	Formulated meanings
"COVID 19 has stressed the essence of the health care system. I am considering a job in Dollar General. I have 38 years in nursing, 22 in the emergency department. I am spent"	COVID-19 has impacted the entire healthcare system, including providers
"I think the pandemic has altered the entire healthcare system. So many patients had surgical delays, avoided the hospital out of fear, or suffered due to prolonged wait times in the emergency department. Opioid abuse patients has to have been affected too"	COVID-19 has impacted the entire healthcare system, including patients with opioid use disorders
"It hasn't changed our practices, but if non-emergent, they wait like anyone else"	COVID-19 has resulted in time delays for all patient populations
"Oh my goodness! Huge setbacks. Struggle just to get patients the bare minimum"	COVID-19 has impacted care of all people
"Jumped tremendously in the amount of patients we see with opioid use"	There has been an increase in the number of patients with OUD's
"Negatively. Rehabs are not taking patients like they used to"	There has been a lack of resources for patients with OUD's during the pandemic
"It has negatively impacted quality of care for people with opioid use disorders by closing many of our local treatment centers and limiting peer support in the emergency department"	There has been a lack of community resources for patients with OUD's during the pandemic which has led to a decrease in quality of care
"COVID has increased this patient population and there are still not enough treatment facilities for these folks to go to"	There have been an increase in patients with OUD's during the pandemic and less resources available
"During pandemic, timeliness has been a challenge regarding delays in treatment. Inpatient beds for chemical dependency were limited"	There has been a lack of community resources for patients with OUD's during the pandemic
"I feel that the mental stress of the pandemic has made mental health concerns greater, thereby complicating treatment"	The pandemic has complicated care of this patient population due to the toll the pandemic has had on mental health

Significant statements	Formulated meanings
"It has caused them to be put on the back burner"	Patients with OUD's have not been prioritized
"During the waves of COVID (and subsequent uptick in alcohol and substance abuse) I feel I've noticed nurses be more resentful of someone taking up an ICU bed due to an overdose. After two plus years of patients severely ill with COVID, overdose patients aren't seen as a priority"	The pandemic has led to increased stigma of people with OUD's and these patients are not a priority

Table 30. Developing Clusters of Themes and Themes From Formulated Meanings

(COVID-19)

Formulated meanings	Cluster of themes	Emergent themes
COVID-19 has impacted the entire healthcare system, including providers	Impact on all providers	Impact of COVID-19 on healthcare system
COVID-19 has impacted the entire healthcare system, including patients with opioid use disorders	System impact on all patients	
COVID-19 has resulted in time delays for all patient populations	Time delays for all patients	
COVID-19 has impacted care of all people	Impact of pandemic on all people	
There has been an increase in number of and people using opioids and subsequent complications associated with opioids due to pandemic	Increase in number of patients and complications	Impact of COVID-19 on patients with opioid use disorders
There are fewer resources available to people with opioid use disorders	Fewer resources	

Formulated meanings	Cluster of themes	Emergent themes
Patients with OUD's have not been prioritized during the pandemic	Lower priority	

Chapter Summary

A survey designed to understand nurses' experiences caring for patients with a history of opioid use disorder or self-injection of opioids was distributed to members of three nursing associations: American Association of Critical Care Nurses, Emergency Nurses Association, and Association of Women's Health, Obstetrics, and Neonatal Nurses. A total of 179 respondents met inclusion criteria and consented to participate, all of whom worked in hospitals and in areas where there were patients with opioid use disorders. Less than half of the respondents had received any employer education regarding substance use disorders, and less than half had participated in recent education regarding substance use disorders. Thirty-eight percent of the participants had participated in any education regarding harm reduction strategies, and 44.7% of the participants had any knowledge regarding harm reduction strategies.

To understand nurses' experiences caring for this population, questions from the survey were scored and means for scores for restrictive safety, effective care, quality care, adverse events, and satisfaction were estimated. Nurses tended to experience a low number of restrictive safety events and an average number of adverse events related to patients with opioid use disorders. Further, the nurses tended to experience an average number of effective care interventions, and rated quality care and satisfaction as average.

Bivariate analyses suggested various associations with all of the nurses' experiences, including restrictive safety, effective care, quality care, adverse events, and satisfaction. Substance use disorder education (employer-provided and recent), and harm reduction education

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and knowledge were the most common variables associated with nurses' experiences. Employer provided substance use disorder education was associated with restrictive safety, effective care, quality care, and adverse events scores. Recent substance use disorder education was associated with effective care and adverse event scores. Harm reduction education was associated with all of the experiences, and harm reduction knowledge was associated with restrictive safety, effective care, adverse events, and satisfaction scores.

Based on median regression analysis, when adjusting for other hospital and unit characteristics, unit type (critical care versus mother baby units) and age group (30-49 years vs. 65+ years) were significantly related to restrictive safety scores. When adjusting for all hospital, unit, and nurse characteristics, unit type (emergency department and critical care unit compared to mother baby unit), age group (18-29 and 30-49 compared to 65+), and harm reduction education were significantly related to restrictive safety scores.

