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Nurses' Attitudes and Knowledge Differences Toward Pain in Patients with Sickle Cell Disease

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Abstract

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Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
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Abstract

Pain is the hallmark of patients with sickle cell disease (SCD) who suffer a lifetime of chronic pain, vaso-occlusive episodes, and long-term opioid use, which may be misconstrued by nurses as narcotic addiction and may complicate pain management care. The purpose of this quantitative comparative study, guided by the theory of planned behavior, was to examine (a) whether there were differences between nurses' positive and negative attitudes towards patients with SCD by years of experience, and race/ethnicity; and (b) whether there were differences between nurses' positive and negative attitudes toward patients with SCD by their high or low scores on the Knowledge About SCD scale in a university acute care setting. Recruited were 79 nurses who cared for SCD patients and who completed the General Perceptions about Sickle Cell Patients Scale, the Knowledge About Sickle Cell Disease questionnaires, and a demographic survey. Results indicated there were no differences in nurses' attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse, and there were no significant differences in positive or negative attitudes identified between those who scored lower and those who scored higher on the SCD knowledge test. Future studies should use a larger sample size and random sampling to examine nurses' pain management documentation and patterns compared with nurses' attitudes and knowledge about SCD. An understanding of nurses' attitudes and knowledge about SCD may promote positive social change as the increased understanding of nurses' attitudes and knowledge about SCD may improve pain management outcomes for patients with SCD.

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Dedication

This dissertation is dedicated to my late African American mother, Bonnie Porter Dickerson. Ardella Wright was her mother. Ardella Wright's great-great-parents are from Africa. Bonnie's father was Clyde Porter. Clyde's great-great parents were from England. Since about 1865, Bonnie's paternal and maternal family members have had historical roots in Bird Township, Jackson County, Arkansas. Bonnie believed in and instilled the value of a good education.

Acknowledgments

I want to thank the faculty at Walden University, my colleagues, family, and friends who have helped me on this PhD educational journey. Posthumously, I would like to acknowledge my friend Dr. Diane Manghram who encouraged me in this pursuit until her untimely death on September 7, 2021.

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Chapter 1: Introduction to the Study

In the United States, pain is a poorly managed problem in all healthcare settings (Institute of Medicine, 2011; Interagency Pain Research Coordinating Committee, 2019). Chronic pain affects more than 100 million Americans and has resulted in healthcare-related costs of around $635 billion annually in lost disability and productivity (Smith & Hilner, 2019).

Sickle cell disease (SCD) is a significant public health concern affecting millions worldwide annually (Abboud, 2019; Babu et al., 2021; Blake et al., 2018; Puri et al., 2016). SCD is a chronic noncancerous genetic disorder of the blood (Coleman et al., 2016; Crego et al., 2020). SCD has multiple comorbidities that result from hypoxemia, hemolysis, tissue injury, and infection (Freitas et al., 2018; Mann-Jiles et al., 2015). Acute painful episodes of vaso-occlusive crisis (VOC) are the hallmark of SCD (Abboud, 2020). Vaso-occlusion induces sickle-shaped blood cells, which causes a blockage resulting in decreased cellular oxygenation, damage to endothelial cells, adverse clinical manifestations, and other plasma components (Abboud, 2020). Vaso-occlusions can clinically manifest in various symptoms and can be arterial or venous, depending on the location and the type of the affected vessel (Kato et al., 2017). Individuals suffer significant disease burdens that result in frequent emergency department (ED) visits, hospitalizations, readmissions, and increased healthcare utilization (Crego et al., 2020).

In 1968, Margo McCaffery described pain as the patient’s subjective experience. In the patients’ words, pain is “whatever the person says it is, existing. whenever or they whatever they say it does” (McCaffery, p. 100, 1968). There is no substantiated objective measurement of patients in pain or patients with SCD in acute or chronic pain (Coleman et al., 2016; Freiermuth et al., 2016).

Nurses are usually the first healthcare givers seen by patients with SCD in the ED and spend the most time at the bedside. Nurses communicate their perceptions, assessments, and the physical and psychological aspects of patients with SCD pain experiences to other healthcare providers (Blake et al., 2018; Clay-Jones et al., 2019; Ezenwa et al., 2015). Miscommunications between nurses and other healthcare providers further burden the pain management experiences of patients with SCD in VOC; subsequently, they develop mistrust with further related interactions (Coleman et al., 2016; Masese et al., 2019). Although nurses are responsible for administering pain medications, patients become frustrated with nurses when there is no physician order for additional pain control (Freiermuth et al., 2016). ED overcrowding and triage prioritizing result in prolonged wait times, delays in care, and ineffective pain management (Freiermuth et al., 2016; Puri et al., 2016). There is a need to understand factors that influence the miscommunication related to pain management between nurses and patients with SCD. The findings from this study may guide the development of education programs and policies geared toward improving pain management in patients with SCD. This chapter will present the background, problem statement, purpose, research question, theoretical framework, and significance of the study.

Background

In the United States, patients with SCD in VOC account for over 200,000 ED visits and more than 68,000 hospitalizations annually for uncontrollable pain (Puri et al., 2016). SCD is one of the more common blood genetic disorders that affect over 100,000 African Americans in the United States (Crego et al., 2020; Puri et al., 2016). This disease is a public health concern because it affects millions worldwide with various clinical manifestations (Abboud, 2020; Centers for Disease Control and Prevention, 2019). Patients with SCD in VOC experience acute episodes of decreased blood flow to the adjacent tissues accompanied by pain. Patients describe VOC episodes as excruciating pain in the limbs, joints, and chest (Jenerette et al., 2015). Vaso-occlusion is sickled blood cells leading to impaired oxygenation, damage to endothelial cells, and other adverse clinical manifestations (Abboud, 2020). Patients describe the pain as unbearable or agonizing (Coleman et al., 2016).

VOC pain is not alleviated in the ED setting; patients must be admitted to an inpatient unit for further pain management (Carroll, 2015). Medical treatment usually requires long-term opioid and nonopioid medications to alleviate the pain (Mann-Jiles et al., 2015). Patients with SCD usually develop an opioid tolerance and, therefore, require higher doses of opioids to achieve relief from their pain (Puri et al., 2016). Patient self-report is the most reliable source of pain and the gold standard of inpatient pain management assessment (American Association of Critical-Care Nurses, 2018; McCaffery, 1968). Patients develop a distrust of nurses. Decreased lack of trust occurs when patients have questions about pain management when pain is not helped or worsens (Fearon et al., 2019). Carroll (2015) examined the link between the perception of pain management satisfaction in patients with SCD hospitalized for VOC and found that 47% of patients reported pain relief within the first 3 days during their hospitalized length of stay. Kim et al. (2017) implemented an evidence-based protocol for pain management for patients with SCD in an urgent care center. The patient's satisfaction with their pain control increased from 23% to 68%.

Nurses may attribute the need of patients with SCD to require higher doses of opioids to addiction and not to increased opioid tolerance (Coleman et al., 2016; Ezenwa et al., 2016; Smith et al., 2017). Nurses' negative beliefs and attitudes about patients with SCD may contribute to poor communication and misunderstanding of the complex nature of the disease burden experienced by patients with SCD (Haywood et al., 2015; Jenerette et al., 2016; Masese et al., 2019; Puri et al., 2016). Nurses' attitudes toward patients with SCD have been examined by several researchers, such as Haywood et al. (2015), Jenerette et al. (2016), and Puri et al. (2016). Compared to physicians, nurses had more negative beliefs toward patients with SCD, which created further barriers between the patient and the nurse (Freiermuth et al., 2016; Haywood et al., 2015). Jenerette et al. (2015) identified that nurses from the ED or intensive care unit (ICU) held higher negative attitudes than medical-surgical nurses and believed that patients with SCD have a drug addiction. Problem. ED nurses' and physicians' positive attitudes increased after participating in educational programs to familiarize them with the challenges and care needs of individuals with SCD; however, physicians' positive attitudes were higher than those of nurses (Freiermuth et al., 2016).

Yaqoob and Nasaif (2015) found that nurses had poor pain assessment and management knowledge. Seventy-three percent of the nurses did not believe the patients with SCD self-reports of pain and scored the pain level identical to whether the patients were smiling or grimacing. Practitioner bias may occur when nurses validate patients' pain experience through objective assessment (Vuille et al., 2017). This finding is opposite to pain is subjective and can only be accurately reported by the patient (McCaffery, 1968). Negative attitudes about frequent ED admissions of patients with SCD for acute pain crisis management may lead to treatment delays, undertreatment with opioids, and inadequate pain management (Jenerette et al., 2015, 2016; Masese et al., 2019; Puri et al., 2016). A better understanding of the relationship between factors influencing nurses' pain management practices in patients with SCD can guide procedures and policies to improve pain management in patients with SCD.

Problem Statement

Pain is the hallmark complaint of patients with SCD in VOC who present in the hospital setting (Crego et al., 2020; Yacoub et al., 2019). Nurses face factors that hinder optimal pain analgesic management for patients with SCD in VOC in excruciating pain (Tanabe et al., 2013; Yacoub et al., 2019). Some of the factors hindering nurses' effective management of pain in patients with SCD in VOC include nurse providers' attitudes, limited knowledge of SCD, disbelief of patients' self-report of pain, and indiscriminate scoring practices (Faro et al., 2020; Glassberg et al., 2013; Haywood et al., 2015; Jenerette et al., 2014, Kim et al., 2017; Yaqoob & Nasaif, 2015).

Nurses' attitudes toward patients with SCD with recent exposure to patients with SCD and the racial characteristics of nurses influenced the increase of noncompliance with pain protocols or guidelines. Haywood et al. (2015) revealed that nurses with more recent and frequent exposure to patients with SCD had increased negative attitudes.

When racial characteristics were associated with attitudes, Asian providers had higher negative attitudes toward patients with SCD, followed by White or Black providers. Haywood et al. (2011) also identified that nurses with more recent and increased exposure to patients with SCD had increased negative attitudes than nurses with no recent exposure. Glassberg et al. (2013) found that nurses' attitudes affected compliance with pain guidelines set for managing SCD pain. Patients were more likely to suffer inadequate analgesia because they did not receive re-dosing with opioids within 30 minutes as prescribed by the guidelines.

Nurses' analgesic pain management practices have affected patients with SCD and prolonged VOC care before seeking treatment (Jenerette et al., 2014; Kim et al., 2017). Jenerette et al. (2014) identified that patients with SCD in VOC often delayed seeking care in the ED because of prior treatment and accusations by nurses as drug seekers. Patients felt that ED staff did not know how to care for them, and behaviors demonstrated by ED staff discouraged any return visits. Patients with SCD experiencing VOC require inpatient medical care to receive pain relief. These patients may develop opioid tolerance resulting from long-term pain management with opioid agents. When nurses do not believe a patient's self-report of the severity of the pain, an antagonistic relationship develops between the patient and the nurse (Marco et al., 2012). SCD patients' tolerance is often mistaken for drug-seeking behaviors. The opioid epidemic has negatively impacted care for patients living with SCD by increasing impediments to opioids (Sinha et al., 2019). Patients with SCD face treatment contracts, decreased opioid dosing, and less access to alternative therapies (Sinha et al., 2019).

The patient's self-report of pain and the nurse's perception of the patient's pain may negatively impact patient satisfaction. Kim et al. (2017) found that patients with SCD and VOC achieved pain satisfaction after implementing an evidence-based protocol. The study indicated other variables outside of patients' self-report and nurses' perceptions that could reduce patient satisfaction, such as ED overcrowding, lack of knowledge, or nonadherence to guidelines resulting in pain management delays. Coleman et al. (2016) focused on the poor understanding by healthcare professionals of patients with SCD and their pain experiences. Because pain is subjective, the painful experiences will vary among patients with SCD in VOC. The healthcare professionals' misunderstanding of the differences between these experiences further exacerbates poor pain management.

To address the problem of nurses caring for patients with SCD in VOC, the areas to be examined are nurses' general attitudes toward patients with SCD and knowledge about SCD. An improved understanding of these factors may influence nurses' pain management in patients with SCD and may guide the development of programs and policies that can positively impact nurses' pain management practices in patients with SCD experiencing VOC.

Purpose of the Study

This quantitative, comparative descriptive study aimed to examine whether there are differences between nurses' general attitudes toward patients with SCD via dependent variables (positive attitudes and negative attitudes subscales) by independent categorical variables (years of experience and race/ethnicity). The purpose was also to examine whether there are differences between the nurses who score 14 and above on the Knowledge About SCD scale compared to the nurses who scored 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. The instruments used were the General Perceptions About Sickle Cell Patients Scale Questionnaire (Haywood et al., 2011), the Knowledge about Sickle Cell Disease survey (Tanabe et al., 2013), and a demographic survey. The sample population consisted of all nurses caring for patients with SCD in VOC at the bedside at a university hospital in the Southeastern United States.

Research Questions and Hypotheses

The following research questions (RQs) and hypotheses guided this study:

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse?

A two-way multivariate analysis of variance (MANOVA) was used to determine the differences.

H_o1: There are no differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

H_a1: There are differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge?

A one-way MANOVA was used to determine the differences.

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

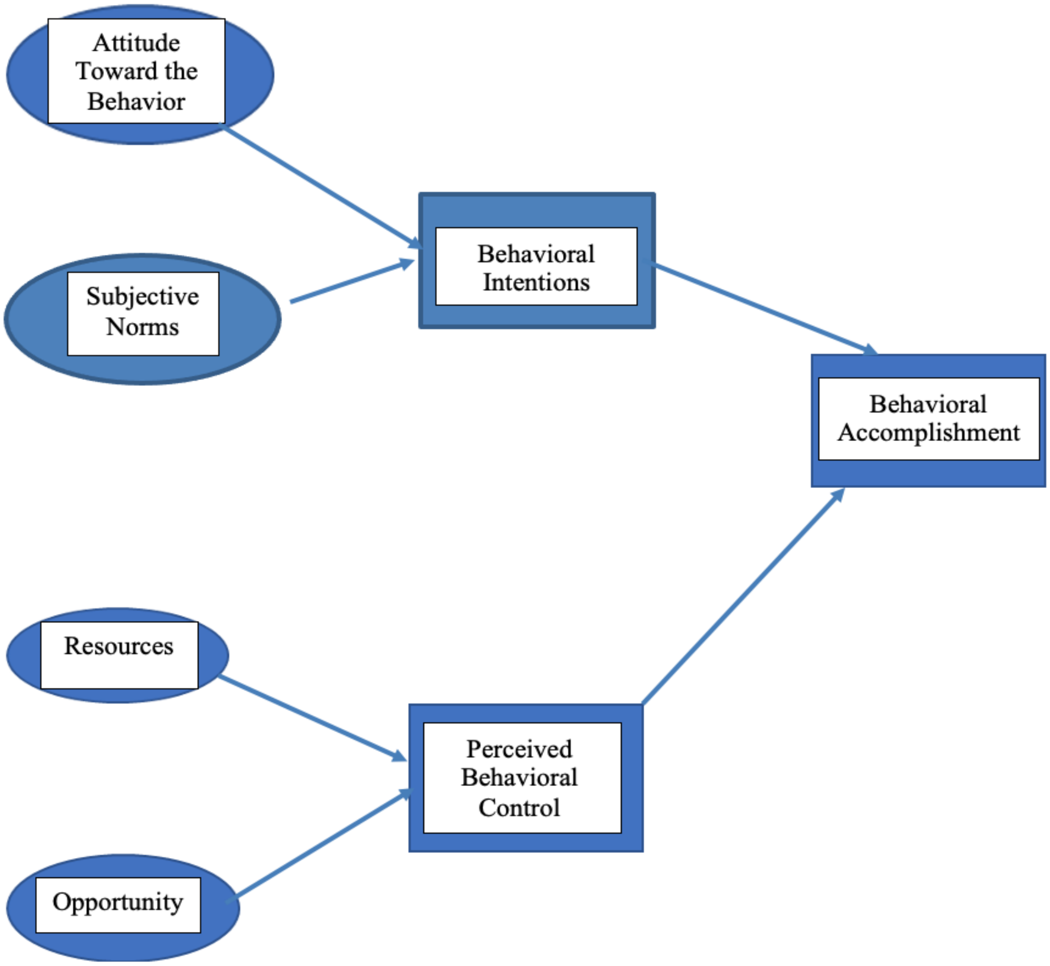
Theoretical Framework

Theory of Planned Behavior

Icek Ajzen's (1991, 2019) theory of planned behavior (TPB) guided this study. Ajzen developed the TPB to predict and describe human behavior in a particular setting or situation (Ajzen, 1991). The TPB is an expansion of the theory of reasoned action proposed by Fishbein and Ajzen (1975) and Ajzen and Fishbein (1980). The theory of reasoned action lacked an individual's perceived behavioral control to execute a particular behavior (Ajzen, 1991). The assumption of the TPB is that perceived behavioral control combined with behavioral intentions can predict a direct connection to behavioral accomplishment (see Figure 1).

Figure 1

Theory of Planned Behavior



Note. Adapted from *Theory of Planned Behavior Diagram*, 2019, by I. Ajzen (https://people.umass.edu/aizen/tpb.diag.html). Copyright 2019 by Icek Ajzen. Adapted with permission.

The more significant the behavioral intention to complete the behavior, the greater the likelihood of the behavior achievement. Behavioral intentions are efforts human beings are willing to make to achieve a behavior. The amount of effort human beings exert may depend on the availability of opportunity or resources. The TPB also assumed that perceived behavioral control by the individual's belief that they will be more likely to have behavioral success if they have the proper resources and opportunities with minimal hindrances.