Adjusting for nursing characteristics, employer-provided SUD education was significantly related to effective care scores, while adjusting for hospital, unit, and nurse characteristics suggested that nurses' age (18–29 and 50–65 compared to 65+) and recent substance use disorder education were significantly related to effective care scores.

In a model adjusting for only hospital and unit characteristics, quality care scores were predicted by unit type (critical care versus mother baby), nursing age (18–29 vs. 65+), number of years in practice (11–20 years vs greater than 20 years), and substance use disorder education (recent and employer-provided). When adjusting for all characteristics (hospital, unit, and nurse), unit type (critical care versus mother baby), age (18–24 vs. 65+), role (staffing vs. non staffing), employer-provided and recent education for substance use disorder and education for harm reduction strategies were significantly related to quality care scores.

Adverse event scores were associated with hospital size (hospitals with less than 100 beds vs. hospitals with 450 or more beds), hospital status (academic medical center vs. teaching hospital), unit type (critical care or medical/surgical/stepdown vs. mother-baby unit), and recent substance use disorder education, when adjusting for other hospital and unit characteristics. When adjusting for all variables, hospital status academic medical centers vs. teaching hospitals), unit type (critical care and medical surgical/stepdown compared to mother baby units), and recent substance use disorder education were all associated with adverse event scores.

Based on a model adjusting for nurses' characteristics, satisfaction scores were associated with whether or not nurses had participated in recent substance use disorder education. In a model adjusting for hospital and unit characteristics, satisfaction scores were not associated with any of the variables. When adjusting for all hospital, unit, and nursing characteristics, hospital location (rural vs. urban) and recent substance use disorder education were associated with nurse satisfaction scores.

Open-ended questions were analyzed to better understand respondents' experiences in equitable, patient-centered, and timely care of patients with opioid use disorders. Themes identified for equitable care included (a) Recognized stigma, (b) Unrecognized stigma, (c) System issues that influence equitable care, and (d) Impact of inequitable care. Themes identified for patient-centered care were (a) Nonpatient-centered care goals, (b) Patient-centered care goals, and (c) Factors that contribute to lack of patient-centered care. Themes identified for timely care were (a) Medication delays, (b) System-related delays, and (c) Patient-related delays.

To better understand how nurses' experiences caring for patients with opioid use disorders was impacted by the COVID-19 pandemic, answers to open-ended question were analyzed. Two themes were identified: (a) Impact of COVID-19 on healthcare system, and (b)

Impact of COVID-19 on patients with opioid use disorders. The themes include nurses'

experiences of how all patient care has been negatively impacted by the pandemic, as well as

impact on health care staff. The themes also include how care for patients with opioid use

disorders have been negatively impacted amidst COVID-19, with increases in number of patients

with opioid use disorders, fewer resources for these patients, and lower prioritization of patients

with opioid use disorders.

CHAPTER V: DISCUSSION

The purpose of this study was to (a) examine nurses' experiences of care for hospitalized patients with a history of opioid use disorder or self-injection of opioids, (b) understand what hospital, unit and nurse characteristics influence nurses' experiences of caring for this population. A secondary aim of the study was to understand how nurses' experiences caring for this population have been impacted by the COVID-19 pandemic. This chapter includes a discussion of the findings in this study, strengths and limitations of the study, implications for hospital care of patients with opioid use disorders, and recommendations for future research.

Discussion of Findings

Most of the participants in this study were staff nurses working in hospitals and were between 30 years of age to 64 years. Participants held various levels of education; the bachelor's degree in nursing was the most common nursing degree of the participants, which is reflective of the current nursing workforce (American Association of Colleges of Nursing, 2019). There was a wide range of nursing experience among the nurses, from less than one year to greater than 20 years.

The nurses in the study worked at hospitals that varied in size, from less than 100 beds, to more than 450 beds. Most of the hospitals were in urban areas and were non-profit status. The unit sizes varied in size as well, from less than 10 beds to greater than 30 beds. The nurses worked in emergency departments, critical care units, medical surgical units, stepdown units, labor and delivery units, and mother baby units.

Less than half of the participants stated their hospital employer had formal policies that addressed the care of patients with a history of opioid use disorders or self-injection of opioids; similarly, less than half of the participants stated the hospital where they worked had informal

policies that addressed the care of these patients. Despite the need for hospital providers to be

prepared to address and treat substance disorders, only 41.9% of nurses had received education

from their employers regarding substance use disorders, and only 45.3% had participated in

recent substance use disorder education. Even more surprising is the fact that so few nurses had

participated in any education regarding harm reduction strategies (38%), and only 44.7% of the

respondents had any knowledge about strategies aimed at reducing harm for people with opioid

use disorders. According to the Institute for Healthcare Improvement and the Grayken Center for

Addiction's recommendations for hospitals in responding to the opioid crisis, one system-level

strategy for hospitals is to reduce the harms of substance abuse disorders (Botticelli et al., 2019),

yet, the majority of the nurses were unsure or did not have any knowledge of harm reduction

strategies in addressing care of people with opioid use disorders. These results are consistent

with previous research that suggests nurses are not prepared to care for people with substance

use disorders and need more education regarding substance use disorders (Horner et al., 2019).

Quantitative Findings

Restrictive Safety

In general, nurse participants did not experience a high number of restrictive safety

measures implemented in the care of patients with opioid use disorders. The restrictive safety

measures included interventions aimed at improving safety for patients, and include restrictions

that are not typically extended to other populations, such as removal of patients' belongings,

restrictions of visitors, or 1:1 staff-patient observation. In general, restrictive safety interventions

may provide an effective means to reduce in-hospital use of illicit drugs, but they may also

infringe upon patients' rights and lead to negative outcomes, such as leaving the hospital against

medical advice (Simon et al., 2019; Taylor et al., 2020). The most commonly experienced

restrictive safety intervention was removal of patients' belongings from the room. Patients with substance use disorders who come into the hospital are at increased risk of harming self or others (Murphy & Bird, 2019), and in those cases, managing patient access to belongings may reduce the risk of self-harm (Donovan et al., 2021). However, routinely searching or removing patients' belongings for patients with a history of opioid use disorder or self-injection of opioids is not a patient-centered response to treating this patient population.

The two restrictive interventions experienced least by nurses were "observation of patient by security camera and "dedicated units that provide care of patients with a history of opioid use disorder of self-injection of opioids." Monitoring patients by video camera is an alternative intervention to 1:1 observation by an employee, and has been used to observe patients with cognitive and behavioral concerns, including patients with a history of substance use (Abbe & O'Keeffe, 2021; Taylor et al., 2020). Because the safety and effectiveness of this intervention has not been established, this intervention may not be commonly employed, resulting in a smaller number of participants who have experienced this practice. Similarly, dedicated hospital units for people with substance use disorders who are acutely ill may not be commonly employed but has been mentioned in the literature as a means to reduce in-hospital use of illicit drugs (Taylor et al., 2020) and was anecdotally discussed by field experts.

Restrictive safety scores tended to be lower in mother baby units compared to critical care units or medical-surgical/stepdown units. These differences may be attributable to various reasons such as differences in populations of patients. Hospitalizations related to opioid use disorders have increased, as have the rate of neonatal abstinence syndrome and maternal opioid-related diagnoses. In a cross-sectional analysis study, researchers studied 11.8 million hospitalizations from 47 states and the District of Columbia, and estimated that the neonatal

abstinence syndrome had increased by 3.3 per 1,000 birth hospitalizations and the maternal opioid-related diagnoses had increased by 4.6 per 1,000 delivery hospitalizations from 2010 to 2017 (Hirai et al., 2021). While these hospitalizations have increased, the number of patients in mother baby units with opioid use disorders may either be lower than the number of people who are acutely ill in other units in the hospitals, or there may be something inherently different from the patient in mother baby units, compared to other areas. In either case, there may not be as much of a perceived need for restrictive safety in these areas. Based on the open-ended questions in this study, participants who worked in mother baby areas frequently mentioned that their patients were more motivated (to not use opioids), which may reduce the perception that restrictive safety is necessary. In a qualitative study of motivators and barriers in treatment for substance use disorders for pregnant women, women identified baby's health, readiness to stop using substances, concerns of custody of baby, and seeking safe housing as motivators for seeking treatment (Frazer et al., 2019).

There was also a trend in younger age predicting lower restrictive safety scores. Perhaps younger nurses were more likely to work in areas with less restrictive safety interventions, or perhaps their perceptions regarding restrictive safety interventions were different because of their age. On the other hand, harm reduction education tended to predict higher restrictive safety scores. The premise of harm reduction is to meet people where they are, and it is possible that nurses who had received education regarding harm reduction strategies were more likely to recognize restrictive safety interventions, and hence have a higher score. However, nurses who work in areas with more restrictions may have access to harm reduction interventions, simply because they are working in areas with more people with opioid use disorders, and have access to education regarding harm reduction.

Effective Care

The average scores for care experiences for effective care were midrange. For effective care, participants noted that they experienced the effective care intervention of pain treatment more often than the other effective care interventions. Based on current evidence, pain can complicate care for patients with opioid use disorders and patients with opioid use disorders fear inadequate pain management while in the hospital (Summers et al., 2018; Velez et al., 2017). The effective care intervention experienced least often was addiction medicine consult. According to the literature, addiction medicine consults are feasible and provide an opportunity for patients with substance use disorders to address important needs that are specific to their substance use (Fanucchi & Oller, 2019; Marks et al., 2019; Trowbridge et al., 2017). Research suggests that addiction medicine consults increase the likelihood that a hospitalized patient with an opioid use disorder will receive medication replacement therapy, however, the evidence related to mortality and morbidity is unclear.

Similar to restrictive safety scores, being younger tended to predict lower effective care scores. There may be something different about younger nurses that changes the way they perceive effective care interventions for this population, but there may be something different about the environments where these nurses work. There was also a trend in employer-provided substance use disorder education predicting higher effective care scores, which may be related to the education itself, or it may be that nurses who work in areas in areas with more effective care interventions are more likely to receive education regarding substance use disorders.