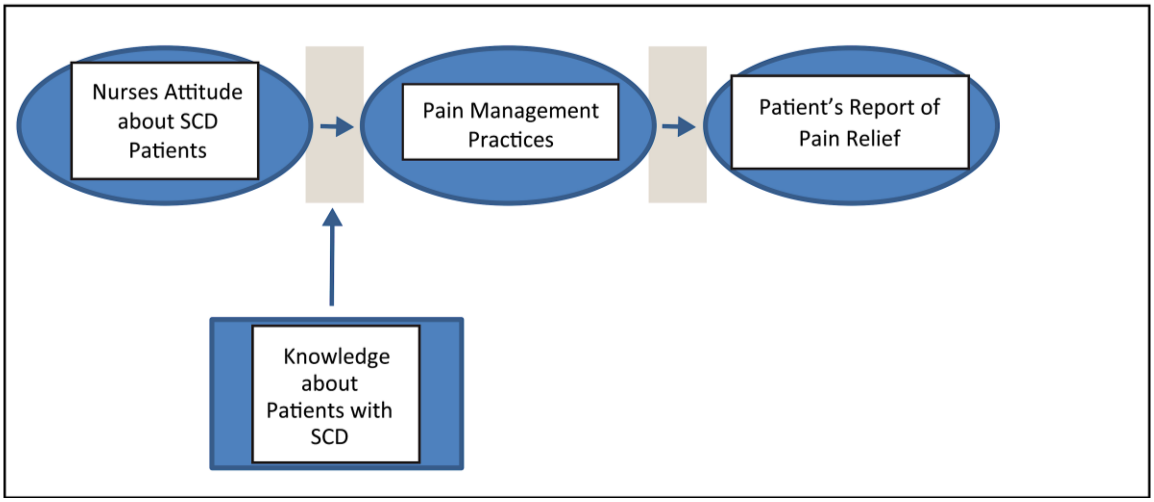
How the Theory Relates to the Study Approach

The TPB relates to the cross-sectional quantitative approach to this study because quantitative research relies on experimental measurements and statistics to identify variations and repeated similarities (Gray et al., 2017). This method of scientific inquiry emerges from the philosophy of logical positivism, upon which the scientific method is based (Gray et al., 2017). Logical positivism considers empirical discovery the only source of knowledge (Gray et al., 2017). Cross-sectional studies have been conducted by Brooks et al. (2018), Fang et al. (2017), and Youngcharoen et al. (2016), using the TPB to expand on and contribute to this theory. Ajzen developed the TPB to predict and describe human behavior in a particular setting or situation (Ajzen, 1991). This study examined nurses' behaviors in treating patients with SCD suffering a VOC in a university acute care setting.

The TPB examined the assumptions associated with the nurse's behavioral intentions and perceived behavioral control for managing patients with SCD. Reviewed were the behavioral intentions based on the nurses' attitudes toward patients with SCD and their perceived behavioral control, which is reflective of their experiences of knowledge about SCD, their pain management practices, and the patient's report of pain relief (see Figure 2).

Figure 2

Behavioral Practices



Nature of the Study

A quantitative, comparative descriptive design was used to answer the research questions. Descriptive research explores and describes the phenomenon of interest, non-experimental, and no intervention exists (Drummond & Murphy-Reyes, 2018; Gray et al., 2017). This study examined whether there are differences between nurses' general attitudes towards patients with SCD via dependent variables: positive attitudes and negative attitudes subscales by independent categorical variables: years of experience (less than 5 years or 6 years or more) and race/ethnicity (Black/African American or all other races). Also examined was whether there are differences between the nurses who score 14 and above on the Knowledge About SCD scale compared to the nurses who scored 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. The instruments used were the General Perceptions About Sickle Cell Patients Scale Questionnaire (Haywood et al. 2011), the Knowledge about Sickle Cell Disease survey (Tanabe et al., 2013), and a demographic survey. The data were analyzed using a statistical software package.

Definition of Key Terms

Knowledge about SCD (Tanabe et al., 2013; Jenerette et al., 2014) to assess nurse participants' knowledge concerning acute and chronic pathophysiological, clinical complications of SCD, pain pathophysiology, and best practices in analgesic management in children and adults in the acute care setting (Tanabe et al., 2013).

Nurses' attitudes toward patients with SCD are the behavioral intentions of nurses toward pain assessment and the management of patients with behavior barriers, such as sociocultural factors, concerns regarding addiction, disbelief by the disconnect of what is observed by the nurse and the patient's behavioral cues lead to the doubtfulness about what the patients say about their self-account of pain. The doubt of nurses increases bias because of their lack of knowledge about SCD (Puri et al., 2016).

Nurses pain management practices are the process of nurses initiating patients' pain assessments, reassessments, reducing the severity of pain, and improving the quality of care (Coleman, 2016; Freiermuth et al., 2016; Kim et al., 2017); The Joint Commission, 2018; Yawn & John-Sowah, 2015).

Patients with SCD Report of Pain is the patient report of pain and the pain experience (McCaffery, 1968). Pain is subjective and what the patient feels and says (McCaffery, 1968). Translating the pain experience of patients with SCD incorporates multifactorial psychosocial and contextual factors that may vary from patient to patient (Collins et al., 2020).

Sickle cell disease is a chronic non-cancer genetic disorder of the blood (Coleman et al., 2016; Crego et al., 2020). This disease has multiple comorbidities resulting from hypoxemia, hemolysis, and tissue injury (Freitas et al., 2018; Mann-Jiles et al., 2015). An elevated temperature or fever is a frequent symptom characteristic of an uncomplicated crisis and may not indicate infection (Uwaezuoke et al., 2018).

The vaso-occlusive crisis of SCD occurs due to the restriction of blood flow to the tissues because of abnormally shaped sickle cells sticking to the walls of the blood vessels, causing occlusion (Yacoub et al., 2019). This blockage within the vessels causes ischemia to the tissue and is characterized by patients' complaints of excruciating pain in the limbs, joints, and chest (Jenerette et al., 2015). The pain is usually described as "unbearable" or "agonizing" and is a recurrent clinical syndrome that drives hospitalizations in patients with SCD (Coleman et al., 2016; Nottage et al., 2016).

Assumptions

Assumptions are those elements that need to be addressed for this study to be relevant (Adu, 2017; Linden, 2018). This study aligns with Ajzen's (1991, 2019) TPB assumptions of nurses' behavior intentions and perceived behavioral control in the pain management of patients with SCD in the acute care setting. Behavioral intentions are the degree of effort individuals are willing to exert to perform a behavior (Ajzen, 1991). Perceived behavioral control refers to the individual's perception of the effort or complexity of performing the behavior of significance (Ajzen, 1991). I used independent and dependent variables to measure the direction of behavioral accomplishment and patients' resolution of pain. This study assumes that nurses with greater knowledge about SCD would have a positive attitude toward the care of patients with SCD and that there may be an association between the independent/predictor variables (IV) and dependent/outcome (DV). Furthermore, it was assumed that nurses who were participants in the study would answer the questionnaires truthfully.

Scope and Delimitations

A quantitative, comparative descriptive design and Ajzen's (1991, 2019) TPB were used to determine the study's parameters that key variables can control. This study examined the differences between nurses' general attitudes towards patients with SCD via dependent variables, positive attitudes, and negative attitudes subscales by independent categorical variables: years of experience (less than 5 years or 6 years or more) and race/ethnicity (Black/African American or All other races). And examined the differences between the nurses who scored 14 and above on the Knowledge About SCD scale compared to those who scored 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. Participants in this study were nurses with at least one year of nursing experience in the acute care setting. Nurse practitioners were eligible to participate if they have less than one year in their current role but have worked at least one year or more as registered nurses and have treated patients with SCD in VOC within the past year. Excluded were nurses with less than one year of nursing experience or new nurse practitioners with less than one year of nursing experience as registered nurses. Generalizability is limited to nurses who have treated patients with SCD in VOC in the acute care setting.

Limitations

The quantitative, comparative design approach examined the differences between two groups of nurses in a commonly accepted acute care setting. A limitation of this study is that it focuses on the nurses' general attitudes, knowledge about SCD, and demographic survey data that could account for the differences in the nurses' pain management of patients with SCD in acute care settings. External variables that could negatively impact patient satisfaction include ED overcrowding, long ED wait times, and interference with triage and pain management practice guidelines (Collins et al., 2020; Smith et al., 2017). The reliability of information obtained from survey questionnaires depends on the responses being answered truthfully by the participants (Queirós et al., 2017). Responses are closed-ended and do not measure open-ended questions (Queirós et al., 2017). Nonprobability convenience sampling has limitations. The results may not be generalized to the larger population (Saunders et al., 2012).

Significance of the Study

Pain is the primary problem of patients with SCD in VOC who seek care in the hospital (Clayton-Jones et al., 2015; Crego et al., 2020; Mann-Jiles et al., 2015). Nurses are part of a team that assesses and administers pain medications to patients with SCD in

VOC (Blake et al., 2018; Clayton-Jones et al., 2019; Ezenwa et al., 2015). Nurses' attitudes toward seeing patients with SCD as "drug seekers" and lower doses of pain medications may be inadequate (Coleman et al., 2016; Ezenwa et al., 2016; Smith et al., 2017). Pain subjectively is as precisely conveyed by the patient (McCaffery, 1968). Nurses exacerbate patient trust when miscommunication and lack of knowledge about SCD are present (Haywood et al., 2015; Jenerette et al., 2016; Masese et al., 2019; Puri et al., 2016). Nurses' analgesic pain management and scoring practices further influence patients' negative pain experiences (Haywood et al., 2015; Glassberg et al., 2013; Jenerette et al., 2014, Kim et al., 2017).

This study will contribute to nursing and managing patients with VOC pain. The results of this study will contribute to the body of nursing knowledge contributing to positive social change for the stakeholders. There is the potential to improve pain relief in patients with SCD in VOC and reduce the burden of increased visits and utilization in the acute care setting. The dissemination of this study could affect future care and treatment through changes in nursing practice and VOC. With the increased availability of researched-based information, nurses will have increased awareness, discourse, and opportunities to identify other variables that create challenges in improving patients with SCD pain management with SCD in VOC. Understanding factors that influence nurses' management of pain in patients with SCD in VOC could reduce the disease burden of SCD.

Summary

In Chapter 1, I focused on pain in the context of nurses' attitudes toward patients with SCD, knowledge about SCD, analgesic pain management, and patient reports of pain. Despite changes to expert protocols and policies, patients who suffer from VOC experience ineffective pain management and challenges seeking care in the acute care setting. This quantitative, comparative study aims to examine the differences between nurses' general attitudes towards patients with SCD via dependent variables: positive attitudes, and negative attitudes subscales by independent categorical variables: years of experience (less than 5 years or 6 years or less), and race/ethnicity (Black/African American or All other races). I also examined whether there were differences between the nurses who score 14 and above on the Knowledge About SCD scale compared to the nurses who scored at 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting Nurses are the healthcare professionals who spend the most time with patients that have SCD in a VOC in the acute care setting. Ajzen's TPB was used to examine the nurses' general attitudes towards patient with SCD, their knowledge about SCD, and demographics. These questions were answered with a quantitative, comparative design using a two-way MANOVA and one-way MANOVA.

This study will add to the existing body of research by identifying factors that may influence the pain management outcomes of patients with SCD. Identifying factors that positively affect the pain management of patients with SCD can improve the patients with SCD pain experience and decrease costs related to increased care utilization. For

Chapter 2, I will delineate the literature search strategy, the theoretical framework, and the literature review related to the key variables: nurses’ general attitudes, positive attitudes, negative attitudes subscales, years of experience, race/ethnicity, and nursing knowledge about pain and patients with SCD.

Chapter 2: Literature Review

Pain is the hallmark complaint of patients with SCD who present in the hospital setting (Crego et al., 2020; Yacoub et al., 2019). Patients with SCD in VOC report that it is difficult to describe their pain and that they feel discouraged when reporting pain relief to the nurse is ineffective. Nurses face factors that hinder providing optimal pain analgesic management for patients with excruciating VOC pain. Some factors that hinder nurses' adequate control of pain in patients with SCD include their attitudes, limited knowledge of SCD pain, disbelief of patients' reports of pain, and indiscriminate pain scoring practices (Yaqoob & Nasaif, 2015). Nurses' attitudes, analgesic pain management practices, and patient self-reports impact pain management resolution in patients in VOC (Glassberg et al., 2013; Haywood et al., 2015; Jenerette et al., 2014, Kim et al., 2017). Quality pain management is critical to the understanding of SCD. The aims of this quantitative comparative study were (a) to examine the differences between nurses' general attitudes towards patients with SCD via dependent variables: positive attitudes and negative attitudes subscales by independent categorical variables: years of experience (5 years or less or 6 years or more) and race/ethnicity (Black/African American or All other races); and (b) to examine whether there were differences between the nurses who scored 14 and above on the Knowledge About SCD scale compared to the nurses who scored at 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. Nurses are the healthcare professionals who spend the most time with patients (Butler, et al., 2018) with SCD in a VOC in the acute care setting. Ajzen's TPB was used to examine the nurses' general attitudes toward patients with SCD, their knowledge about SCD, and their demographics. These research questions were answered with a quantitative, comparative design using a two-way MANOVA and one-way MANOVA.

This study adds to the existing body of research by identifying factors that may influence the pain management outcomes of patients with SCD. Identifying factors that positively affect the pain management of patients with SCD can improve the patients with SCD pain experience and decrease costs related to increased care utilization. For Chapter 2, I will delineate the literature search strategy, the theoretical framework, and the literature review related to the key variables: nurses' general positive or negative attitudes subscales, years of experience, race/ethnicity, and nurse scoring from the Knowledge about SCD survey. This chapter discusses the literature search strategy, the theoretical foundation, and the literature review related to the key variables.

Literature Search Strategy

My literature search strategy included academic databases, such as Cochrane, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Medline (Medical Literature On-Line), PubMed, Google Scholar, Sage Journals, and ScienceDirect. Search terms used were *nurses' attitudes, knowledge about SCD, pain, pain management, SCD, and reports of pain.* I searched these terms in keywords, text, authors, and titles, and keywords were combined to cover many MeSH (Medical Subject Headings) descriptors. Articles from reference lists provided additional information from selected peer-reviewed published journal articles.

I followed Polit and Beck's (2008, 2017) significant steps in formulating research-based literature to guide the review. The steps are (a) "formulate and refine primary and secondary questions;" (b) construct a search strategy "keywords, databases, other sources;" (c) "document search decisions and results, organize materials;" (d) perform the search "primary source materials;" (e) collect relevant data, read and "screen abstract" information for relevance; (f) "critically appraise studies;" (g) "analyze and integrate information for themes;" and (h) prepare a written synthesis of information, "critical summary" (Polit & Beck, 2017, p. 146). After removing duplicates and irrelevant studies, 67 studies met the evaluation criteria for inclusion. Studies included in this review were research or outcomes-based, published in the English language in peer-reviewed journals within five years between 2016 and 2021. However, the search produced articles that were older than 5 years. Still, they were historical and relevant to my understanding of the theory, the research questions, and the examination of potential associations between the nurses' attitudes toward patients with SCD, knowledge about SCD, nurses' pain management, and patients with SCD reports of pain.

Studies were reviewed, and the final review included about 67 research articles that provided information related to the purpose of the study. The articles are classified using the hierarchy of evidence defined by Polit and Beck (2008), which ranks the evidence based on the power of the data offered. Alekseyev et al. (2012) adapted Polit and Beck's (2008) evidence hierarchy by summarizing levels of evidence for articles reviewed (see Table 1).

Table 1

Evidence Table

Levels of evidence	Definition	Articles reviewed
I	Evidence from a systematic review or meta-analysis of all relevant RCTs or evidence-based clinical practice guidelines based on systematic reviews of RCTs	2
II	Evidence-based from at least one well-designed RCT or single nonrandomized trial	1
III	Systematic review of correlational/observational studies	0
IV	Single correlational/observational study	0
V	Evidenced from systematic reviews of descriptive and qualitative studies	2
VI	Evidence from a single descriptive or qualitative study	67
VII	Evidence from the opinion of authorities and/or reports of expert committees	6

Note. RCT = randomized clinical trial. From "The Influence of Race and Gender on Pain Management: A Systematic Literature Review," by S. B. Hampton, J. Cavalier, and R. Langford, 2015, *Pain Management Nursing*, *16*(6), p. 970. (https://doi.org/10.1016/j.pmn.2015.06.009). Copyright 2015 by Elsevier.

Theoretical Foundation

Icek Ajzen's (1991, 2019) TPB guided my understanding of the nurses' behavior in the pain management of patients with SCD in this study. Ajzen developed the TPB to predict and describe human behavior in a particular context or setting. The TPB expands the theory of reasoned action, which had limitations because of the lack of the individuals' total control over performance behaviors.

In Ajzen's (1991) theory of reasoned action, the central aspect of the TPB is the intention of the individual to perform behaviors. Intentions are the considerations to seize on the motivational aspects toward the performance of behaviors. These aspects are the amount of effort individuals are willing to exert to perform the behaviors (p. 181).

In broader circumstances, the greater the intentions to perform the behavior, the more likely the behavioral performance is to occur. Under the will of individuals, they can decide whether to perform a behavior or not (Ajzen, 1991). The performances of behaviors determined by no motivational issues, such as the availability of opportunities and resources, lead to the success of performing a behavior. These aspects are related to the individual's actual control over performance behaviors. Success should prevail if individuals have the available opportunities, resources, and intentions to perform the behavior. Behavioral achievement depends on the amount of intentional exertion and the behavioral control or ability to perform the behaviors successfully.

According to the TPB, given the available resources and opportunities, this "perceived behavioral firm and behavioral intention predict the likelihood of behavioral achievement. In keeping intentions constant, efforts to reach a successful behavioral conclusion are likely to be greater with "perceived behavioral control" (p. 184). "Perceived behavioral control" is essential to change information and the availability of resources or opportunities, and the accuracy of behavioral prediction may be less accurate.

The TPB suggests "three conceptually independent determinants of intention" (Ajzen, p. 188). These determinates of intention are attitudes, subjective norms, and perceived behavioral control. These antecedents are what determine intentions and actions. Predicting intentions through attitude toward the behavior refers to an individual’s positive or negative appraisal of the behavior of interest. Predicting intentions through subjective norms refers to the perceived social pressure to perform or not to perform the behavior of interest (Ajzen, 1991). The individual social environment to comply to engage or not engage in the behavior (Ajzen, 1991). Behavioral control, as stated previously, is the extent to which individuals believe they can accomplish an act.

The TPB has been used to study nurses’ behavioral intentions toward pain and pain management in patients within and outside of the acute care setting (Brooks et al., 2018; Fang et al., 2017; Youngcharoen et al., 2016). Youngcharoen et al. (2016) used the TPB in a nonexperimental cross-sectional design to determine relationships among nurses’ beliefs, attitudes, norms, and perceived behavioral control of postoperative pain in hospitalized elderly patients. The sample included 140 nurses from three hospitals who worked in adult surgical units. The nurses’ behavioral, normative, and controlled beliefs directly influence their attitudes, perceived norms, and perceived behavioral control toward pain management. The nurses’ attitudes and perceived norms directly influenced their pain assessments and intentions. Low perceived behavioral control and the nurses’ perceptions of their ability to perform pain assessments and deliver pain medications were not significantly associated with nurses’ intentions. The TPB iterates the antecedents of attitudes, subjective norms, and perceived behavioral control that drive intentions and actions. These researchers found that nurses continued to assess and manage their patients’ pain despite low perceived behavioral control. The variables for this study examined similar variables and the relationships between nurses’ attitudes toward patients with SCD. These variables align with the TPB attitude toward the behavior and behavioral intentions. Nurses' pain management practices align with the TPB's subjective norms, resources, and opportunities. Knowledge about SCD aligns with the TPB resources, and patients' reports of pain relief align with the TPB behavioral achievement (see Figure 2).