Quality Care

The scores for quality care were midrange, meaning, the nurses tended to rate quality care as average. For quality care, more nurses tended to agree that the policies and practices promoted

the safety of patients compared to other quality aims. Fewer nurses agreed that the policies and practices were efficient, compared to the other quality aims. These nurses' experiences of safety and efficiency take into account how each respondent defines safety and efficient care, which may include bias and stigma. If a nurse feels negatively towards people with opioid use disorders, they may not feel that addressing these patients' needs is an optimal use of resources, and regardless of whether the policies or practices are efficient, the nurse may rate this question lower. Similarly, if a nurse believes that the best way to manage patients with opioid use disorders includes an abstinence approach, the nurse may believe that preventing the patient from using any opioids is more important than the rights of the patient, and such, would rate safety as higher because the policies are aimed at restricting illicit use of drugs. On the contrary, restrictive policies may actually contribute to poor patient outcomes, including patients leaving the hospital against medical advice.

Quality care scores tended to be higher for nurses who had participated in employer-provided education and lower for nurses who had participated in recent substance use education. It is possible there was something about the employer-provided substance use disorder education that changed the way nurses experienced quality care in their areas. In one study, researchers studied the effect of an educational caring program on nurses' attitudes and perception of caring behavior toward patients with substance use disorders (Zewiel et al., 2020). Nurses' attitudes and perception toward caring for people with substance use disorders significantly improved; the researchers suggested this would improve the quality of care the nurses delivered when caring for this patient population. On the other hand, participating in recent education about substance use disorder that is independent of the hospital may provide nurses with different insight regarding the care they are providing in their facilities. Further, "recent" was not defined in the

survey, such that nurses may have participated in substance use disorder education that was not current or evidence-based.

Similar to other experience scores, age and unit type tended to predict quality care scores. Restrictive safety scores tended to be higher for nurses working in critical care units compared to mother baby units, which may have impacted the overall quality scores; nurses in critical care units experience more restrictions on patients, and perhaps do not experience as high a level of quality care. Quality care scores tended to be lower for younger nurses, which may be reflective of their perceptions or environments.

Nurses who had a bachelor's degree tended to have lower quality care scores than nurses with a master's degree or doctoral degree. The differences in scores based on education may be related to some knowledge that persons with higher levels of education may have attained, that change the way they understand the aspects of quality of care. It also may be that nurses with a master's or doctoral degree were more likely to have created the policies than nurses with a bachelor's degree because they are in administrative positions. Interestingly, nurses who identified as staff nurses had higher quality scores than nurses who were in non-staff nursing positions. Nurses who are providing the care may feel differently about quality of care than nurses who are not providing direct care to patients.

Adverse Events

Most of the nurses had experienced at least one adverse event with patients with substance use disorders. Participants most commonly experienced patients leaving the hospital against medical advice, compared to other adverse events. Close to all (97.5%) of the participants in this study responded they had experienced patients leaving the hospital against medical advice, which aligns with current evidence. Substance use disorders are associated with

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a high number of discharges against medical advice, with one study suggesting that approximately one in 10 substance use disorder-related hospitalizations resulted in discharge against medical advice (Zhu & Wu, 2019). In the same study, discharge against medical advice was most frequent among patients with opioid use disorders, compared to other substance use disorders.

Participants experienced patients retaining medications administered by staff (to use or inject later) with 22.6% of the respondents stating they had experienced patients retaining medications for later use. Research suggest that patients with opioid use disorder may use illicit drugs while in the hospital (Strike et al., 2020). In some cases, providers may be aware of this behavior, in some cases, they are not aware. One form of drug misuse occurs when patients retain medications provided by hospital staff for later use, such as retaining an opioid pain medication, crushing the pill, and injecting the pill into an intravenous line. This particular behavior may not be common, which would result in a lower percentage of nurses responding they had experienced this activity. Alternatively, this activity may be more common, but the nurse respondents were unaware because the behavior is concealed by patients. In one study, illicit drug use was identified in 40.5% of hospitalized patients with serious infections related to injection drug use (Fanucchi et al., 2018).

One trend suggested that nurses who worked in academic medical centers experienced more adverse events scores compared to nurses who worked in teaching hospitals (without a medical school affiliation). It may be that these areas had more adverse events associated with the care of people with substance use disorders. Similar to other experiences, nurses who worked in critical care units tended to experience more adverse events related to patients with opioid use disorders than nurses in mother baby units. Nurses who worked in medical-surgical/stepdown

units tended to experience more adverse events compared to nurses working in mother baby units. These findings support other trends in this study that there are differences in nurses' care experiences of people with opioid use disorders in mother baby units compared to other units. Nurses who had participated in recent education about substance use disorders tended to experience more adverse events related to patients with opioid use disorders. Perhaps there was something different about the area where these nurses practiced that motivated them to seek education, or the education itself changed the way they experienced care.

Satisfaction

Most of the participants had neutral satisfaction scores, meaning most nurses rated their experiences as neither "very satisfied" or "not at all satisfied" at all. None of the participants rated their experiences caring for people with opioids use disorders as being "very satisfied." Nurse dissatisfaction can negatively impact patient outcomes, including patient satisfaction and adverse events (Richter & Beauvais, 2018). While this study did not aim to understand how nurse satisfaction impacts quality care, it is an important consideration for future research for this population.

Qualitative Findings

Equitable Care

Four themes emerged from the open-ended survey item regarding equitable care, which include (a) unrecognized stigma, (b) recognized stigma, (c) system issues that influence equitable care, and (d) impact of inequitable care. Many of the participants discussed their experiences caring for this population, with evidence of stigma and bias caring for this population, but the participants may not have been aware they had negative bias against this population. Stigma can be defined as a label of shame on the basis of a situation or a personal characteristic (Wogen &

Restrepo, 2020; Zwick et al., 2020). For example, one participant stated, "I believe the individual care is good. Whether the patient wants to get help is another question," and another stated, "very hard to take care of, very manipulative." In these examples, the participants discussed equitable care from the perspective of patient factors that prevented equitable care. However, equitable care is defined as care that is based on patients' needs, rather than individual characteristics, and these statements imply that these patients do not deserve equitable care, simply because of individual characteristics associated with the substance use disorder.

Another theme that emerged from the participants' comments was recognized stigma; in these cases, the participants identified that patients with opioid use disorders did not receive equitable care because of provider stigma and bias. For example, one statement was "… There is still stigma around these patients and some make unprofessional comments," and another "I feel this [equitable care] is completely dependent upon the provider for each patient. Each case is different and based more on patient's attitude …" These respondents and others discussed provider stigma that prevents equitable care, which supports the first theme, that provider stigma and bias exists, and can impact equitable care of this population. Stigma regarding substance use disorders creates barriers to optimal health outcomes and impacts the continuum of care, including seeking treatment, treatment retention, choice of treatment, and treatment adherence (Zwick et al., 2020).

Nurse participants also identified system factors that prevent equitable care of people with opioid use disorders. One participant stated, "I think some policies separate and stigmatize the patients, and I have seen the policies not work and patients not be given pain meds. I wish policies were more patient focused, meeting them (patients) where they are …" It is important that hospital employ polices that support quality care for all patients, including patients with

opioid use disorders. The Institute for Healthcare Improvement and the Grayken Center for Addiction approaches hospital care of people with substance use disorders from a systems-approach, providing hospitals with system-level interventions to improve outcomes for this population, including addressing stigma (Botticelli et al., 2019).

Another example of a system-level factor that prevents equitable care was education. One participant stated, "anything nurses know is from our own research and bringing it to the job," and another stated, "we could use more education on best practices and it seems like their pain is not easy to control." These statements confirm current literature and findings in this study that nurses often do not have adequate education regarding caring for people with substance use disorder, including harm reduction strategies.

The last theme that emerged from the comments regarding equity was the impact that inequitable care has, including impact on patient outcomes, community and staff. One respondent discussed that inequitable care led to poor management of pain, stating, "I have found that a history of substance use will render a patient exempt from meaningful pain management by the primary team." Current literature indicates that hospitalized patients with opioid use disorders fear inadequate pain and withdrawal management (Summers et al., 2018; Velez et al., 2017). Other participants referred to the impact on staff such as, "… so caring for them in house becomes a stress to the staff," and "… the hospital staff is overtasked and held responsible for the patients' actions …" In a qualitative study of physicians who work with patients with opioid use disorders, 70% of the providers reported feeling a range of negative emotions caring for this patient population, with 24% of those experiencing burnout as a result of the interactions (Dhanani et al., 2022). In the same study, many of the providers expressed that lack of training,

lack of resources, and misunderstanding of patient behaviors contributed to the stress, burnout, and negative emotions they experienced.

Patient-Centered Care

Three themes emerged from the respondents' comments for the open-ended question regarding patient centered care: patient-centered goals, non-patient-centered goals, and factors that contribute to a lack of patient-centered care. Respondents frequently referred to patient's goals being different from the care team goals, and perceived that patients' goals were often focused on immediate needs. One respondent stated, "so, their goals are different from ours sometimes. It seems they want a quick bandaid or a stop to the pain they are in without really getting to the bottom of their issues." Another participant stated, "the individual often wants stabilization and to be released or leave AMA [against medical advice] ASAP [as soon as possible]." Many of the participants recognized that the goals of care were not patient-centered, and discussed non-patient-centered goals. One participant stated, "I don't think enough providers ask, and listen to what the patient's goals are. What would be the reaction to, 'I just don't want to lose my arm, and I plan to continue to use because I don't want to stop'? I have seen providers shut down to similar statements because the help the patient wants is not what the provider thinks they should help with. I have also seen providers truly discuss options in a nonjudgmental way, and sometimes the outcome is actually better." Care for patients with substance use disorders has historically been abstinence and program-based, rather than patient-focused (Rastegar, 2021). Patient-centered care should take into consideration what the patient's needs, preferences, and values are, and include harm reduction services that are provided without conditions.

The last theme that emerged from the comments regarding patient-centered care was factors that contribute to a lack of patient-centered care. According to one participant, "Our

closest methadone clinic is an hour away. Most of us have little idea how to get them connected to this clinic," and another participant stated, "… We have not received enough education or best practice on how to talk with patients who want to leave AMA [against medical advice]." The comments point to a lack of resources and lack of training to adequately care for this patient population.