Various studies have been conducted using the TPB and expanded on and contributed to this theory (Fang et al., 2017; Nyirigira et al., 2018; Youngcharoen et al., 2016). I chose something other than Ajzen and Kruglanski's (2019) theory of goal pursuit to guide this study. This theory is goal-centered and integrates the TPB. It assumes the formation of a behavioral intention is determined to perform a behavior in the context of the individual's current operational goals. I did not select this theory because there was insufficient nursing or academic research to support its use for this study.

The TPB guided Youngcharoen et al.'s (2016) comparative, descriptive, cross-sectional study to describe nurses' beliefs (behavioral, normative, and control) about hospitalized elderly patients with postoperative pain and their pain management. Item analysis for the nurses' beliefs, attitudes, perceived norms, and perceived behavioral intentions and examined the behaviors in case study vignettes. Most nurse participants had strong beliefs (behavioral, normative, and control), attitudes, perceived norms, and perceived behavioral control with intentions to assess pain and treat pain using Pro Re Nata (PRN) as needed opioid analgesics. Nurses with more than 10 years of experience had the highest scores for attitudes toward pain management and others' expectations about PRN opioid administration. In the case study vignettes, nurses from public health and military hospitals had significantly different pain assessment responses and PRN opioid analgesic treatment behaviors. The nurses working in the university hospital settings had more perceived discussions in opioid order management with physicians than those working in public health or military hospitals. Their findings suggest better collaboration between nurses and physicians in the university hospital. There were no significant differences between those nurses with or without pain management training.

Nyirigira et al.'s (2018) quantitative study used the TPB to guide the development of a questionnaire to measure the intent of healthcare personnel; the majority were staff nurses from two Rwandan hospitals to assess and treat postoperative pain. The developed questionnaire described barriers, facilitators, current pain practices, and treatment. The questions used centered around (a) individual's self-reported perceptions/experiences with caring for patients in pain, (b) the medications and treatments available to assist with patient's pain, and (c) issues/problems encountered by nurses while providing care to patients in pain. The questionnaire cited systemic and knowledge barriers, lack of proper medications, and limited use of evidence-based protocols for assessing and treating postoperative pain. There was an aversion to the administration of opioids and knowledge barriers related to recognizing and correcting the adverse effects of opioids.

Fang et al.'s (2017) descriptive, analytical, cross-sectional study was guided by the TPB through direct attitude, belief-based intention, subjective norm, and direct and indirect control in Chinese nursing students during a clinical rotation in a medical college-affiliated hospital in China. The students had an overall negative attitude and behavioral intentions toward pain management. Their "direct control, subjective norm, belief-based attitude, and indirect control were found to independently predict nursing students' intention to treat patients with pain" (p. 255). Behavioral intentions toward pain management were low in the Chinese nursing students to provide pain relief. This negative impact on low intentions is indirectly related to China's expected pain endurance culture. Generational acceptance of pain is inherent in most nursing students. This culture of pain indicates that optimal pain management is controllable by factors other than knowledge barriers.

Literature Review: Key Variables

The literature review is related to the key variables of this study. I will define and discuss the literature relating to each variable: (a) the nurses' attitudes toward patients with SCD and (b) the nurses' knowledge about SCD. I will discuss each variable as to how the study is supported or not supported to the study.

Nurses' Attitudes Toward Patients With SCD

The nurses' attitudes toward patients with SCD may be manifested in the behaviors of nurses toward the pain assessment and management of patients with SCD, behavior barriers, such as sociocultural factors, concerns regarding addiction, disbelief by the patients, and poor quality of care (Linton et al., 2020; Yaqoob & Nasaif, 2015). This disconnection between the patients' behavioral cues leads to doubting what patients say about their self-account of pain. The doubt creates a bias against patients' accounts of their pain experience (Puri et al., 2016).

Nurses' attitudes have been reported in research findings to influence the pain management of patients with SCD. Haywood et al. (2015) studied the association of clinical characteristics with their attitudes toward patients with SCD. Demographic information was obtained to measure clinician characteristics. A survey instrument, the General Attitudes Toward Patients With SCD, and newly developed items based on the literature that focuses on clinician trust and distrust in patient reports of pain and the essential need for opioids to treat pain. Asian clinicians reported more negative attitudes toward patients with SCD than Black or White clinicians. Nurses were more likely than physicians to show more negative attitudes. The providers with more recent exposure to patients with SCD in pain reported more negative attitudes than those with less exposure.

Freiermuth et al. (2016) conducted a longitudinal quality improvement study using the General Perceptions About SCD Patients Scale to measure healthcare professionals' attitudes at two EDs in North Carolina with a university affiliation at baseline, 6 months, and 30 months. The researchers categorized registered nurses and nurse practitioner participants as nurses. The nurse practitioners' classification was due to no nurse practitioners working at one site during the initiation of Surveys 2 and 3 and at the second site. The nurse practitioners working at the other site were new but had at least 10 years of experience as registered nurses. There were two groups, ED nurses and physicians. Registered nurse participants were the most significant number of healthcare professionals at Time 1 ($n = 120$ of $n = 216$), at Time 2 ($n = 95$ of $n = 182$), than at Time 3 ($n = 51$ of $n = 113$). Nurses at both sites had higher mean negative attitudes on the subscales than physicians at site number one ($p = .0001$). The mean negative subscales for nurses were higher at Site 2, and physicians at Site 2 had higher mean negative subscales at Site 1 nurses and physicians. The uneasiness with care subscales did not differ over time. However, this subscale was higher in physicians when compared to nurses (*p* = .001) and higher at Site 1 than Site 2 (*p* = .0563). The mean positive subscales improved over time, and physicians had higher mean positive subscales when compared to nurses. The mean estimated addiction percentage subscale was significantly higher for nurses when compared to physicians (*p* = .0001). The estimated mean addiction percentage did not decrease over time.

Hazzazi et al. (2020) conducted a cross-sectional in Jazan, Saudi Arabia, using the General Perceptions about SCD Patients scale questionnaire. Nurse participants were 54% of 244, and the rest were physicians. Of nurses, 54.5% worked in internal medicine, 19.3% worked in the ED, and 26.2% in the pediatric department. Nurses had 67% or (*p* = .003) significant negative attitudes than physicians toward sickle cell patients. Most of the nurses in this study were female, and most females had negative attitudes toward sickle cell patients of no significance. (*p* = .482). Compared to physicians with less than five years of experience, nurses had more negative attitudes than nurses and physicians with more than five years of experience (*p* = .003). Nurses with more experience with sickle cell patients were likelier to have positive attitudes toward sickle cell patients (*p* = .001).

Jeanerette et al.'s (2015) quantitative study examined the differences in nurses' attitudes toward patients with SCD in their clinical department. This study used Haywood et al. (2011) "General Perceptions about Sickle Cell Patients Scale" to measure nurses' attitudes. The subscale measures six items about negative attitudes, four about positive attitudes, and five about red-flag behaviors. Nurse participants were chosen from the ED/intensive care unit (ICU) and medical-surgical worksite units at a single facility.

Nurses working in the ED/ICU were likelier to show negative attitudes, concern-raising behaviors, red-flag behaviors, and lower mean scores for positive attitudes than nurses from the medical-surgical worksite areas. Although there were differences, the differences did not reach statistical significance "(p = .342) for negative attitudes; (p = .661) for positive attitudes; p = .232 for concern-raising behaviors; (p = .186) for red-flag behaviors" (p. 177).

Jenerette et al. (2016) used a prospective descriptive, quantitative design with an educational conference intervention and data collection from a survey questionnaire, the "General Perceptions about Sickle Cell Patients Scale" over three-time frames: pre-conference at the end of the conference and two months post-conference. Registered nurses were the largest group who completed the survey questionnaires before the start of the conference (n = 59), post-conference (n = 38), and two months post-conference (n = 30). The goal was to improve healthcare professionals over time. The mean negative attitude subscales improved from pre-conference to post-conference. Over time mean positive attitudes subscales toward patients with SCD trended higher but not significantly. Red-flag issue subscales decreased from pre- to post-conference, but red-flag behaviors did not change over time. It is yet to be determined if the educational intervention will change practice over time.

Puri et al. (2016) did a prospective pre- and post-intervention ED study with 96 healthcare staff at baseline, including 57% nurses (n = 55) at an urban university hospital on the East Coast of the United States. All completed Haywood et al. (2011) General Perceptions about Sickle Cell Patients Scale. During the intervention, participants watched an eight-minute video that discussed the challenges of caring for patients with SCD from the perspectives of ED healthcare personnel and patients with SCD. Post video, 83 participants completed the survey. Three months post-video, 83.3% completed the survey. Mean scores on the negative, positive, and red-flag subscales show statistical significance post-intervention. Negative attitudes subscale means scores decreased from a score of 40.8 to 29.3, a (-11.5) difference (95% CI [-14.3, -8.7]). Positive attitudes subscale means scores increased from 34.8 to 44.8, a difference of (-10) points (95% CI [6.6, 13.4]). Red-flag behaviors subscale mean scores decreased from 64.8-52.1, a (-12.8) difference (95% CI [-16.3, -9.3]). There were no significant changes in the mean scores at three months on the negative attitudes' subscales post-intervention. The positive attitudes, three months post-intervention mean scales were still better than baseline but lower, and the red-flag behaviors were about the same but significant from baseline. Nurses, when compared to physicians, exhibited lower positive feelings towards patients with SCD. Compared to all other healthcare professionals, nurses had a higher level of belief about patients with SCD demonstrating "red-flag behaviors" as inappropriate drug-seeking.

Nurses' Knowledge About SCD

The knowledge about SCD is the ability of nurses to assess the pathophysiology in the patient complications of SCD, indications for blood transfusions, pain physiology and management, syndromes of SCD, improving the quality of sickle cell care, and overcoming the challenges of hospital care (National Heart, Lung, Blood Institute; U. S. Department of Health and Human Services. (2014); Tanabe et al., 2013; Jenerette et al., 2014; Yaqoob & Nasif, 2015). There must be an understanding of the SCD syndromes to implement best care practices (Tanabe et al., 2013). Also, promoting multimodal appropriate analgesia practices, implementation of evidence-based protocols, timely pain assessments, pain measurements, and pain management decrease VOC mortality complications (Uwaezuoke et al., 2018).

In a need assessment survey by Linton et al. (2020), they found the majority (98.1%) of participants acknowledged they knew how to treat patients with SCD in VOC. However, only 23% of the participants knew of the National Heart, Lung, and Blood Institute's (NHLBI's) guidelines for treating VOC. The success of local use of VOC protocols was limited. Only 55.6% of the participants acknowledged that their ED had a protocol for treating patients with SCD pain.

Masese et al. (2019) completed need assessments, interviews, and focus groups from healthcare facilities in central North Carolina. The researchers found that 70% of the participants were unaware of the NHLBI's guidelines for the ED management of patients with SCD. Furthermore, the Kim et al. (2017) prospective pre-and post-evaluation study showed resistance to a practice change and knowledge deficits to evidence-based protocols for patients with SCD in VOC. Inadequate pain assessments fractured the process of rapid pain assessments in the ED because of time constraints, competing priorities, and overcrowding. These preliminary assessments result in longer wait times and pain management delays.

Knowledge of patients' current electronic medical records, history, and treatment is vital in proper care and treatment on ED visits. The lack of access to these records after clinic hours or weekends prevents the individualization of pain management plans

(Masese et al., 2019). Marco et al. (2013) study found that patients with SCD have the highest mean pain scores by diagnosis., and the Yaqoob and Nasaif (2015) study found that most nurse participants (73.3%) did not believe the patients with SCD self-reported pain.

The Faro et al. (2020) retrospective needs assessment study on health care practitioners' clinical performance on service delivery and quality of care to improve the education and knowledge of patients of SCD and providers education for patients with SCD. Data were collected from regions 7 and 5 Medicaid and Managed care organizations from 2014-2017. The study lacked the uniform measures needed from 28 regional and territorial Medicaid/Medicaid Managed Care Organizations for defining and collecting data to drive qualitative improvement outcomes for healthcare professionals. Although the Medicaid records showed that care was received, there was no information on the specific care provided. A future strategy needs to include improved quality metrics and establish an SCD patient registry, the patient's electronic health records, and the exclusion of Medicaid data. Showing well-defined quality measuring metrics and building and establishing partnerships with stakeholders with a shared approach will contribute to a quality approach to caring for patients with SCD.

Tanabe et al. (2013) did a one-day "train-the-trainer workshop" development and evaluation program on the knowledge of SCD. Researchers invited ED nurses and physicians with the highest number of patients with SCD to participate in this program. A panel of six SCD and ED developed a 20-item pretest and posttest knowledge of SCD evaluation. The objective of the knowledge assessment was to determine the differences in the pre-test and post-test results and the number of participants who disseminated the informational content of the workshop. Most healthcare professionals who attended were nurses (*n* = 29), physicians (*n* = 11), and others (*n* =15). The mean scores significantly improved between the pre-test and post-test (95% CI= 2.96 [2.36, 3.57]). The paired *t*-test results showed improvement as well. The low pretest scores were from questions related to addiction and understanding of pathophysiologic complications of SCD. Nurses' and physicians' knowledge in content areas showed no improvement in the transfusion and iron overload threshold. The content of this question may not have been clear to the participants. It was not clear for the poor dissemination of the program information.

Yaqoob and Nasaif's (2015) quantitative, descriptive, cross-sectional study used the Nurses' Knowledge and Attitude Survey regarding Pain developed by Betty Ferrell and Margo McCaffery in 1987 at a government hospital in the Kingdom of Bahrain. Many researchers use this survey instrument. With permission from the developers, the survey questionnaire was modified to reflect the pain management of adult patients with SCD in VOC. This study aimed to assess nurse participant staff's knowledge and attitudes about the pain assessment and management of patients with SCD during a VOC. Nurses were found to be deficient in their knowledge regarding medications, vital signs, and the patient's ability to sleep in the areas of pain assessment and management. Lack of training and continuing education could have contributed to inadequate knowledge about SCD because most participants had no pain management training outside of their academic education.

Nurses' Pain Management Practices of Patients With SCD

The pain management of patients with SCD involves the nurses' process of initiating patients' pain assessments, and reassessments, reducing the severity of pain and improving the quality of care (Coleman, 2016; Freiermuth et al., 2016; Kim et al., 2017); The Joint Commission, 2018; Yawn & John-Sowah, 2015). Pain assessments and reassessments include how the patient expresses pain, associated physiological signs, accompanying symptoms, and other clinical information (Collins et al., 2020). Trust and belief between the provider and patient are important when promptly treating the patient's pain (Collins et al., 2020).

Multidisciplinary approaches to ED or inpatient SCD are a strategy to educate patients and staff, to improve pain management, or decrease acute care utilization of adult SCD patients (Della-Moretta et al., 2020; Lyon et al., 2020; Odesina et al., 2010; Powell et al., 2018; Tanabe et al., 2015). Multidisciplinary teams were similar in each study. They included physicians, nurse practitioners, nurses, nurse case managers, social workers, and pharmacists. There were different multidisciplinary approaches to the type of pain management plan implemented. The pain management plans were for an individualized care plan or standardized sickle cell pathway for treating patients with SCD. Most of these studies were retrospective chart reviews (Della-Moretta et al., 2020; Lyon et al., 2020; Odesina et al., 2010; Powell et al., 2018; Tanabe et al., 2015). In each multidisciplinary study, findings show ~~a~~ decrease in ED visits, hospital admissions, and readmissions of patients with SCD (Della-Moretta et al., 2020; Lyon et al., 2020; Powell et al., 2018. In the multidisciplinary approaches, no data were collected for individual participants implementing any type of pain management protocol or nurse or other healthcare provider variability in the protocols was used (Della-Moretta et al., 2020; Lyon et al., 2020; Odesina et al., 2010; Powell et al., 2018; Tanabe et al., 2015).

Patients With SCD Report of Pain

The patient report of pain is how patients define pain experiences. Pain is subjective and is what the patient feels and says it is (McCaffery, 1968). Translation of pain experiences of patients with SCD will vary from one patient to another and incorporate multifactorial psychosocial and contextual factors (Collins et al., 2020).

Bakshi et al. (2018) enrolled participants in a web-based decision aid randomized clinical trial (RCT) for therapeutic choices in SCD. The therapeutic options were for disease-modifying treatments, such as hydroxyurea, bone marrow transplantation, or chronic blood transfusions. Patient participants volunteered via fliers from SCD clinics and regional and national conferences. One of the goals of this RCT was to gather further evidence toward an accepted definition of chronic pain in patients with SCD as indicated by the Analgesic, Anesthetic, and Addiction Clinical Trial Translation Innovations Opportunities and Networks-American Pain Society Pain Taxonomy. Participants were to answer questions about the frequency of vaso-occlusive episodes and determine if pain three days or greater in one limb or more out of a week was associated with worse pain-related outcomes. The National Institutes of Health developed the Patient-Reported Outcomes Measures Instrument (PROMIS). This instrument measures adults with SCD Patient-Reported Outcomes (PROs) of pain interference, anxiety, depression, fatigue, and physical functioning. Of the 79 participants, 47 completed at baseline the PROMIS questionnaire. Participants who did not meet the PROMIS questionnaire were younger, and the mean age was 25 vs. older participants, where the mean age was 35 (p = 0.08). The researchers had two groups of participants, (n = 33) who reported pain three or more days a week and (n=14) who reported no pain three or more days out of the week. There were no statistically significant demographic variables among the groups. The PROMIS measures were more deficient in functioning when compared to population-based norms and worse in pain interference and anxiety. However, the PROMIS median scores were less for pain interference, anxiety, and depression among the two divided groups. Although the RCT delineated participants who had pain more significant than three days out of the week and measured worse functioning, this is evidence of defining chronic pain in patients with SCD. Knowing the participants' pain intensities during those days would have been helpful. Researchers did not examine participants' medical records were reviewed. All data was based on patients' self-report.

Ezenwa et al.'s (2016) exploratory study examined the patients' reports of pain regarding health injustice toward patients with SCD. Distributive justice is when the outcomes are incongruent with established standards. According to Colquitt (2001), distributive justice is when results are inconsistent with established standards for allocation or equality (p. 110). This area pertains to patients with SCD in VOC in an acute care setting. Patients are expected to receive the correct medications and dosages administered by nurses for their current pain level, spend less time at intolerable pain levels, and achieve adequate pain control. When these parameters are unmet, the patients perceive this outcome as unjust. Patients reported pain medications were not given promptly when inside the hospital ED or during hospital admission fell within the patients' perceived experiences of health distributive injustice and poor pain outcomes. Nurses not knowing about SCD, changing prescribed dosages to lower dosages, and not notifying a physician negatively impacted patients' perceived pain experiences. Patients remember these experiences.