Timely Care

Four themes emerged from the question regarding timely care: medication delays, system-related delays, patient-related delays, and impact of delays in care. Participants frequently discussed medication delays, for example, "We have a horrible problem with patients not getting the meds ordered or delivered in a timely manner. Withdrawals run rampant … patients go into withdrawal after heart surgery!" Several studies have revealed medication delays for hospitalized patients with opioid use or substance use disorders. In one qualitative study, patients discussed that providers did not always believe their reported pain level, and that providers ignored opioid tolerance levels and requests for higher doses of pain medication (Strike et al., 2020). Other studies report that patients with substance use or opioid use disorders fear inadequate pain management when needing hospital care, which can lead to delays in seeking care (Bearnot et al., 2019; Carusone et al., 2019; Velez et al., 2017).

Participants also discussed patient-related issues that led to actual or perceived delays in care. Some of the participants identified that either patient perception or patient lack of understanding contributed to what seemed to be delays in care. One participant stated, "They [patients] are usually on the call light more than other patients when they have meds due. I believe they receive timely care." While the nurse believed that timely care occurs, they imply that the patient does not perceive timely care because of desire to have pain management.

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Another theme identified in the comments regarding timely care was system-related delays, including, provider-related delays, hospital-related delays, and delays related to a lack of resources. One participant discussed how the healthcare system and hospital policies can prevent timely care, "Unnecessary delays can be from numerous issues within a healthcare system. The best prevention would be establishing protocols and order sets that reflect best practices and empowering nurses with effective strategies to promote safety." Other participants discussed how a shortage of resources can delay timely care, such as, "Care is sometimes fragmented due to limited resources, and/or adequate staffing to provide 1:1 care, expertise with this population, and a lack of family support." This emerging theme identifies factors that move beyond individuals, and point to issues that occur because of a lack of system support. In the case of provider-related factors, policies or protocols may reduce variations in care that occur because of provider differences. Researchers have identified that the provision of medications for opioid use disorders is often not standardized within medical care, creating an institutional barrier that should be addressed (Madras et al., 2020). This theme points to a need for standardized practices and adequate resources that better support timely care for this population.

The last theme identified from the question regarding timely care was the impact of delays in care for patients with opioid use disorders, including patients leaving the hospital against medical advice, loss of trust between provider and patient, and patient agitation. One participant stated, "Delays in care tend to make these situations worse. Patients get agitated, feel like they aren't being listened to. It's not uncommon that I've had people leave against medical advice." Participants not only discussed that delays in care exist, but that they can negatively impact patient outcomes.

In general, the open-ended questions helped to inform the results of the study regarding equitable, patient-centered, and timely care of people with opioid use disorders. These components of quality have been identified in the literature for hospitalized patients with opioid use disorders. Equitable, timely and patient-centered care are complicated concepts, and it is difficult to understand how nurses experience these from one question on a Likert scale; the open-ended questions were designed to better understand how nurses experience these components of care. The content analysis of these questions provided a richer understanding of the nurses' experiences, highlighting stigma that some nurses were unaware of, and stigma that some providers were able to identify. While not all participants discussed experiences of inequitable, non-patient-centered, or untimely care, most participants discussed experiences of care that was not equitable, patient-centered, or timely. These results fill a gap in the literature regarding nurses' experiences of care for patients with opioid use disorders. Only two studies in the review of literature included care providers' experiences of care for these patients, and only one of the studies focused exclusively on nurses' experiences (Horner et al., 2019).

COVID-19 Impact on Care of Persons with Opioid Use Disorders

Two themes emerged from the responses to the open-ended question regarding how care experiences have been impacted by the COVID-19 pandemic. These themes included the impact of COVID-19 on the healthcare system, and the impact COVID-19 has had on patients with opioid use disorders. Many of the participants identified that the pandemic affected all of healthcare, with impacts on all patients and providers, including time delays for all patients. One participant commented, "I think the pandemic has altered the entire healthcare system. So many patients had surgical delays, avoided the hospital out of fear, or suffered due to prolonged wait times in the emergency department …" According to an issue brief released by the United States

Department of Health and Human Services, the COVID-19 pandemic has placed significant

stress on the health care workforce, resulting in increased health provider burnout, trauma, and

exhaustion (Secretary for Planning and Evaluation, 2022). The stress of the pandemic

compounded existing workforce burnout in a health care system that was plagued with shortages

prior to the pandemic, with the most critical staffing shortages occurring during peaks in

COVID-19 cases. The effects of the pandemic will likely persist beyond the pandemic, and the

Office of the Secretary for Planning and Evaluation recommends that the impacts of the

pandemic as well as the problems hospitals health care systems faced prior to the pandemic

should be addressed in order to build a more resilient workforce.

The second theme that emerged from the data was the impact the pandemic has had on

patients with opioid use disorders. Several participants discussed lack of beds in rehabilitation

facilities as a result of the pandemic, including, "It has negatively impacted quality of care for

people with opioid use disorders by closing many of our local treatment centers and limiting peer

support in the emergency department." Increases in substance use and drug overdoses have

increased in the United States since the pandemic (NIDA, 2022), and research suggests that

substance use disorder treatment facilities have not had the resources to implement infection

control measures, resulting in delayed treatment initiation for patients in need of treatment

(Pagano et al., 2021). This problem is not limited to the U.S.; in a study of 177 addiction

medicine professionals from 77 countries, respondents completed a questionnaire regarding

health responses during the pandemic (Radfar et al., 2021). Participants reported that substance

use disorder treatment and harm reduction services had been significantly impacted by the

pandemic, with 41% of countries reporting partial discontinuation of harm-reduction services,

such as needle and syringe programs. Fifty-seven percent of overdose prevention interventions

and 81% of outreach services had been negatively impacted. Additionally, 37.5% of the countries represented in the study experienced shortages of methadone or buprenorphine.

Overall, the participant comments regarding how care has been impacted by the COVID-19 pandemic support that care of people with opioid use disorders has been negatively impacted. The results also provide evidence that the pandemic has had a widespread impact on the entire health care system. Based on the results and current evidence, the pandemic worsened issues that already existed in health care and in the care of people with opioid use disorders. Over two years into the pandemic, the entire health care system is struggling with staffing shortages, staff burnout, and there is evidence of widening disparities for people with substance use disorders.

Conclusion of Findings

This study utilized the Six Domains of Health Care Quality as a framework to better understand nurses' experiences of hospital policies and practices for people with a history of opioid use disorders or self-injection of opioids. The Six Domains provided a useful framework for designing the survey and to facilitate the understanding of these care experiences. Open-ended questions regarding equity, patient-centeredness, and timeliness facilitated a better understanding of nurses' experiences of these components of quality care. The Six Domains have recently been used in research to explore the impact of a tele-education practice project aimed at improving mental health outcomes for underserved populations (Sockalingam et al., 2021). In another study, researchers utilized the Six Domains to analyze care in 27 trauma care facilities (Aragon et al., 2022). To date, the current study appears to be the only study utilizing the framework to assess nurses' experiences, or care for people with opioid use disorders.

The results reported in this study include insight from a national sample of nurses who work in hospitals caring for patients with opioid use disorders. This is the first quantitative study

which examines nurses' experiences of hospital policies and practices for this population. The majority of the participants had not participated in education regarding substance use disorders or harm reduction strategies. The majority of the participants did not have knowledge regarding harm reduction strategies. The results indicate a need for more education for nurses working in hospitals regarding substance use disorders and harm reduction strategies. The results also indicate a need for standardized policies in hospitals that are based on current evidence, in order to facilitate the delivery of quality care for patients who are acutely ill and have a history of opioid use disorders. There were trends in factors that influenced nurses' experiences of care for this population, including hospital size, hospital teaching status, unit type, age, years in practice, nurses' role, education level, substance use disorder education, and harm reduction education; these findings provide insight into how care for this population can be improved.

Limitations

This study has several limitations that should be considered. The participants in the study were recruited from three professional nursing associations, and while the sample frame was randomly selected from the associations' members' lists, the sample of nurses may not be representative of all nurses in practice. However, observed nurse demographics aligned with nursing profession demographics.

The survey was developed utilizing the tailored design method, including methods such as minimizing the total time to complete survey, order of questions (to reduce bias), and question format. This survey was tested in a pilot survey, and while the pilot results supported the face validity of the survey, the survey may lack construct validity. Specifically, the quality care scale contained questions regarding complex constructs, such as equitable care and patient-centered care. Nurses were asked to rate their experiences of whether the policies and practices were

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equitable or patient-centered, and were provided a brief definition of these terms. These definitions may not be the only ones pertinent to this area. Patient-centered care has been measured by multiple tools that contain multiple subscales (Hudon et al., 2011), and similarly, researchers identified multiple tools to measure health equity, each with multiple subscales (Ash et al., 2021). The items in the quality care only reflect those included and may be narrower than the full nature of the intended constructs, such as equitable care, patient-centered care, efficacy, safety, or timeliness included in quality of care.

Other than the quality care experience scale, the internal consistency of the nurses' experiences was below an acceptable threshold coefficient value of 0.7 (for Cronbach's alpha or KR-20). These scales have not been used in the past, thus, additional questions should be considered if these experience scales were to be used again.

Implications

In order to improve health care in the United States, the Institute of Medicine defined quality care with six aims: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity (Institute of Medicine, 2001). The aims provide a structure with which to define and improve health outcomes for individuals and populations. Amidst the opioid epidemic, research describes an increase in emergency department visits and hospitalizations related to opioid use (Guy et al., 2018; Hsu et al., 2017; Salzman et al., 2020; Singh & Cleveland, 2020; Tedesco et al., 2017). The Institute for Healthcare Improvement and the Grayken Center of Addiction have provided improvement recommendations for hospitals responding to the opioid crisis, including identifying and treating opioid use disorder, modification of opioid prescribing practices to reduce harm and enhance benefits, training stakeholders regarding risks of opioid use disorder

and how to reduce stigma, identification and screening of people at high risk of developing

opioid use disorders, and reducing the harms of substance use disorders.