Evensen et al. (2016) cross-sectional study examined patients with SCD quality-of-life measures in the ambulatory care and emergency care departments. The patients reported quality-of-life measures related to pain and pain treatment within the past 12 months. Ninety percent had been treated for a severe painful episode, then (20%) were treated the week before the study, and nine percent at the implementation of the survey. Sixty-seven percent of the participants reported that the severity of pain was enough to interfere with their lives, and 37% said the pain was so severe to the point of debilitation requiring assistance or ongoing care. The pain of patients with SCD dominates every aspect of their lives.

Sinha et al.'s (2019) qualitative study examined the impact of the opioid epidemic and adult patients with SCD living with chronic pain. All participants (n = 18) had reported experiencing pain for more than three days out of the week and had a current prescription for opioids. Twelve of the participants had been prescribed opioids in childhood or adolescence, and three in adulthood. In the analysis, three themes emerged, opioid prescriptions had become more restrictive, under more surveillance, and increased barriers in pharmacy dispensing. Participants experienced a focus on pain medication reduction and began seeking alternative therapies for the removal of pain. These emerging themes have led to further erosion in patients' sensitivity, decision-making, and the undertreatment of pain. Thus, the opioid epidemic has negatively impacted patients with SCD to seek medical treatment and pain management.

Collins et al. (2020) included young adult participants with SCD and numeric pain scales to communicate pain severity in a longitudinal qualitative case study. Pain rating scales do not share the complex nature of relational or social aspects of communication between patients, health care professionals, and significant others during severe pain experiences. The emerging themes are the complex use of pain scales and healthcare professional influences on pain assessment and judgments. Other themes are how pain relates to significant others and past medical history. The complexities of the pain scale did not incorporate the sequelae of pain during a VOC; pain is different in several areas that are affected simultaneously in the body. Just giving one pain score is more difficult to translate if there are several areas of pain—two different patients with SCD experience dissimilar acute VOC. Healthcare personnel need to understand this furthering distrust. Painful crises heavily influence social relationships. Patients with SCD in VOC may try to conceal pain because of how others perceive pain, not to have them worry, run them off, or be overprotective. While pain rating scales are in everyday use, the scales do not communicate the relational and social aspects of pain.

Nurses' attitudes toward patients with SCD were studied by Freiermuth et al. (2016), Haywood et al. (2015), Hazzazi et al. (2020), Jenerette et al. (2015, 2016), and Puri et al. (2016) using the survey questionnaires. Freiermuth et al. (2016), Haywood et al. (2015), Jenerette et al. (2015, 2016), and Puri et al. (2016) used the "General

Perceptions about Sickle Cell Patients Scale." Physician healthcare professionals were included in some of the studies; however, most participants were nurses. Researchers collected demographic data in all studies. Freiermuth et al. (2016), Jenerette et al. (2016), and Puri et al. (2016) conducted longitudinal studies over three-time frames. In all studies, the mean negative subscales for nurses were higher than for physicians. The physicians had higher mean positive subscales than nurses. Nurses had higher mean red-flag behaviors toward patients with SCD than physicians. Haywood et al. (2015) examined healthcare professional attitudes and racial characteristics regarding healthcare disparities or barriers toward patients with SCD. Asian clinicians had higher mean negative attitudes than Whites or Blacks. Freiermuth et al. mean subscales of uneasiness with care subscale were higher in physicians than nurses. Jenerette et al. (2016) and Puri et al. iterated that the long-term impact of educational interventions changed negative attitudes over time. However, with ongoing educational opportunities, Freiermuth et al. attitudes did improve over time.

Faro et al. (2020), Linton et al. (2020), Masese et al. (2019), Tanabe et al. (2013), and Yaqoob and Nasaif (2015) researched knowledge about SCD. Faro et al. conducted a retrospective chart review study of Medicaid and Managed Care Organization data. The researchers examined healthcare professionals' clinical performance, service delivery, and quality of care in patients with SCD. Linton et al. and Masese et al. administered needs assessment survey questionnaires. Linton et al. and Yaqoob and Nasif tested participant self-reports on survey questionnaires on the knowledge about SCD. Linton et al., Masese et al., and Yaqoob and Nasaif found deficiencies related to the opioid epidemic, inadequate pain management, and patient behaviors of knowledge about SCD. The Faro et al. study was able to assess population-based improvements. However, the challenges of not evaluating patient electronic health records to determine healthcare delivery and services knowledge deficits are unknown.

Della-Moretta et al. (2020), Lyon et al. (2020), Odesina et al. (2010), Powell et al. (2018), and Tanabe et al. (2015) studied multidisciplinary approaches of healthcare professionals' personnel in the pain management of patients with SCD. Delta-Moretta et al. found with individualized plans in patients with SCD, there was a decrease in time to the first opioid dose. Lyon et al.'s observation unit-based pathway for uncomplicated VOC had a decreased admission rate of 20%, a reduction of 3.6% in return rate, and a 41% rate in a 30-day return rate over a three-year timeframe. Odesina et al. retrospective review study assessed the development and implementation of an adapted ED pain clinical pathway for sickle cell patients. Tanabe et al. implemented a nurse-driven high-dose opioid protocol for pain in sickle cell patients. Patients received initial analgesics in a shorter time frame compared with prior practices. When the nurse-driven protocol was used, no patient suffered any abnormal vital event requiring intervention. Multidisciplinary clinical pathways for patients with VOC are successful when implemented without delays in the initial dosing of opioids and ongoing continual care. Delt-Moretta et al. found no decrease in the length of stay after inpatient admissions.

Bakshi et al. (2018), Ezenwa et al. (2016), Evensen et al. (2016), Collins et al. (2020), and Sinha et al. (2019) researched patients with SCD reports of pain from different pain perspectives. Bakshi et al. examined patients with SCD reports of pain for at least three days out of a week to meet chronic pain criteria and definitions. Pain for three days out of a week is associated with poorer outcomes. Sinha et al. explored the opioid epidemic and its negative impact on patients with SCD. The opioid epidemic and patients with SCD face pain contracts, reduced opioid medications, and looking for alternative means to relieve pain or escalation of pain. Evensen et al. participants document how pain impacts all aspects of their daily lives. Upon presentation to ambulatory and emergency care departments, pain is exacerbated when healthcare professionals with poor knowledge about SCD. Ezenwa et al.'s research into distributive injustice occurs with higher levels of pain requiring higher dosages of opioids. When lesser dosages are given, this is inadequate and distributive injustice. Collins et al.'s (2011) research into pain scales in daily use does not measure pain's social and communication aspects. Pain scales do not note the pain levels in each body area.

Summary and Conclusions

For nurses who care for patients suffering from the long-term effects of SCD, acute VOC, and challenges of pain management in the acute care setting, present were four significant nursing relationships in the literature. They were nurses' attitudes toward patients with SCD (attitude toward the behavior, behavioral intentions), nurses' pain management practices (subjective norms, resources, opportunities), knowledge about SCD (resources), and patients' reports of pain relief (behavioral achievement). The nurses' attitudes toward patients with SCD are in the behaviors of nurses toward the pain assessment and management of patients with SCD behavior barriers, such as sociocultural factors, concerns regarding addiction, disbelief by the patients, and deficient quality of care. The pain management of patients with SCD involves the nurses initiating patients' pain assessments and reassessments, reducing the severity of pain, and improving the quality of care. The knowledge about SCD is the ability of nurses to assess the pathophysiology in the patient complications of SCD, indications for blood transfusions, pain physiology, and management, syndromes of SCD, improving the quality of sickle cell care, and overcoming the challenges of hospital care. The patient report of pain is what or how patients define pain experiences. Pain is subjective and is what the patient feels and says it is.

In conclusion, nurses who care for patients with SCD must realize the acute and chronic pain nature of this long-term illness. The recurring themes of the four variables must be examined to make time for successful outcomes in the pain management of patients with SCD in VOC. Immediate initial dosing and subsequent follow-up dosing for VOC will help in acute pain suffering.

This critical study fills a gap in the literature by examining whether nurses' general attitudes about SCD, Knowledge about SCD and demographics are factors in improving pain management care for patients with SCD in VOC. The study extends the knowledge in the nursing discipline by reducing pain, suffering, the reduction in morbidities, and mortalities related to VOC.

Chapter 2 discussed the literature search strategy, theoretical foundation, literature key variables, summary, and conclusion. Chapter 3 discusses the research design and rationale, methodology, threats to validity, and ethical procedures.

Chapter 3: Research Method

The purpose of this quantitative, comparative descriptive study was initially planned to examine nurses' attitudes towards SCD and their practices in administering medications to SCD patients. The study was revised after access to data showing that pain medication administration and effectiveness in patients with SCD was not available to match with the 77 nurses in the sample. Therefore, the nurses' data obtained from the three scales were established as valid and used to examine whether there are differences between nurses' general attitudes towards patients with SCD via dependent variables of positive attitudes and negative attitudes subscales by independent categorical variables years of experience (5 years or less or 6 years or more) and race/ethnicity (Black or All other races) and to examine whether there are differences between the nurses who scored at 14 and above on the Knowledge About SCD scale compared to the nurses who scored at 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. The three instruments used were the General Perceptions About Sickle Cell Patients Scale Questionnaire, the Knowledge about Sickle Cell Disease survey, and a demographic survey. The sample population consisted of all nurses who cared for patients with SCD at the bedside recruited from one university hospital located in the Southeastern United States.

This chapter presents the research design and rationale, research questions and hypotheses, role of the researcher, methodology, instrumentation, data collection, data analysis plan, threats to validity, and ethical procedures. These elements ensured a sound methodological approach to the study.

Research Design and Rationale

The quantitative, comparative descriptive design was used to answer the research questions. This design is used to explore and describe the phenomenon of interest; this is nonexperimental—there is no random assignment of study subjects or intervention (Drummond & Murphy-Reyes, 2018; Gray et al., 2017). Comparative research designs are used to explain the differences in the variables in groups of two or more in a commonly accepted setting (Gray et al., 2017). This design is often used in nursing research studies when faced with complex limitations (Cantrell, 2011). This study examined the independent and dependent variables to answer the research questions and hypothesis.

Research Questions and Hypotheses

This quantitative, comparative descriptive design was used to answer the following two research questions and hypotheses:

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse?

H_o1: There are no differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

H_a1: There are differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge?

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by the level of SCD knowledge.

There were no significant time or resource constraints related to the design choice. This study focused on nurses’ attitudes, knowledge about SCD, and demographic data in the acute care setting. External variables that could have negatively impacted patient satisfaction include ED overcrowding, long wait times, and interference with triage and pain management practice guidelines (Collins et al., 2020; Smith et al., 2017), which may not be accounted for in this study. The reliability of information obtained from survey questionnaires depended on the responses being answered truthfully by the participants (Queirós et al., 2017). Responses are closed-ended and do not measure open-ended questions (Queirós et al., 2017). Nonprobability convenience sampling has limitations. The results may not be generalized to the larger population (Saunders et al., 2012).

The research design choice and the use of TPB related to this study’s quantitative comparative design approach relied on nonexperimental measures to describe the differences in two or more groups in a commonly accepted setting (Gray et al., 2017). This method of inquiry emerged as a preeminent approach for discovering commonalities across the social science fields of research (Griffiths, 2017). Jenerette et al.’ (2015)

studied nurses’ attitudes toward patients with SCD, to determine whether there were significant differences in nurses’ attitudes by worksite comparison. Brooks et al. (2018), Fang et al. (2017), and Youngcharoen et al. (2016), used the TPB to expand on and contribute to this theory. Ajzen developed the TPB to predict and describe human behavior in a particular setting or situation (Ajzen, 1991). In this study, I examined the nurses’ behaviors in the context of treating patients with SCD suffering a VOC in a university acute care setting.

Role of the Researcher

My role in this study was to be the principal investigator. My personal and professional relationships could have affected my abilities as a principal investigator in recruiting participants. The participating university hospital’s institutional review board (IRB) reviewed any potential conflicts of interest and found none. I am a doctoral-prepared registered nurse employed at the participating university for over 30 years of nursing experience and 6 years of experience on a hematology/oncology floor. I have taught nursing students from the BSN to the doctorate level via the affiliated hospital university. The participating hospital was able to support my study through (a) the facilitation of the hospital IRB process; and (b) internally granting access to nurses’ pain management documentation in electronic medical records of patients with SCD retrospectively within the past year; this information was not used in final study secondary to this information was needed before the start the study thereby changing the research design of the study; (c) recruitment by offering an anonymous electronic or paper survey options with no identifying information; (d) recruitment via flyers and electronic organizational nursing management and leadership assistance with the study invitation; (e) providing space for data collection via the hospital information technology department; and (f) offering the paper survey to nurses who have left the institution but want to take the survey and have voluntarily provided their addresses per legal and risk-management authorities. All anonymous electronic and paper surveys were recorded individually and given a five-digit randomized number to keep information organized and compiled into a codebook (Berman, 2022; Frankfort-Nachmias et al., 2015). My Collaborative Institutional Training was current as a student at Walden University and as the principal investigator at the participating hospital. Data analyzed for this study included demographic information and survey questionnaires. Doing this research was not a part of my job responsibility.

Methodology

Population

The target population was nurses who had at least one year of nursing experience and had taken care of patients with SCD in VOC from a single university-setting hospital in the Southeastern United States. The sample size was approximately 77 nurses with experience treating patients with SCD in VOC. Attrition accounted for incomplete data or if participants decided not to participate (Polit & Beck, 2017). An estimated sample size above 68 was needed to maintain statistical power (Gray et al., 2016). A 10%–15% attrition rate would have required 84–89 participants (Gray et al., 2016). Demographic information on the target population was collected for this study through a demographic questionnaire (see Appendix B).

Sampling and Sampling Strategy, Participant Selection, and Criteria

I used convenience sampling to conduct this study. This type of design is called nonprobability or nonrandom sampling. Nurse participants are the ones who spend the most time at the bedside of patients with SCD. Subjects met inclusion criteria. Nurse participants were recruited from a university-affiliated hospital in the Southeastern United States. Recruits came from the medical center and children's hospital. All nurses had at least one year of nursing experience and have taken care of patients with SCD within the past year were eligible to participate. Nurse practitioners were qualified if in the role for less than a year but have practiced as registered nurses for at least one year. Nurses without prior experience providing care for patients with SCD within the past year were excluded.

G*Power 3.1.9.6 was selected to calculate the sample size for the study. The test family chosen was the F-test. The statistical test selected was the multiple linear regression: fixed model, R^2 deviation from zero. The type of power analysis was A priori: Compute the required sample size – given α and effect size. Input parameters were as follows: α err prob = 0.15 was selected for a medium effect; α err prob (0.05) was an acceptable 5% error for the null hypothesis; power (1-β err prob) = 0.8 to detect a real relationship; the number of predictors = 3, resulting in 77 participants required for the study, which was met (see Appendix A).

Procedures for Recruitment, Participation, Data Collection and Saturation

Participants were provided an introductory letter and information sheet about the study electronically and on paper on all the medical-surgical areas and the ED in the

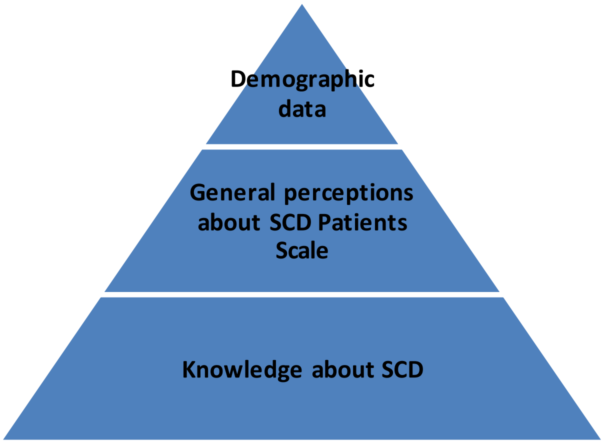
Southeastern acute care facility. For the participants, the study was voluntary and anonymous. All participants were English-speaking and could read the survey's instructions in English. Participants were free to withdraw from the study at any time. A similar introductory letter and information sheet accompanied the paper survey to potential nurse participants. Data collection occurred until accounting for attrition occurred. Although only 77 participants were needed for the study, over 100 paper surveys were sent out in addition to the electronic survey. From the beginning, the electronic survey had inconsistent links that stalled and delayed participation. Between both methods, about 84 surveys were returned. Some paper surveys had missing data, but 79 participants satisfied the sample size criteria for the study.

Instrumentation, Data Collection, and Operationalization of Constructs

The instrumentation and the operationalization of constructs used previously published and validated instruments (see Figure 3).

Figure 3

Data Collection Instruments



Note. SCD = sickle cell disease.

The instruments used were the General Perceptions Scale about Patients Sickle Cell Patients Scale, Knowledge about Sickle Cell Disease, and the demographic survey. The TPB, developed by Fishbein and Ajzen (1980) and Ajzen (1991), was used to guide the study using the four variables: the nurses' attitudes toward patients with SCD (attitude toward the behavior, behavioral intentions) and knowledge about SCD (resources). The theory has been used in behavioral research for the social sciences and nursing.

The General Perceptions about Sickle Cell Patients Scale, a provider-focused instrument, was developed or adapted from the existing literature at the time by Haywood et al. (2011) for use with healthcare personnel (e.g., physicians and nurses; see Appendix C & G, Permissions). Freiermuth et al. (2014) and Puri et al. (2016) have used the 31-item tool to assess positive or negative attitudes or beliefs of professional physicians and nurses towards patients with SCD exhibiting drug-seeking behaviors. The outcomes or construct validity were evaluated with prior validation using the Medical Condition Regard Scale (MCRS), which measures participants' degree of which patients with a particular medical illness or condition are pleasurable, manageable, and in consideration for health care resources. The physician and nurse participants in this study expressed more negative attitudes about patients with SCD. These participants also had lowered regard for patients with SCD as hypothesized and measured by the MCRS. The MCRS had previously shown good reliability (α = 0.87; Haywood et al., 2011). Assessed were the primary measures of attitudes towards patients with SCD using a 5- or 6-point Likert scale (1= *Always* to 5= *Never* and 1 = *Strongly Disagree* to 6 = *Strongly Agree*, respectively). Haywood et al. (2011) used exploratory factor analysis to develop interval scales and identify attitudinal domains. The General Perceptions About Sickle Cell Patients Scale has a short version with 17–18 questions to a longer version with 30–31 questions (Maddray & Phillips, 2020). I used the General Perceptions About Sickle Cell Patients Scale with 31 questions in this study (Puri et al., 2016). However, to measure the primary outcomes of nurses' attitudes towards the patients with SCD, I used the following subscales: (a) the six-item subscale of negative attitudes, where the higher points on the scale are suggestive of negative perceptions about SCD patients combined with, (b) the four-item subscale of the positive attitudes, where the higher points on the scale are suggestive of positive perceptions about patients with SCD, and (c) the five-item subscale of red flag subscale, where the higher scores are suggestive of the of clinicians' beliefs that certain patients with SCD behavior are drug-seeking (Puri et al., 2016). "Internal consistency reliabilities have been reported to range from .76 to .89 for negative attitudes, positive attitudes, concern-raising behaviors, and red-flag behaviors," and construct validity was supported by expected correlations with the MCRS (Jenerette et al., 2016, p. 5).