Despite these recommendations, this study revealed that nurses caring for this patient

population experienced a lack of standard practices to guide care for this population and lacked

education regarding substance use disorders and harm reduction strategies. Further, many of the

participants either revealed unrecognized stigma or observed stigma in the care of patients with

opioid use disorders. The results of this study suggest that bias and stigma may prevent quality

care, including equitable, patient-centered, or timely care. These results are consistent with

previous reports from patients who report stigma in hospitals, and may result in negative patient

outcomes, including leaving the hospital against medical advice and avoiding seeking care

(Bearnot et al., 2019; Biancarelli et al., 2019; Summers et al., 2018; Velez et al., 2017), The

findings are consistent with previous reports from health care providers who confirm perceptions

and experiences of stigma and bias for this patient population (Biancarelli et al., 2019; Horner et

al., 2019).

Standard practices aimed at improving quality of care may help to address stigma and

bias. In a qualitative study of hospital nurses caring for patients with opioid use disorders, nurses

recommended more streamlined care and felt that nurses should have expanded roles in creating

policies to care for this patient population (Horner et al., 2019). These policies should aim to

reduce harm in this patient population and nurses should have an understanding of harm

reduction strategies. While harm reduction strategies have been widely incorporated in

community-based care, more hospitals should provide education to staff regarding harm

reduction and implement more harm reduction strategies into policies and practices for care of

patients with opioid use disorders. For example, all nurses working with this population in

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hospitals should be aware of overdose prevention and infection prevention for patients who use opioids and self-inject opioids. These nurses should have adequate training to support and educate patients regarding strategies to avoid overdose and infections from the use and injection of opioids. Further, nurses should be trained regarding medication assisted recovery (MAR), so they are able to advocate for the use of opioid replacement medications such as methadone and buprenorphine. In a qualitative study, nurses received formal training for medication treatment for opioid use disorder and identified increased job satisfaction; the nurses were identified as being vital in enhancing access to medication replacement therapy for opioid use disorders (Radmall et al., 2022).

In addition to harm reduction education, hospitals should provide education to nurses regarding substance use disorders, utilizing the brain disease model of addiction, including definitions of addiction and substance use disorder that help nurses understand behaviors associated with addiction as a part of the disease itself. Research supports that education aimed at reducing stigma for patients with substance use disorders may provide nurses with increased confidence and improved attitudes working with patients who have substance use disorders (Jackman et al., 2020; Russell et al., 2017). Education regarding this population should include use of appropriate and inclusive language, as stigmatizing language contributes to implicit bias and lack of patient engagement (Werder et al., 2022).

Education regarding substance use disorders and harm reduction should also be built into nursing school curriculum and may lead to a cultural shift in reducing stigma and bias in this patient population. Historically, nursing education curricula has not adequately covered the complex nature of substance use disorders, and new graduate nurses have entered the workforce without adequate preparation to care for this patient population (Farrell, 2020). Increasing the

amount of content time and clinical experiences specific to caring for patients with substance use disorders may help to improve care for this population. Several studies suggest that nursing students have negative attitudes towards people with substance use disorders, but that education interventions in nursing school help to improve students' attitudes, reduce stigma, and help students be better prepared to care for patients with substance use disorders (Dion, 2019; Dion & Griggs, 2020; Lanzillotta-Rangeley et al., 2020).

The care of patients with opioid use disorders has been worsened by the COVID-19 pandemic. The pandemic unveiled many of the systemic issues that have contributed to the marginalization of this population. The pandemic has provided opportunities for hospitals to address barriers to the care of this population and to address larger system problems that are contributing to a workforce that is experiencing high rates of burnout. Implementing standard approaches to caring for patients with opioid use disorders can help mitigate stigma and improve outcomes for these patients. In addition to improving care for this patient population, addressing staffing shortages is vital to improving health outcomes for all patients requiring hospital care. There is a current crisis in the nursing workforce that needs to be addressed; inadequate staffing levels have devastating impacts on patient outcomes, including increased mortality rates and increased injuries to patients (American Nurses Association, n.d.). Appropriate staffing levels reduce mortality and contribute to increased patient satisfaction and improved nursing retention (Haddad et al., 2022).

Future Research

Future studies investigating the impact of the implementation of harm reduction education and strategies in hospital care of patients with opioid use disorders would inform current understanding. The review of the literature included seven studies that provided insight

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into medication assisted recovery and a syringe needle and syringe program, but more studies are needed to understand how harm reduction strategies can impact hospital care of people with opioid use disorders. Specifically, a large, multi-site study that seeks to understand patients' and nurses' perceptions or experiences of care when harm reduction education and strategies have been implemented is warranted. Future research regarding the impact of providing nursing students with substance use disorder and harm reduction education and experiences on care of this population is needed. Quality improvement projects aimed at implementing standards of care for this population would also inform the science.

A study aimed at exploring hospital policies for this patient population is essential to better understanding the care for patients with opioid use disorders. While the current study provides insight into the policies regarding this care, collecting the written policies from a random, national sample of hospitals and analyzing the six aims of quality of care would provide clarity regarding the current state of care for patients with opioid use disorders and identify gaps and inconsistencies in policy governing care.

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