Tanabe et al. (2013) developed the Knowledge about SCD Questionnaire to assess healthcare professionals' knowledge and change for those who care for patients with SCD, the pathophysiology of SCD, pain physiology, and the need for blood transfusions for dissemination of content workshop (see Appendix D, G, and Permissions). An expert panel of six SCD and ED physicians and nurses with expertise in SCD convened to develop the pretest and posttest knowledge evaluation questions about SCD. The group defined the workshop topics, objectives, and targeted audience through an extensive literature review, conference calls, and meetings (Tanabe, 2013).

The SCD Scale was also used at the one-day workshop conducted by Jenerette et al. (2016), where 55 subjects attended. More nurses attended (*n* = 29) than physicians (*n* = 11) attended, plus 15 nonclinical subjects. Forty subjects took the initial pretest, and 27 out of 40 took the posttest. The pretest mean for the total cohort was 13 (*SD* = 2), and the posttest mean was 16 (*SD* = 2). The posttest scores showed a significant improvement from the pretest scores; the "mean difference (95% CI = 2.96, [2.36; 3.57])" for providers at the one-day workshop. Questions not answered on the questionnaire were considered missing data (Jenerette et al., 2016). Researchers calculated a total percent score for completed surveys (Jenerette et al., 2016). Jenerette et al. initiated the Knowledge about SCD questionnaire at an SCD educational conference and collected data at three different intervals. A pretest before the conference, a posttest immediately after the conference, and another posttest 2 months later. When compared to the Tanabe et al. (2013) conference, the Jenerette et al.'s conference knowledge scores were significantly improved (Kruskal Wallis $x^2 = 21.23$, $p < .0001$), the points between T1-T2 ($Z = 2.4$, $p = .0125$), and between ($Z = 2.4$, $p = .012$). At T3 for seven questions, the scores were lower than the baseline T1 score. Therefore, the SCD knowledge Scale was considered valid as an instrument to measure nurses' knowledge of SCD in my study.

The demographic survey was developed from the information from several of the research studies on nurse participants who care for patients with SCD. Basic information gathered and used for the study were race/ethnicity and years of experience. This information was used to answer research question one and to test the hypotheses.

Data Analysis Plan

A commercial statistical software package was used to analyze the data (IBM SPSS Statistics for Macintosh (Version 27.0, 2020). The instruments used were the “General Perceptions About Sickle Cell Patients Scale questionnaire (Haywood et al., 2011),” the “Knowledge About SCD questionnaire survey (Tanabe et al., 2013), and a demographic survey. Once the data was received from the electronic and paper surveys, all surveys were checked for completeness and missing data (Gray et al., 2017). A total of 84 surveys were received, and five paper surveys had to be removed because of missing data. The surveys were then ready for data entry into the statistical software package to begin to answer the research questions and hypotheses. The research questions and hypotheses were:

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse?

H_o1: There are no differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

H_a1: There are differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge?

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by the level of SCD knowledge.

A two-way MANOVA and one-way MANOVA were chosen.to test the hypotheses. Multivariate ANOVA or MANOVA analyzes the differences between the dependent variable and between groups of two or more independent variables (Laerd, 2023). In a MANOVA, the dependent variables must be continuous (Laerd, 2023). The two-way MANOVA and the one-way MANOVA each have a list of assumptions that must be met to accept the null or alternative hypotheses (Laerd, 2023). The results were interpreted to accept or reject the null hypotheses.

Threats to Validity

The external threats in this study and the findings may not be generalizable Attended any pain healthcare setting. A high refusal rate or insufficient participants could affect the power of the study and the significance or statistical conclusion validity. Threats to internal validity are preventable or decreased when all biases and questions are addressed. Historically, in the face of post-COVID-19 pandemic nursing and healthcare personnel shortages in acute care settings, procedures and protocols change daily. Although this was not an experimental study, attrition can occur, affecting the power of the study. Noncompletion of survey questionnaires or omissions may result in incomplete data. Participants may change their minds and stop participating in the study. Electronic commercial survey testing sites may advertise before directing participants to a survey questionnaire site. This may hinder nurses from taking an electronic survey. There may be a testing threat to participants, especially when knowledge of certain questions is unknown. Nurses who opted to do the electronic survey have electronic daily email reminders, job updates, and surveys related to job-related materials. Most electronic job requirement testing is mandatory and creates another stressor to do student nurse surveys at the same time while working and caring for patients. Many nurses said they do not read emails unless they are told there is something in the email that requires their attention. Also, the implementation of a paper questionnaire survey through the standard United States Postal Services mail delivery for those nurses who have left the medical center and still voluntarily want to take the survey and have provided their addresses. The introduction of the paper survey option by the principal investigator permitted nurses to voluntarily do the survey without booting up to a computer without any identifying nurse information.

Ethical Procedures

No information about human participants was initiated until IRB, Risk Management, Ethics Management, and Data Management approval occurred at the participating university hospital and Walden University. A collaborative Institutional Training Initiative was required of all personnel conducting human research. All personal health information was protected, and the regulations were followed for electronic health records (Centers for Disease Control and Prevention., Health Insurance and Accountability Act of 1966). Patients' records providing retrospective nurse pain

management documentation practices were analyzed and provided by the participating university data management team without any patient identifiers (Gray et al., 2018).
All introductory letters, information sheets, and flyers for electronic or paper surveys to participants, the IRB, Risk Management, Ethics Management, and Data Management met approval before use. Researchers followed all IRB guidelines to avoid any incidents or variances. The researcher reported all changes, concerns, and or potential breaches.

Any participant voicing ethical concerns about participation or requesting early withdrawal from the study was thanked for their consideration and dismissed from the study. A pre-emptive approach to prevent ethical dilemmas was facilitated by providing comprehensive information about the study to the IRB before approval. Any ethical concern if any was to be reported according to established IRB guidelines.

If there were any questions, I, the principal investigator answered any questions until the participants were satisfied. Participation was voluntary and anonymous. All electronic data was password protected, and all storage devices were stored and locked in a secure place. Paper surveys were placed in a secured location. No one had access to the data other than the principal investigator. Data was destroyed after the study concluded.

Summary

This chapter discussed the research design and rationale, research questions and hypotheses, role of the researcher, methodology, instrumentation, data collection, data analysis plan, threats to validity, and ethical procedures. There have been challenges along this process. However, in revising the original plan, the focus shifted from nurses ‘attitudes, knowledge about SCD, and pain management documentation to the nurses’ general attitudes, demographic data, and the level of knowledge about patients with SCD. Chapter 4 will focus on the introduction, the setting, demographics, data collection, data analysis, the results and summary.

Chapter 4: Results

This study aimed to examine nurses' attitudes toward patients with SCD using the General Perceptions about Sickle Cell Patients Scale (Haywood et al., 2011), and their knowledge about SCD using the Knowledge about SCD survey questionnaire (Tanabe et al., 2013). I examined the differences between nurses' general attitudes towards patients with SCD via dependent variables (positive and negative attitudes subscales) and independent categorical variables (years of experience and race/ethnicity). The dependent variable information of the positive and negative attitudes subscale data came from the participants who took the General Perceptions about Sickle Cell Patients Scale (Haywood et al., 2011) questionnaire. The years of experience (less than 5 years or 6 years or more) and race/ethnicity (Black/African American or All other races) information was gained from the collected demographic questionnaire. I also examined the differences in the positive and negative attitudes subscale scores (dependent variables) between nurses who scored 14 and above and nurses who scored 13 and below (independent variables) on the Knowledge about SCD scale questionnaire in a university acute care setting.

There were two research questions, each with null and alternative hypotheses:

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse in a university acute care setting?

A Two-Way MANOVA was used to determine the differences.

H_o1: There are no differences in nurses' negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

H_a1: There are differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by the level of SCD knowledge in a university acute care setting?

A One-Way MANOVA was used to examine the differences.

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by the level of SCD knowledge.

In this chapter, I describe the data collection methods and analysis used to address the two research questions in this study. I also present the findings of nurse participants who took the General Perceptions about Patients with SCD, the Knowledge About SCD scale questionnaires, and the demographic survey.

Data Collection

Process of Data Collection

Prior to administering the surveys and questionnaires, I obtained an exemption for the study from the teaching hospital IRB located in a Southeastern region of the United States. Going through about three IRB specialists, the IRB approval process took nearly a year, after which I began the nurse recruitment process. Between the hospital Qualtrics electronic survey link and the paper survey, recruitment took about 2 months. Participation was voluntary. Participants were recruited by distributing fliers to each floor in the acute care hospital setting and sending an email to nurse managers to be forwarded to potential nurse participants that included an email link to the teaching hospital Qualtrics survey. The day I began data collection, the Joint Commission was at the start of its survey at this institution, so there was a bit of anxiety among the nursing staff, nursing managers, and leaders. There were also problems with stalling at the email link. The Internet technical support for the hospital was contacted. As an alternative to the electronic link, a subsequent request was made to the hospital Intuitional Review Board to administer an alternative paper survey. The administration of the paper survey was quickly approved.

Participants were cooperative in participating in the study. Some participants referred others. Some individuals were excluded because they did not meet the inclusion criteria as described in Chapter 3.

As outlined in Chapter 3, I realized there was the possibility of not obtaining enough participants to complete the survey. However, I received 84 surveys. Accounting for attrition, I met the requirements of at least 68 to maintain statistical power. The demographic section was completed by 85.7% of participants (*n* = 66), and 14.3% (*n* = 11) of demographic surveys were missing data. For the General Perceptions about Patients with SCD section, 97.4% (*n* = 75) completed the survey, and 2.6% (*n* = 2) did not. For the Knowledge about SCD section, 100% (*n* = 77) were completed by participants. All nursing data that were included (*n* = 79) was entered into IBM SPSS Statistics for Macintosh (Version 27.0, 2020). Each anonymous nurse participant was coded with a five-digit randomized number (Berman, 2022). As iterated in Chapter 3, nursing pain documentation had to be excluded from this study due to an inability to connect anonymous nursing data to specific nurses and patients. So only the results from the anonymous nursing data collected are in the revision of this study. However, there are further limitations to this study sample given the change in the analysis plan from regression to MANOVA, so the number of participants was not likely enough to power a MANOVA as indicated in the post hoc power analysis and described in the results.

Descriptive and Demographics

Age

There was a total of 79 participants in this study. Because of errors in the paper survey, not all participants completed this area in the paper survey. Between the hospital electronic commercial survey and the paper survey, only 47 of the 79 participants answered the age question. All participants had to be at least 18 years old to participate in the study. The youngest group was 21–26 years of age (*n* = 8). The next group was 27–32 years of age (*n* = 10). Eleven of the participants were 33–38 years of age. Seven of the participants were 39–45 years of age. The oldest were greater than 50 years old (*n* = 9).

Registered Nurses

There was a total of 79 participants in this study. All agreed to participate in the study anonymously. To participate in the study, all participants had to be at least 18 years of age, be registered nurses (including nurse practitioners), and be able to speak English (see Table 2).

Years of Working in Nursing

Of the 79 nurse participants, 28 (or 35.4%) have worked as a nurse for 1 to 5 years. Eighteen (22.8%) have worked as a nurse from 6 to 11 years. Nineteen participants

(24.1%) have worked 12–17 years as nurses. Fourteen nurses (17.7%) have worked as a nurse for 18 years or more (see Table 2).

Race and Ethnicity

Of the 79 nurse participants, 28 (35.4%) were White. Eighteen participants (22.8%) were Black or African American, and 33 participants (41.8%) were Asian, Native American/Alaskan Native, or Native Hawaiian/Pacific Islander (see Table 2).

Table 2

Frequency and Percentage Distribution of the Four Demographic Variables

Variable	*N*	%
Nurses	79	100
Race/ethnicity		
White/Caucasian	28	35.4
Black/African American	18	22.8
Asian	19	24.1
Native American/Alaskan/Hawaiian/Pacific Islander	14	17.7
Years of experience		
1-5 years	28	35.4
6-11 years	18	22.8
12-17 years	19	24.1
18 or years	14	17.7
Areas of Practice		
Hematology/BMT	31	39.3
Medical surgical	28	35.4
Emergency department/intensive care	20	25.3

Results

I began data collection began on October 31 and continued through December 31, 2022. The survey completion took place through the study hospital electronic commercial survey system and a comparable paper survey. The paper survey came about because there were issues with the hospital's electronic commercial survey system related to stalling and site advertisements, resulting in participation delays. In addition to the survey questionnaires, originally, patient-related data were received from the hospital data management through a data analyst. I later learned the patient-related data could not be used due to a preliminary critical oversight error prior to data collection. The electronic patient-related data would have been necessary to identify potential nurse participants directly in the nursing pain documentation. This error resulted in using only the nurse survey data and demographic information. I received a total of 24 electronic survey responses and about 60 paper surveys. Five paper surveys were excluded for missing data, leaving a total of 79 nurse participants. I later worked with a statistician, the current chair, and a committee member to identify which multiple regression tests would be used. The research questions and hypotheses had to be revised. This work resulted in revisions to several parts of the dissertation over the next two-semester terms related to the two-way MANOVA and one-way MANOVA. In selecting the two-way MANOVA and the one-way MANOVA, using G*Power, I learned that 158 participants were needed to power the study. Having only the original 79 nurse participants would be one of the flaws of the final study.

All 79 of the nurse participants who completed the questionnaire surveys and demographic information met the registered nurse criteria. Twenty-eight of the nurses had worked less than 5 years as a nurse and 57 had worked 6 years or more as a nurse. Eighteen were Black/African American, and 61 were of all other races/ethnicities.

This population is a representation sample of the population of interest (Statistic Solutions, 2023). This is a sample of participants who are nurses who cared for patients with SCD patients. This is a population when you want to draw conclusions (Survey Monkey, 2023).

Results for RQ1 Using a Two-Way MANOVA

The primary purpose of the two-way MANOVA is to understand whether there is an interaction between the two independent variables on the two or more dependent variables (Laerd Statistics, 2023). In my study, I used the two-way MANOVA to determine the effect of race/ethnicity and years of experience on the nurses' attitudes towards SCD collectively or if there was an interaction between the variables.

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse in a university acute care setting?

Using a MANOVA to determine the differences requires that the test assumptions be met or accommodations be made for deviations from the assumptions. I first checked for assumptions before running the MANOVA. The MANOVA has nine assumptions. The first four assumptions are described below and are met.

1. Two or more dependent variables are needed. In my study, the two dependent variables are general attitudes toward SCD patients, including negative and positive attitudes. All dependent variables are continuous variables scored on a 6-point Likert scale. The higher the score, the higher the degree of positive attitudes and the higher the degree of negative attitudes.
2. The second assumption is that the independent variables are categorical and consist of independent groups so that each participant is only in one of each of

the groups. The two categorical variables in my study are Race/ethnicity, consisting of African American/Black and All others, which are independent of each other, and Years of Experience, which includes two independent groups: 5 years or less and 6 years of experience or more.

3. The third assumption is that the data must have independence of observations and no relationship between the observations in each group. This assumption is met as the Black/African Americans are not in the All-other race ethnicity group. The variable also has no relationship between the two groups so those with less than 5 years' experience are independent of participants in the 6 years or more group.
4. The fourth assumption is that an adequate sample size is needed. There must be more in each group than the number of dependent variables. With two dependent variables and a sample size of 79, this assumption is met.

Assumptions 5 through 9 were checked using SPSS to determine if the assumption was met.

Assumption 5 shows no extreme multivariate outliers (across each IV with each DV). I used a boxplot to test for multivariate outliers for each DV and across each of the IV groups. Only one outlier was found in the Race/ethnicity group-Black/African American attitudes. Although a MANOVA can tolerate a few outliers, no extreme outliers were found, so Assumption 5 was met (see Figures 4–7).

Figure 4

Multivariate Outliers Years Working as a Nurse and Positive Attitudes

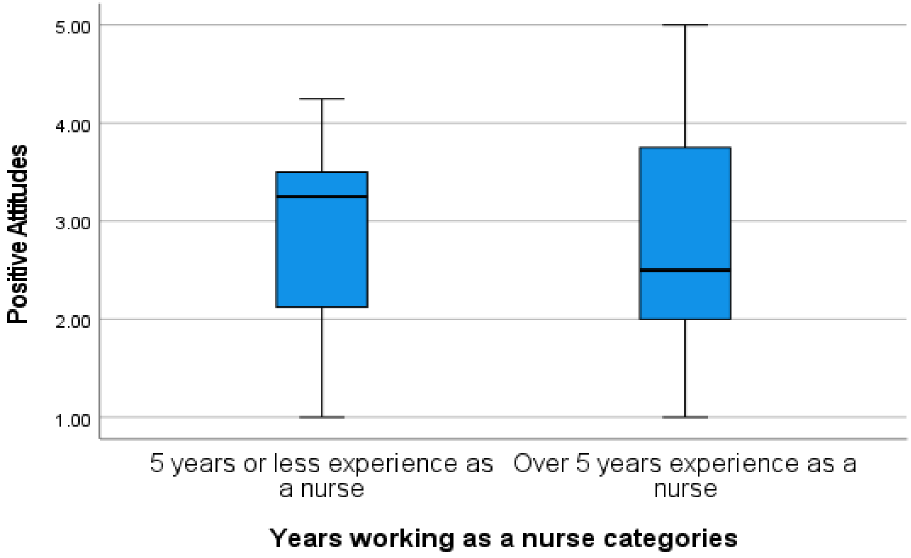


Figure 5

Test of Multivariate Outliers Years Working as a Nurse and Negative Attitudes

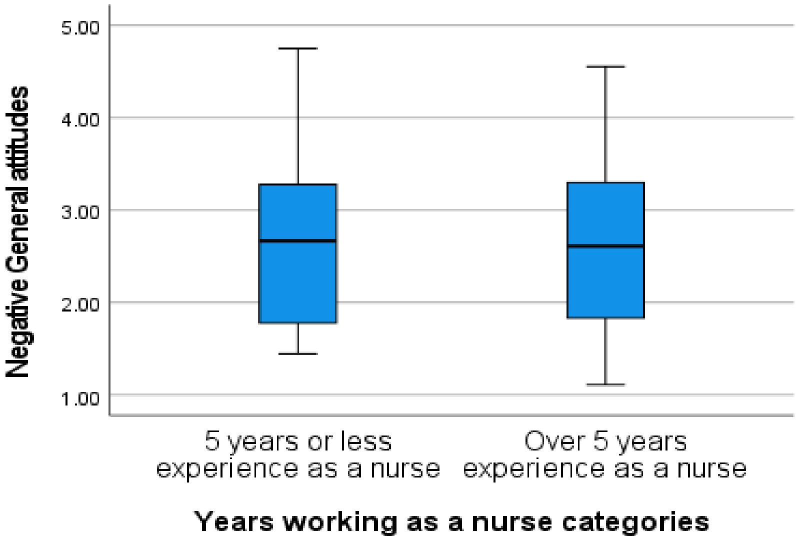


Figure 6

Multivariate Outliers Race Ethnicity and Positive Attitudes

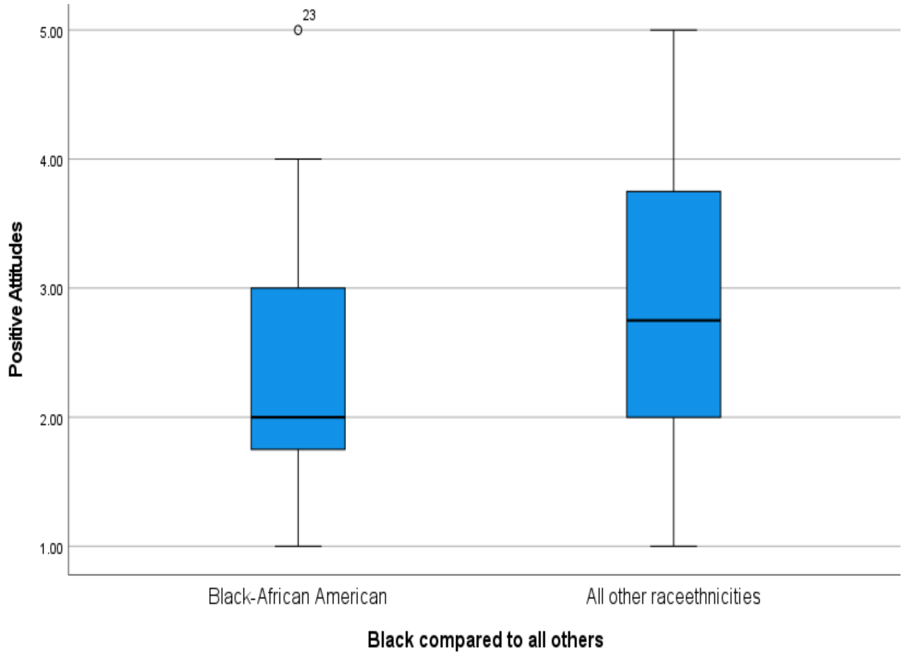
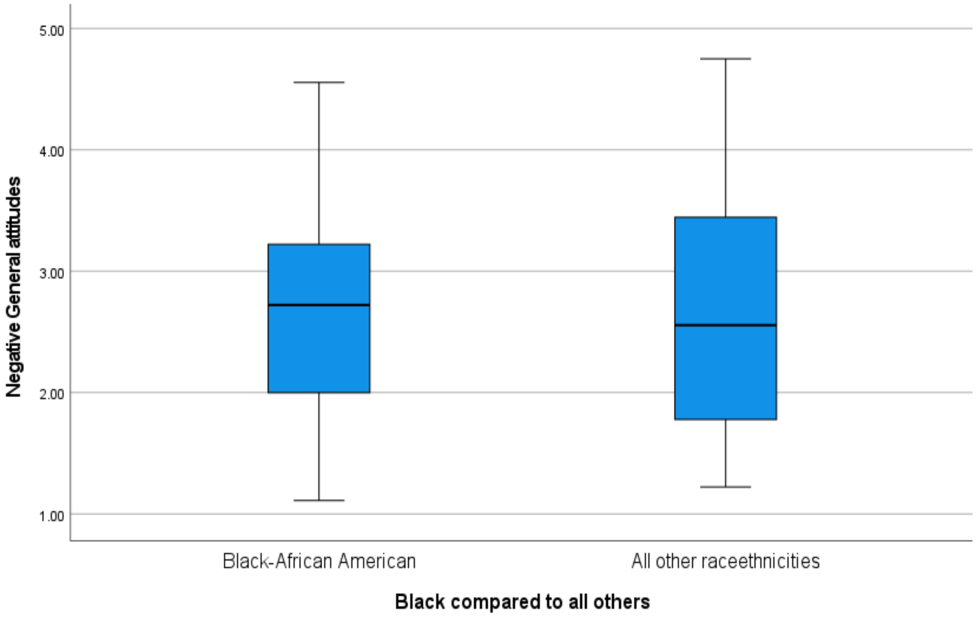


Figure 7

Multivariate Outliers Race Ethnicity and Negative Attitudes



Assumption 6 is that the data must have multivariate normality—I ran a Shapiro-Wilk test of normality for each of the groups. The Shapiro-Wilk test was conducted to test for normality across the IVs and DVs. Positive attitudes for the five years or less experienced nurses and all other race ethnicities were not significant, 0.935, *df* = 27, *p* =.090, and .966, *df* = 57, *p*= .104, respectively; and the negative general attitudes for nurses with over five years-experience was not significant *p* =.090 as well as the Black-African American variable at .984, *df* = 18, *p* = .982, respectively, indicating these two combinations of variables were normally distributed.

The final two combinations of variables were not normally distributed. The over 5 years positive attitudes (*p* = .026) and the Black-African American positive attitudes (*p* = .047), in addition to the 5 years or less negative attitudes (*p* = .042) and the All-other race ethnicities (*p* = .005), were not normally distributed with Shapiro-Wilk test of $p < .05$ (see Table 4). Because the Shapiro-Wilk test of normality lacked normal distribution in two of each of the combinations of each of IVs and DVs, the test was considered violated. However, because MANOVA is known to be robust against minor deviations from normality (Zach, 2021), I proceeded with the remainder of the assumptions and the test statistics (see Table 3).

Table 3

Shapiro-Wilk Test of Normality

Attitudes		Shapiro-Wilk		
		Statistic	*df*	Sig.
	Years working as a nurse			
Positive attitudes	5 years or less	.935	27	.090
	Over 5 years	.945	48	.026
Negative general attitudes	5 years or less	.921	27	.042
	Over 5 years	.959	48	.090
	Race/ethnicity			
Positive attitudes	Black-African American	.895	18	.047
	All other race/ethnicities	.966	57	.104
Negative general attitudes	Black-African American	.984	18	.982
	All other race/ethnicities	.937	57	.005

The seventh assumption must show a linear relationship between each dependent variable and for all combinations of the IV groups. To test Assumption 7, I ran scatter plots of the residuals for positive and negative attitudes. Results indicated there is a linear relationship between each dependent variable of positive and negative general attitudes toward SCD for all combinations of the independent variable groups for Race/ethnicity and Years' Experience (see Figures 8 and 9). Assumption 7 was met.

Figure 8

Scatter Plot of the Negative Attitude Residuals

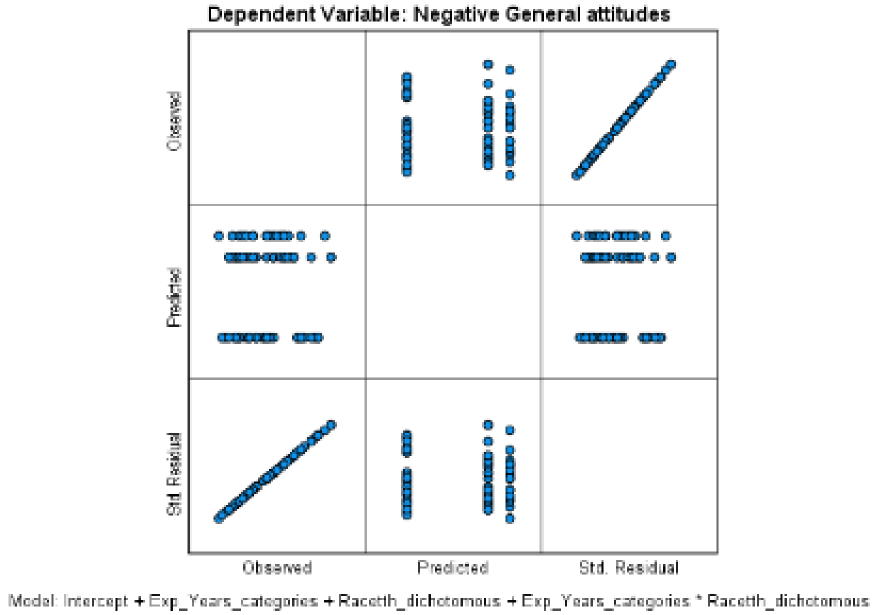
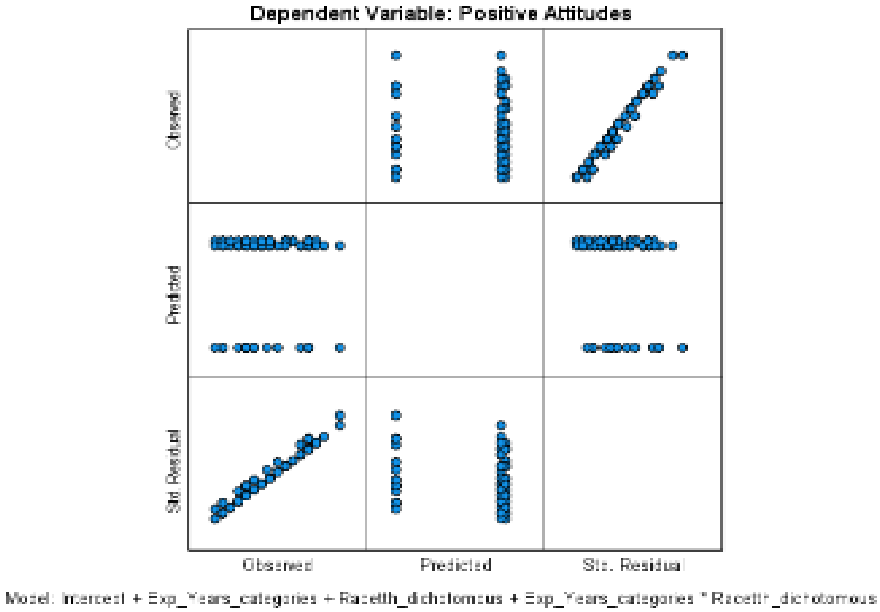


Figure 9

Scatter Plot of the Positive Attitude Residuals



Assumption number 8 indicates there must be homogeneity of variance-covariance matrices. I tested the assumption using Box's M Test of Equality of Covariance Matrices (see Field, 2013). Box's M test of equality of covariance matrices indicated that the equality of variances was equal across all groups, and the assumption was met. (*p* >.05; see Table 4).

Table 4

Equality of Covariance Matrices

Box's Test of Equality of Covariance Matrices [a]	
Box's *M*	7.717
F	1.231
*df*1	6
*df*2	48028.065
Sig.	.286

Note. Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

[a] Design: Intercept + Exp_Years_categories + Racetth_dichotomous + Exp_Years_categories * Racetth_dichotomous

The final assumption, Assumption 9, is that there is no multicollinearity. In MANOVA, the DVs should be related conceptually. In this study, the dependent variables are general attitudes toward SCD, positive and negative, and may be mildly correlated. If correlations are low, I would need to run separate one-way ANOVAs; multicollinearity would be present if they are too highly correlated (greater than 0.9), and the MANOVA would not have meaningful results. Correlations between the dependent variables of negative and positive attitudes were examined with the Pearsons' correlation and showed a moderate negative relationship (-0.482, p <.01; (95% CI [-.639, -0.287]). The test of correlation indicates the assumption is met for MANOVA (See Table 5).

Table 5

Multicollinearity Using Pearsons Correlation

Dependent variable	Pearson correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed) [a] Lower	Upper
Positive attitudes - negative general attitudes	-.482	<.001	-.639	-.287

[a] Estimation is based on Fisher’s r-to-z transformation.

Given the MANOVA assumptions were met, I proceeded to complete the MANOVA analysis to determine the answer to research question one.

RQ1: What are the differences in nurses' negative or positive attitudes toward patients with SCD by Race/ethnicity and years of experience as a nurse in an acute care setting?

A Two-Way MANOVA was used to determine the differences.

H_o1: There are no differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

H_a1: There are differences in nurses’ negative or positive attitudes towards patients with SCD by race/ethnicity and years of experience as a nurse.

Demographics

Black/African American nurses with over 5 years of working experience mean with less positive attitudes at 2.4120 compared to all other race/ethnicities group where the mean score for positive attitudes was higher at 2.83. In terms of negative general attitudes, there was little difference in the scores for negative general attitudes toward

SCD between Black/African American nurses with over 5 years of working experience and all other races. The differences seen descriptively must be cautiously considered in view of having a much smaller sample size (n=18) in the Black/African compared to all other race/ethnicities (n=57). Little differences are seen between the groups in the groups' attitudes toward SCD in the five years and less experience (See Table 6).

Table 6

Descriptive Statistics for Research Question 1

	Years working as a nurse	AA/Black compared to all others	*M*	*SD*	*N*
Positive attitudes	5 years or less	All other race/ethnicities	2.8519	.96142	27
		Total	2.8519	.96142	27
	Over 5 years	Black-African American	2.4120	1.12003	18
		All other race/ethnicities	2.8333	1.06134	30
		Total	2.6753	1.09145	48
	Total	Black-African American	2.4120	1.12003	18
		All other race/ethnicities	2.8421	1.00627	57
		Total	2.7389	1.04338	75
Negative general attitudes	5 years or less	All other race/ethnicities	2.6646	.97721	27
		Total	2.6646	.97721	27
	Over 5 years	Black-African American	2.6690	.84647	18
		All other race/ethnicities	2.6481	.98653	30
		Total	2.6560	.92725	48
	Total	Black-African American	2.6690	.84647	18
		All other race/ethnicities	2.6559	.97337	57
		Total	2.6591	.93894	75

Pillai's trace showed a significant effect of race ethnicity and years of experience on nurses positive and negative attitudes toward SCD, V=.960, F (2,71) = 860.3, $p < .001$ (Fields, 2013; see Table 7).

Table 7

Multivariate tests RQ 1

Multivariate tests[a]						
Effect		Value	*F*	Hypothesis *df*	Error *df*	Sig.
Intercept	Pillai's Trace	.960	860.304[b]	2.000	71.000	<.001
	Wilks' Lambda	.040	860.304[b]	2.000	71.000	<.001
	Hotelling's Trace	24.234	860.304[b]	2.000	71.000	<.001
	Roy's Largest Root	24.234	860.304[b]	2.000	71.000	<.001
Exp_Years_categories	Pillai's Trace	.000	.008[b]	2.000	71.000	.992
	Wilks' Lambda	1.000	.008[b]	2.000	71.000	.992
	Hotelling's Trace	.000	.008[b]	2.000	71.000	.992
	Roy's Largest Root	.000	.008[b]	2.000	71.000	.992
Racetth_dichotomous	Pillai's Trace	.031	1.134[b]	2.000	71.000	.327
	Wilks' Lambda	.969	1.134[b]	2.000	71.000	.327
	Hotelling's Trace	.032	1.134[b]	2.000	71.000	.327
	Roy's Largest Root	.032	1.134[b]	2.000	71.000	.327
Exp_Years_categories * Race ethnicities dichotomous	Pillai's Trace	.000	.[b]	.000	.000	.
	Wilks' Lambda	1.000	.[b]	.000	71.500	.
	Hotelling's Trace	.000	.[b]	.000	2.000	.
	Roy's Largest Root	.000	.000[b]	2.000	70.000	1.000

[a] Design: Intercept + Exp_Years_categories + Race ethnicities_dichotomous + Exp_Years_categories * Racetth_dichotomous

[b] Exact statistic

I ran a separate univariate ANOVAs on the outcome variable which revealed a non-significant effect on positive attitudes, F (2, 72) = 1.170, p= .316, and negative attitudes, F (2,72) = .003, p = .997. Because the univariate ANOVAs were not significant, no further examinations were needed, and the null hypothesis was retained (see Table 8).

Table 8

Tests of Between-Subjects Effects RQ1

Source	Dependent variable	Type III *SS*	*df*	*MS*	*F*	Sig.
Corrected Model	Positive attitudes	2.535[a]	2	1.268	1.170	.316
	Negative general attitudes	.006[b]	2	.003	.003	.997
Intercept	Positive attitudes	442.204	1	442.204	408.057	<.001
	Negative General attitudes	439.179	1	439.179	484.733	<.001
Exp_Years_categories	Positive attitudes	.005	1	.005	.004	.947
	Negative general attitudes	.004	1	.004	.004	.948
Racetth_dichotomous	Positive attitudes	1.997	1	1.997	1.843	.179
	Negative general attitudes	.005	1	.005	.005	.942
Exp_Years_categories * Raceetth/dichotomous	Positive attitudes	.000	0	.	.	.
	Negative general attitudes	.000	0	.	.	.
Error	Positive attitudes	78.025	72	1.084		
	Negative general attitudes	65.234	72	.906		
Total	Positive attitudes	643.174	75			
	Negative general attitudes	595.540	75			
Corrected total	Positive attitudes	80.560	74			
	Negative general attitudes	65.240	74			

[a] R Squared = .031 (Adjusted R Squared = .005)
[b] R Squared = .000 (Adjusted R Squared = -.028)

Results for RQ2 Using a One-Way MANOVA

A one-way MANOVA was used to answer RQ2:

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by the level of SCD knowledge in an acute care setting?

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge.

The results from RQ2 with assumptions following a one-way MANOVA are as follows:

The principal purpose of the one-way MANOVA is to test for the direction and means across the groups of the independent variable score levels- those with scores 14 and over and those scoring 13 and under (Laerd Statistics, 2023). In conducting a one-way MANOVA. The two dependent variables are each measured as scale variables and, therefore, appropriate to measure against the categorical independent variable. Between the two levels of knowledge, I tested for statistically significant differences in positive and negative SCD attitudes (See Laerd Statistics, 2023). To use a one-way MANOVA, ten assumptions need to be satisfied (Laerd Statistics, 2023):

- Assumption #1: Two or more dependent variables must be measured at the continuous level. Examples of continuous variables from the *General Perceptions about Sickle Cell Disease Scale* include positive attitudes (four questions measured on a 5-point Likert scale; 1= less than 5%, 5=>75%, and negative attitudes (nine questions measured on a 6-point Likert scale; 1=strongly disagree, 6=strongly agree (Freiermuth et al., 2016, Laerd Statistics, 2023).
- Assumption #2: One independent variable must have two or more categorical independent groups. Examples of independent variables that meet this criterion include comparing nurses who scored 14 and above or nurses who scored or measured 13 or below (independent variables) on the *Knowledge About SCD* scale. Also, with two independent variables rather than just one,

“consideration may be given to a two-way MANOVA instead of a one-way MANOVA” (Laerd Statistics, 2023).

- Assumption #3: There must be an independence of observations, thereby no relationship among or between the observations in each group of the independent variable or among the groups. I have split the nurses into two groups: nurses who scored or measured above 14 or those who scored or measured below 13. No individual nurse can belong to both groups at the same time. This is in accordance with independent groups. There is no effect on or between participants in the two groups. “This is important of the one-way MANOVA” (Laerd Statistics, 2023).
- Assumption #4: There must be no univariate or multivariate outliers. There must be no univariate outliers in each group of the independent variable for any of the dependent variables (Laerd Statistics, 2023). I used a Boxplot to test for multivariate outliers for each dependent variable (positive and negative attitudes score of each independent group, those nurses that scored 14 or above, and nurses that scored 13 and below). There were no outliers found. The assumption for no multivariate outliers was satisfied (see Figures 10 and 11).

Figure 10

Status of SCD Test Pass or Fail Negative Attitudes

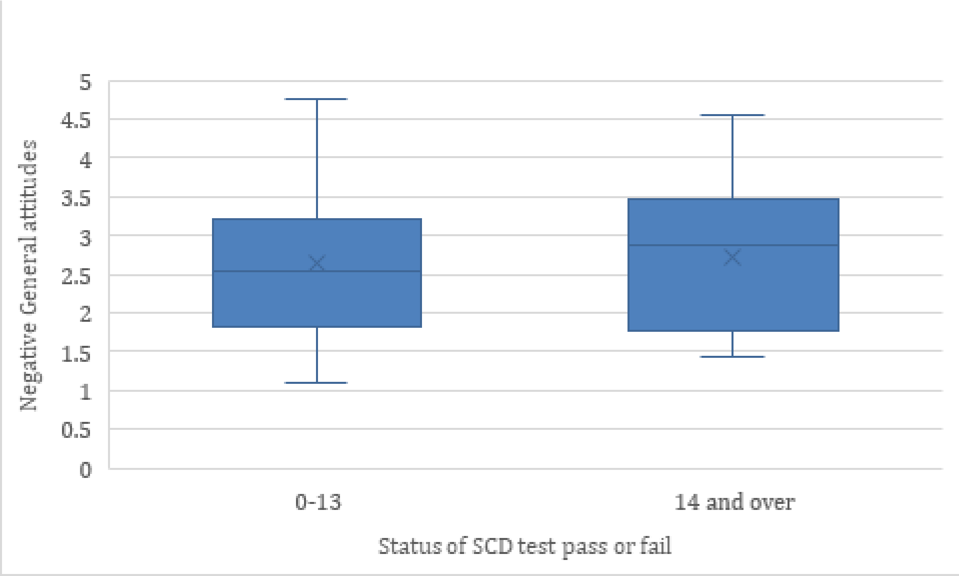
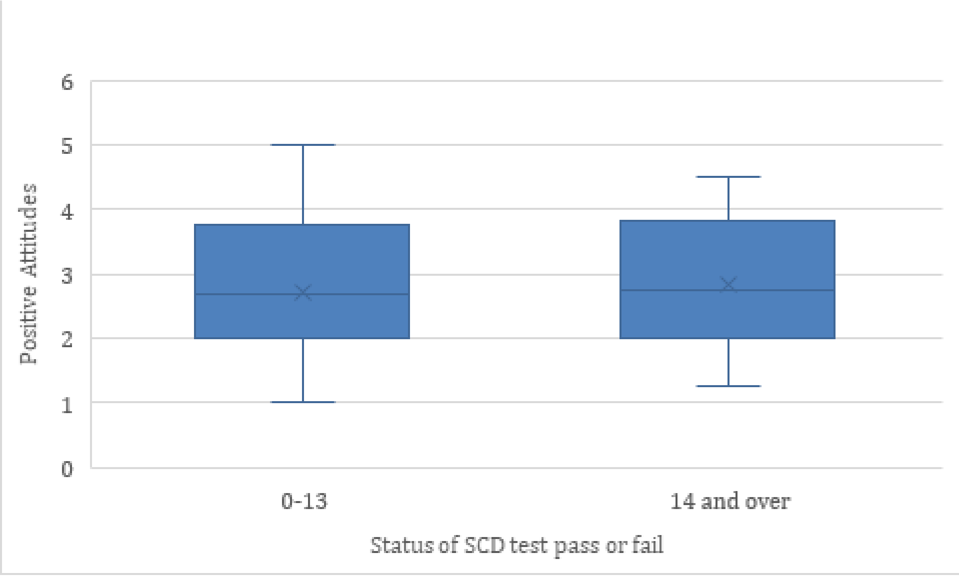


Figure 11

Status of SCD Test Pass or Fail Positive Attitudes



- Assumption #5: Multivariate normality is required. The MANOVA requires the data to be multivariate normal. Multivariate normality cannot be directly tested in SPSS Statistics. The normality of each dependent variable for each of the independent variable groups is used as a good estimation as to whether there is multivariate normality (Laerd Statistics, 2023).

I conducted a Shapiro-Wilk test for normality for the independent and dependent variables. The negative general attitudes score for nurses with scores 13 or below was not significant, 0.930, *df* 18, *p* =0.195; and the positive attitudes score for nurses with scores 13 or below and nurses with scores 14 and above was not significant, 0.960, *df* 57, *p* = .059, and 0.945, *df* 18, *p* = 0.348, respectfully indicating one combination of variables were normally distributed. However, nurses with scores 13 and below were not normally distributed, and negative general attitudes were significant (*p* = .009). The test may have been violated because the Shapiro-Wilk test lacked normal distribution in one of the combinations of independent and dependent variables. I then checked the kurtosis and skewness for the one combination of the independent and dependent variables. Acceptable values of skewness fall between − 1 and + 1, and kurtosis is appropriate from a range of − 2 to + 2 (Hair et al., 2022). While the status of the dependent variable, negative general attitudes skewness and kurtosis, was within acceptable limits, and the independent variable of SCD test pass or fail had acceptable kurtosis levels, the independent variable, Status of SCD test scores, had a slight positive skew

(1.323). MANOVA is robust against violations of the assumption of multivariate normality the assumption of normality is accepted (Zach, 2021) (See Tables 9 and 10).

Table 9

Test of Normality

	Status of SCD test pass or fail	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	Df	Sig.
Negative General attitudes	0-13	.113	61	.049	.946	61	.009
	14 and over	.176	18	.144	.930	18	.195
Positive Attitudes	0-13	.099	57	.200*	.960	57	.059
	14 and over	.125	18	.200*	.945	18	.348

*. This is a lower bound of the true significance.

[a] Lilliefors Significance Correction

Table 10

RQ 2 Statistics

		Negative General attitudes	Status of SCD test pass or fail
N	Valid	79	79
	Missing	0	0
Skewness		.690	1.323
Std. Error of Skewness		.271	.271
Kurtosis		.132	-.257
Std. Error of Kurtosis		.535	.535

- Assumption #6: There must be no multicollinearity**.** In MANOVA, the DVs should be related conceptually. In this analysis the dependent variables are general attitudes toward SCD positive and negative and may be mildly correlated. If correlations are low, I would need to run separate one-way

ANOVAs, if they are too highly correlated (greater than 0.9, multicollinearity would be present and the MANOVA would not have meaningful results (Laerd Statistics, 2023) (See Table 11).

Table 11

RQ 2 Coefficients

		Unstandardized coefficients		Standardized coefficients			Collinearity statistics	
Model		B	*SE*	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	2.680	.356		7.531	<.001		
	Status of SCD test pass or fail	.022	.274	.009	.082	.935	1.000	1.000

Note. Dependent Variable: Negative General attitudes

I tested for multicollinearity using the variance inflation factor (VIF) to assure the VIF is not greater than 10, creating no cause for concern. The VIF was acceptable at 1.0 so further confirmation that multicollinearity was not present (Field, 2013) and the assumption was met.

- Assumption #7: Between the dependent variables for each group of the independent variable there should be a linear relationship. In this one-way MANOVA, there is only one pair of dependent variables: positive attitudes and negative attitudes score paired with pass or fail levels on the SCD knowledge test. I ran a scatterplot of the categorical independent and continuous dependent variables with results indicated a linear relationship was present and therefore assumption 7 was met.
- Assumption #8: An adequate sample size is required. The required sample size needed for this study is based on convenience sampling related to changes in the original study. In this example, there are more than two cases per group

(e.g., nurses score 14 and above, and nurses score 13 or below), n = 79 (See Gray et al., 2017; Laerd Statistics, 2023). Due to a revision in the initial study, the inadequate sample size is one of the study's shortcomings.

Prior to data collected, I calculated my needed sample size using G*power (Faul, et al., 2009) The effect size was 0.0625; α err prob. = 0.05; and 0.8 power which yielded a sample size of 158. However, I was not able to achieve the sample size needed and post hoc analysis indicated the observed power which I ran with the univariate analysis revealed an observed power for the positive attitude with SCD knowledge was .063; and for negative attitudes the observed power was .066 (See Table 16, page 96), showing that the analysis was underpowered for providing generalization of the results.

- Assumption #9: There must be homogeneity of the variance-covariance matrices and a further assumption of the one-way MANOVA is that there are similar variances and covariances. A Box's M test of equality of covariance was used to test this assumption (Laerd Statistics, 2023). Box's M test of equality of covariance matrices indicated equality of covariance were equal across all groups and the assumption were met. (p >.05) (See Table 12).

Table 12

Box's Test of Equality of Covariance Matrices

Test Parameter	Results
Box's M	3.976
F	1.265
df1	3
df2	15374.278
Sig.	.285

Note. Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. Design: Intercept + SCD_Test_Result

Given the assumptions for RQ 2 MANOVA were met, I then proceeded with examining the descriptive statistics for nurses scores on SCD knowledge and their positive and negative general attitudes toward SCD. The independent variable was the nurses' level of knowledge on the SCD knowledge test. The dependent variables were the nurses negative or positive attitude toward patients with SCD.

RQ2: What are the differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge in a university acute care setting?

A one-way MANOVA was used to determine the differences.

H_o2: There are no differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge?

H_a2: There are differences in nurses' negative or positive attitudes toward patients with SCD by level of SCD knowledge?

In comparing the means of the positive attitudes and the negative general attitudes there are few differences in the means of status of the participants scores on the SCD test-pass or fail. This status of the scoring is grouped as below the scoring threshold of 14 for the SCD knowledge test as fail and 14 and above the threshold as pass (See Table 13).

The group that scored 14 or above had slightly higher positive general attitudes toward SCD with positive mean scores, (*M* = 18, 2.8194) suggesting more positive attitudes than those that scored below 14 (*M* = 57, 2.7135) (See Table 13). Participants who scored 14 or above, (*N* = 18) had a mean negative attitude score of 2.7245 compared to those who scored below the threshold of 14 with a mean negative attitude score of 2.6384. The group scoring lower on the SCD knowledge test had fewer negative attitudes than those scoring higher on the SCD knowledge test. With such a wide variation in sample sizes across the two groups, findings must be considered with caution (See Table 13).

Table 13

Descriptive Statistics

	Status of SCD test pass or fail	*M*	*SD*	*n*
Positive attitudes	0-13	2.7135	1.06113	57
	14 and over	2.8194	1.01026	18
	Total	2.7389	1.04338	75
Negative general attitudes	0-13	2.6384	.94601	57
	14 and over	2.7245	.94002	18
	Total	2.6591	.93894	75

In evaluating the SCD test results, the Pillai’s Trace are when the values fall between 0 and 1. The closer the value is to 1, the stronger the evidence on the explanatory variable has on the statistical significance on the variables of the response variables. In this case the Pillai's trace is 0.786 and is significant. (Fields, 2013) (See Table 14).

Table 14

Multivariate Tests

	Effect	Value	*F*	Hypothesis df	Error df	Sig.	Partial Eta squared	Noncent. parameter	Observed power[c]
Intercept	Pillai's Trace	.956	785.196[b]	2.000	72.000	<.001	.956	1570.392	1.000
	Wilks' Lambda	.044	785.196[b]	2.000	72.000	<.001	.956	1570.392	1.000
	Hotelling's Trace	21.811	785.196[b]	2.000	72.000	<.001	.956	1570.392	1.000
	Roy's Largest Root	21.811	785.196[b]	2.000	72.000	<.001	.956	1570.392	1.000
SCD_Test_ Result	Pillai's Trace	.007	.242[b]	2.000	72.000	.786	.007	.484	.087
	Wilks' Lambda	.993	.242[b]	2.000	72.000	.786	.007	.484	.087
	Hotelling's Trace	.007	.242[b]	2.000	72.000	.786	.007	.484	.087
	Roy's Largest Root	.007	.242[b]	2.000	72.000	.786	.007	.484	.087

[a] Design: Intercept + SCD_Test_Result
[b] Exact statistic
[c] Computed using alpha = .05

Examining the Levene's Test of Equality of Error Variances, all *p*-values range from (0.887 to 0.994). These values are greater than (.05). So, there no significant differences between the variances (See Table 15).

Table 15

Levene's Test of Equality of Error Variance

		Levene statistic	df1	df2	Sig.
Positive Attitudes	Based on Mean	.006	1	73	.937
	Based on Median	.005	1	73	.941
	Based on Median and with adjusted df	.005	1	71.190	.941
	Based on trimmed mean	.006	1	73	.939
Negative General attitudes	Based on Mean	.011	1	73	.915
	Based on Median	.000	1	73	.994
	Based on Median and with adjusted df	.000	1	72.961	.994
	Based on trimmed mean	.020	1	73	.887

Note. Tests the null hypothesis that the error variance of the dependent variable is equal across groups. Design: Intercept + SCD_Test_Result

Because no significant differences in positive or negative attitudes were identified between those who scored lower and those who scored higher on the SCD knowledge test, the null hypothesis was retained indicating there is no significant differences ($p > .05$ in nurses' negative or positive attitudes towards patients with SCD by level of knowledge (see Table 16).

Table 16

Tests of Between-Subjects Effects

Source	Dependent variable	Type III *SS*	*df*	*MS*	*F*	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Corrected Model	Positive Attitudes	.154[a]	1	.154	.140	.710	.002	.140	.066
	Negative General attitudes	.101[b]	1	.101	.114	.737	.002	.114	.063
Intercept	Positive Attitudes	418.785	1	418.785	380.209	<.001	.839	380.209	1.000
	Negative General attitudes	393.452	1	393.452	440.939	<.001	.858	440.939	1.000
SCD_Test_Result	Positive Attitudes	.154	1	.154	.140	.710	.002	.140	.066
	Negative General attitudes	.101	1	.101	.114	.737	.002	.114	.063
Error	Positive Attitudes	80.406	73	1.101					
	Negative General attitudes	65.138	73	.892					
Total	Positive Attitudes	643.174	75						
	Negative General attitudes	595.540	75						
Corrected Total	Positive Attitudes	80.560	74						
	Negative General attitudes	65.240	74						

a. R Squared = .002 (Adjusted R Squared = -.012)

b. R Squared = .002 (Adjusted R Squared = -.012)

c. Computed using alpha = .05

Summary

In this study, the differences between nurses' general attitudes towards patients with SCD were examined by evaluating the dependent variables: positive and negative attitudes subscales and the independent categorical variables: years of experience and race/ethnicity. I also examined the independent variable differences between nurses who scored 14 and above and nurses who scored 13 and below on the Knowledge about SCD scale questionnaire (Tanabe et al., 2013), and by the dependent variables: positive and negative attitudes subscale scores from the General Perceptions about Sickle Cell Patients Scale (Haywood et al., 2011), in a university acute care setting. The research questions and hypotheses were analyzed using a two-way MANOVA for research question one and a one-way MANOVA for research question two.

I analyzed research question 1 using a two-way MANOVA. I tested for the assumptions which were met. The differences seen descriptively must be cautiously considered in view of having such a small sample size (n =18) compared to all other races (n = 57). I used Pillai's trace to determine if there was a significant effect of race, ethnicity, and years of experience on nurses' positive and negative attitudes toward SCD (V=.960, F (2,71) = 860.3, p< 0.001. However, separate univariate ANOVAs on the outcome variable revealed a non-significant effect on positive F (2, 72) = 1.170, p= 0.316 and negative F (2,72) = .003, p = 0.997 attitudes. Because the univariate ANOVAs were not significant, no further examinations were needed, and the null hypothesis was retained. However, the differences seen descriptively must be cautiously considered in view of having such a small sample size (n =18) compared to all other races (n = 57).

The results for research question two were:

For research question 2, the assumptions of the one-way MANOVA were met. However, my sample size was small and less than the power needed for this study. There were no significant differences in positive or negative attitudes were identified between those who scored lower and those who scored higher on the SCD knowledge test, so I retained the null hypothesis which indicated there is no differences in nurses' negative or positive attitudes towards patients with SCD by level of knowledge. The value for the SCD test result of the dependent variables positive attitudes and negative attitudes was < 0.05. The values of the positive attitudes were (0.66) and the negative attitudes were

(0.63). There is not much difference between the two variables. Because the dependent variables are greater than 0.05 neither were significant.

Chapter 5: Discussion, Conclusions, and Recommendations

The purposes of this quantitative, comparative descriptive study were to examine (a) if there are differences between nurses' general attitudes towards patients with SCD via dependent variables: positive attitudes and negative attitudes subscales by independent categorical variables: years of experience, and race/ethnicity and; (b) if there were differences between the nurses who score 14 and above on the Knowledge About SCD scale compared to the nurses who scored at 13 or below (independent variable) and by the (dependent variables) positive attitudes, negative attitudes, subscales scores in a university acute care setting. The instruments used were the General Perceptions About Sickle Cell Patients Scale Questionnaire (Haywood et al., 2011), the Knowledge about Sickle Cell Disease survey (Tanabe et al., 2013), and a demographic survey. This research design explores and describes the phenomenon of interest; it is nonexperimental, with no random assignment of study subjects and no intervention (Drummond & Murphy-Reyes, 2018; Gray et al., 2017). Comparative research designs are used to explain the differences in the variables in groups of two or more in a commonly accepted setting (Gray et al., 2017). This design is often used in nursing research studies when faced with complex limitations (Cantrell, 2011).

My results for RQ1 showed that Black/African American nurses with over 5 years of working experience had lower mean positive attitudes (*M* = 2.4120) than all other races/ethnicities (M = 2.8333), although the difference in the two scores was not statistically significant. Similarly, Black/African American nurses with over 5 years of working experience had higher negative attitude scores (*M*=2.6690) as compared to nurses from all other races with a lower mean score of (2.6481), which was also not statistically significant.

The results for RQ2 revealed there was no significant differences in positive or negative attitudes were identified between those who scored lower and those who scored higher on the SCD knowledge test, so I retained the null hypothesis. The value for the SCD test result of the dependent variables, positive attitudes, and negative attitudes, was < 0.05. The values of the positive attitudes were 0.66, and the negative attitudes were 0.63.

Interpretation of the Findings

Findings for RQ1 Compared to the Literature

The findings of my study were like those of Hazzazi et al. (2020), who studied physicians' and nurses' perceptions and attitudes toward patients with SCD in 12 hospitals in a Middle Eastern region and found that half of the participants were nurses and one-third of the nurses had more negative attitudes, although nurses may have negative attitudes toward patients with SCD, there was no statistical significance. I used the concepts of the TPB by Ajzen (1991, 2019), which predicted and described human behavior in a particular setting. Attitudes are one of the determinants of intentions and actions (Ajzen, 1991, 2019). I measured attitudes using the General Perceptions About SCD Patients scale questionnaire (Haywood et al., 2011). Shurgarman et al. (2010) reported that years of nursing experience had a negative relationship with behavioral intentions, which does not align with the results of my study. Although not significant in this study, Black/African American nurses with 5 years or more experience, when compared to all other races with less experience, had slightly lower positive and slightly higher negative attitudes. However, one of Shurgarman et al.’s findings indicated that nurses with more experience were more likely to underestimate a patient’s pain but not significant in the overestimation of pain. In contrast to this study’s findings, Haywood et al. (2011) found that Asian clinicians had more negative attitudes toward patients with SCD than Black or other clinicians.

Findings for RQ2 Compared to the Literature

In comparing the means of the positive attitudes and the negative general attitudes of nurses toward patients with SCD by the nurses’ knowledge about SCD, few differences were found in the means of the status of the participant’s scores on the SCD test (i.e., pass or fail). This scoring status is grouped as below the scoring threshold of 14 for the SCD knowledge test as a fail and 14 and above the threshold as a pass.

Positive Attitudes Comparison

I did not find any studies that examined knowledge of SCD in relationship to attitudes toward the care of SCD patients. Therefore, my study added new knowledge to the literature. However, Yacoub et al. (2019) found that educational intervention knowledge and care practice improvements were related to positive morbidity and mortality outcomes in patients with SCD. While also not specific to the nurses’ attitudes, Freiermuth et al. (2013) studied ED providers and found that ED providers, compared with nurses, had more positive attitudes towards patients with SCD, which was seen as an important factor in improving the quality of care of SCD patients.

Negative Attitudes Comparison

Freiermuth et al. (2014) found that negative attitudes among ED providers have been shown when recommended guidelines are not followed when treating patients in pain. Furthermore, nurses who have frequent or recent contact with patients with SCD display/possess more negative attitudes towards patients with SCD. Yacoub et al. (2019) found in their study comparing an educational intervention group with a control group that nurses raised concerns about incremental opioid dosage needed for patients with SCD and were hesitant to give negative connotations against the individual patients. Yacoub et al. (2019) found that an educational intervention suggested nurses had questions or the need for further parameters about incremental opioid dosages in patients with SCD when compared with a control group study.

Findings in the Context of the Theoretical Framework

The TPB is a theoretical model that has been extensively used in healthcare to predict individual behavioral intentions and behavior: attitudes towards behavior, beliefs, perceived behavioral control, and subjective norms in the acute care setting (Burns & McIlfatrick, 2015). Perceived control and individual perception of the difficulty of a task can be influenced by such factors as knowledge and other internal factors (Burns & McIlfatrick, 2015). I did not find any studies that examined knowledge of SCD in relationship to attitudes toward the care of SCD patients. Therefore, my study added new knowledge to the literature. However, Yacoub et al. (2019) found that knowledge and practice improvements were related to positive morbidity and mortality outcomes in patients with SCD.

Limitations of the Study

The findings of this study are limited by several factors. For this quantitative, comparative design study, I examined the differences in attitudes of nurses toward patients with SCD between two groups of nurses, those with greater than 5 years' experience who are African American compared to those with greater than 5 years of experience who are of all other race ethnicities combined in an acute care setting. I planned to compare nurses' attitudes to pain management; however, pain management data were unavailable. The reliability of information obtained from survey questionnaires depended on the responses being answered truthfully by the participants (see Queirós et al., 2017).

Another limitation is that the nursing representation was from nonprobability convenience sampling. The observed power was indicated as .66, which is lower than the .80 desired for this study, which reduces generalizability. Therefore, the results of my study may not be generalized to a larger population (Saunders et al., 2012).

Recommendations

The responses in the study were also from a validated quantitative survey that did not provide for qualitative responses that may have provided further insight into the attitudes of the nurse participants about their SCD patients but also may have provided an understanding of medication administration patterns that nurses self-reported for treatment of their patients (Queirós et al., 2017). Future quantitative research is needed to examine nurses' attitudes in the various acute care settings toward patients with SCD, including examining nurses' pain medication administration patterns for the nurses in the study. Additionally, I would recommend that this study be replicated with a larger sample.

An educational intervention study would also be useful to determine whether there would be changes in nurses' attitudes before and after educational training programs on best practices for SCD. Although the study site recommended using their commercial survey site, I would investigate an alternative electronic survey site to use. If a paper survey is to be used, it should be ready to be administered as an immediate backup to electronic survey methods. I also recommend a qualitative study to examine the nurses' attitudes toward the pain management of SCD patients and understand nurses’ medication administration patterns.

Implications

This study may raise awareness of the need to consider interventions for education about SCD and treatment options for the condition among nurses working with patients with SCD in acute care settings. By raising awareness of the need for ongoing education about patients with SCD in VOC in the acute care settings, the potential impact for positive social change may be an improvement in the quality of care provided by not only nurses but for other members of the healthcare team. Nurses who, as a part of the health care team, are the ones who spend the most time at the bedside with patients with SCD who suffer from VOC and are uniquely prepared to recognize patients in pain and treat them effectively from the emergency department visit to hospital admissions or any hospital stay (Butler et al., 2018). Nurses who are educated about SCD and VOC can do better with continuing education to improve attitudes and knowledge. This will be a long-term effort over time because patients with SCD inherently have chronic pain. When patients with SCD say they are in pain, providers need to believe them because “pain is what the patient says it is” (McCaffery, 1968).

Conclusions

In conclusion, I found the differences between the groups in my comparative quantitative study; Black/African American nurses with over 5 years of working experience had greater negative attitudes when compared to all other races, although the statistical tests did not show significance in the differences between the groups. The univariate ANOVA revealed differences between the races to be nonsignificant. Also, I found in comparing the means of the positive attitudes and the negative general attitudes that there were few differences in the means of the status of the participant’s scores on the SCD test—pass or fail. These findings will be helpful for planning future research when comparing populations of nurses caring for patients with SCD.

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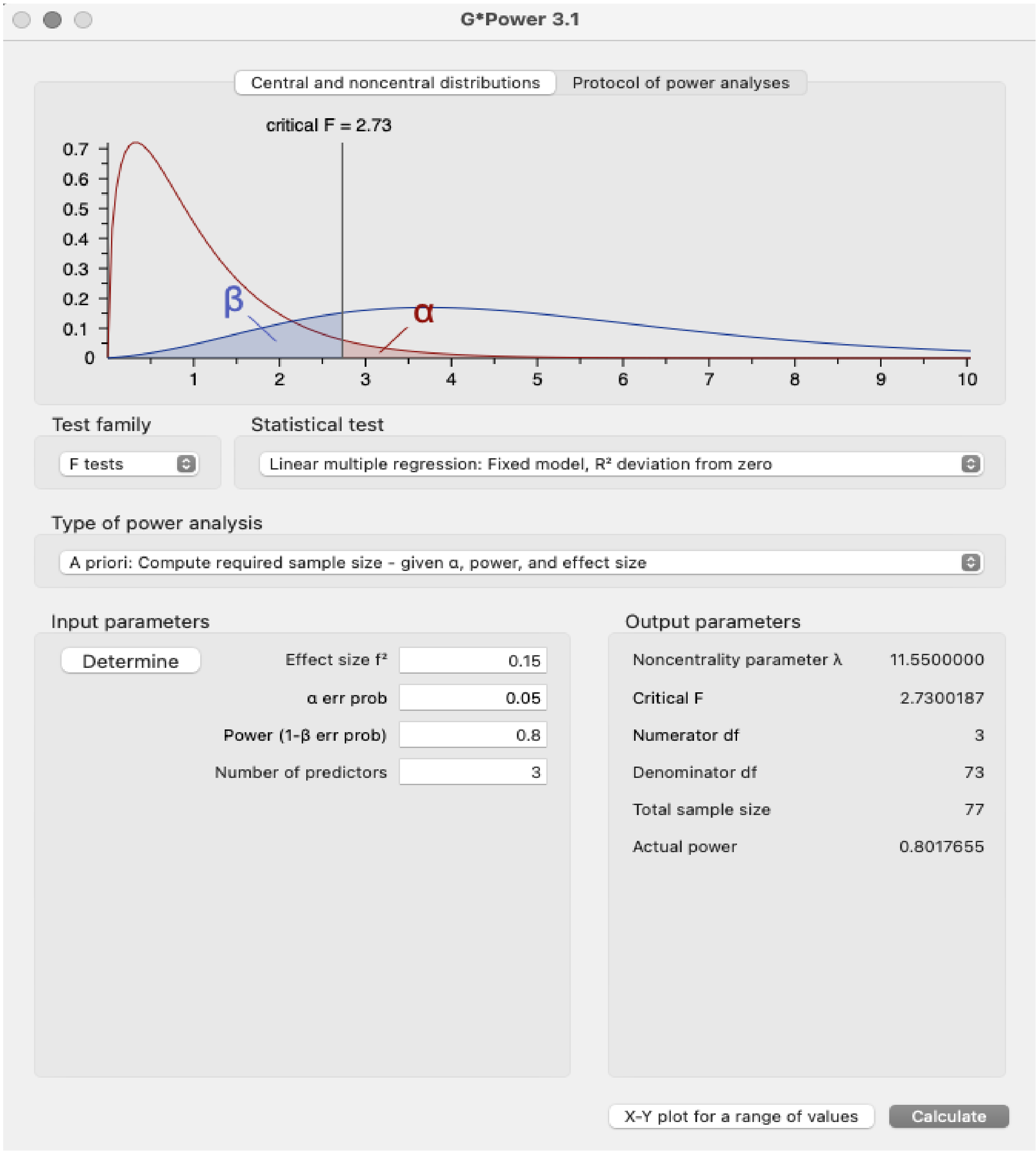
Appendix A: Calculation Sample Size



Test family: F tests

Statistical test: Linear multiple regression: Fixed model, R^2 deviation from zero

Type of power analysis: A priori: Compute required sample size - given α, power, and effect size

Input parameters

Effect size f^2	0.15
α err prob	0.05
Power (1-β err prob)	0.8
Number of predictors	3

Output parameters

Noncentrality parameter λ	11.5500000
Critical F	2.7300187
Numerator df	3
Denominator df	73
Total sample size	77
Actual power	0.8017655

Note. Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses.

Appendix B: Demographic Survey

Registered Nurse:
Yes
No

Nurse Practitioner < one year of experience, but > one year as a registered nurse
Yes
No

Years of working in nursing:

1-5 years
6 to 11 years
12 to 17 years
18-23 years

Race and Ethnicity:
White
Black
Asian
Native American/Alaskan Native
Native Hawaiian/Pacific Islander
White Hispanic/Latino
Multiracial/Other Hispanic/Latino

Gender:
Male
Female
Non-binary

Education
Associate degree-RN
BSN
MN/MSN
DNP/Ph.D.

Areas of Clinical Practice
Hematology/Oncology
BMT
Med/Surg
OR/PACU
ICU
Emergency Department

Attended any pain management training?
Yes
No
Age
21-26
27-32
33-38
39-45
46-50
50 or >

The number of patients with SCD cared for within the past 3 months
0
1-3
4-7
8-11
12 or more

References: Freiermuth et al., 2016; Jenerette et al., 2016; Masese et al., 2019; Yaqoob & Nasaif, 2015.

Appendix C: General Perceptions About Sickle Cell Patients Scale

General Perceptions About Sickle Cell Patients Scale (Haywood et al., 2011)

Your completion of this survey or questionnaire will serve as your consent to be in this research study.

SECTION A

What percentage of patients with sickle cell disease:	<5%	6-20%	21-50%	51-75%	>75%
1. Over-report (exaggerated) pain?					
2. Fail to comply with medical advice?					
3. Abuse drugs, including alcohol?					
4. Manipulate you or other providers?					
5. Are drug-seeking when they come to the hospital?					
6. Are frustrating to take café of?					
7. Makes me feel glad that I went into medicine?					
8. Are the kind of person I could see myself friends with?					
9. Are satisfying to take care of?					
10. Are easy to empathize with?					

SECTION B

Please indicate your opinion about the degree to the following is a sign that a patient with sickle cell disease is inappropriately/unnecessarily drug seeking:	Strongly Disagree	Disagree	Not Sure but Probably Disagree	Not Sure but Probably Agree	Agree	Strongly Agree
1. Patient requests specific narcotic drug and dose?	1	2	3	4	5	6
2. Patient changes his/her behavior (e.g., appears to be in greater distress) when provider walks in room	1	2	3	4	5	6
3. Patient appears comfortable (e. g. talking on the phone or watching TV) while complaining of severe pain	1	2	3	4	5	6
4. Patient has a history with of disputes with staff	1	2	3	4	5	6
5. Patient rings bell for nurse and constantly asks for more pain medication before the next dose is due	1	2	3	4	5	6
6. Patient has history of signing out against medical advice	1	2	3	4	5	6
7. Patient tampers with a patient-controlled analgesia device	1	2	3	4	5	6
8. Patient complains of severe pain but has no change in hemoglobin, a normal reticulocyte count, and a normal physical examination	1	2	3	4	5	6

SECTION C

Please indicate your level of agreement with the following statements:	Strongly Disagree	Disagree	Not Sure but Probably Disagree	Not Sure but Probably Agree	Agree	Strongly Agree
	1	2	3	4	5	6
1. The most reliable indicator of the existence and intensity of acute pain episodes in sickle cell disease is patient self-report.	1	2	3	4	5	6
2. An important focus of the health provider in treating acute pain episodes in sickle cell disease is adequate pain relief.	1	2	3	4	5	6
3. An important focus of the health care provider in treating acute pain episodes in sickle cell disease is preventing drug addiction.	1	2	3	4	5	6
4. A patient with sickle cell disease can present with crisis in the absence of any objective measures (e.g.,	1	2	3	4	5	6

baseline hemoglobin, normal reticulocyte count, normal physical examination).

SECTON D

Please State How Often the Following Things Occur:	Always	Most of the Time	Some of the Time	Rarely	Never
1. I am bothered by the way some doctors treat patients with SCD.	1	2	3	4	5
2. I am bothered by the way some nurses treat patients with sickle cell disease.	1	2	3	4	5
3. I am bothered by the way some of my own friends and colleagues treat patients with sickle cell disease.	1	2	3	4	5
4. I try to imagine myself in the shoes of a patient with sickle cell disease when providing care for them.	1	2	3	4	5

SECTION E

In Your Opinion, Many Patients with Sickle Cell Disease Who Exaggerate Pain Do So as A Result of:	Strongly Disagree	Disagree	Not Sure but Probably Disagree	Not Sure but Probably Agree	Agree	Strongly Agree
1. Inappropriate or unnecessary drug addiction/drug seeking	1	2	3	4	5	6
2. Inadequate pain management by doctors and nurses	1	2	3	4	5	6
3. Personality disorders	1	2	3	4	5	6
4. Previous poor pain management in the health care system	1	2	3	4	5	6
5. A perception among patients of the need to “act out” to get appropriate pain medication	1	2	3	4	5	6

Thank you for taking the time to participate.

Appendix D: Knowledge About SCD (Correct Answers) *

1. Which of the following pathophysiologic mechanisms are associated with SCD?
   Hemolysis
   Vaso-occlusion
   Hemolysis and vas-occlusion*
   None of the above

2. Which of the following complications is not common among children with SCD?
   Avascular necrosis*
   Acute splenic sequestration
   Dactylitis
   Acute chest syndrome

3. Acute hemorrhagic stroke is more common in children than adults.
   True
   False*

4. Iron overload is common in all adults with SCD.
   True
   False*

5. Patients with hemoglobin of <5 g/dl should always be transfused.
   True
   False*

6. Acute chest syndrome may be associated with which of the following presentations?
   Shortness of breath
   A new infiltrate on chest x-ray
   Hypoxemia
   All of the above*

7. Many patients with SCD experience both acute and chronic pain.
   True*
   False

8. Which of the following pain syndromes should warrant further investigation for the cause?
   Abdominal pain
   Chest pain
   Headache
   All of the above*

9. Which of the following painful conditions is frequently the initial manifestations of SCD in children?
   Dactylitis*
   Acute stroke
   Acute splenic sequestration
   Arm and leg pain

10. All children with the genotype SS should be placed on penicillin until age 5.
True*
False

11. Which of the following approaches to analgesic management is considered the gold standard?
   Individualized plans*
   Nurse initiated, standard orders
   Individual orders by the emergency department physicians
   None of the above

12. Leg ulcers are more common in women than men.
   True
   False*

13. List the most common contraindication to NSAIDS for patients with SCD
Allergy
   Gastrointestinal ulcers
   History of acute chest syndrome
   Renal failure or insufficiency*

14. Long-and short-acting opioids have a role in the management of SCD for patients with chronic pain.
   True*
   False

15. Methadone may be indicated for which of the following patients?
A patient with prolonged QT interval and chronic pain
A patient who cannot be managed on extended-release morphine sulfate
A patient who cannot be managed on hydromorphone
B&C*

16. Addiction is a state of adaptation in which exposure to a drug induces changes that result in a diminution of one or more of the drug's effects over time.
   True
   False*

17. Using opioids to treat insomnia, anxiety, or for some other purpose than treating pain defines
   Chemical coping
   Substance misuse*
   Addiction
   Pseudo-addiction

18. Which of the following social issues may influence patients with SCD?
   Poor school attendance
   Lack of understanding of SCA by family members
   Difficulty finding a physician to treat SCA
   All of the above*

19. Which of the following psychological issues are not common among patients with SCD?
   Opioid addiction*
   Anxiety
   Depression
   Neuro-cognitive deficits

20. Which of the following genotypes is most common and associated with more complications?
   SC
   SB
   SS*
   SB+

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8/19/2021: Email communication from Icek Ajzen

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[redacted]

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9/15/2021: Email communication from Jeanne Brewster

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Appendix G: Knowledge About SCD

9/6/2021

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