

Pediatric Sickle Cell Patients ‘Walk It Out’ to Reduce Length of Hospital Stay:
A Children’s Hospital of the King’s Daughters Quality Improvement Project

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DNP Project submitted to the School of Nursing
of Salisbury University in partial fulfillment of the requirements
for the degree of
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Elizabeth Kaitlin Webb

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Dedication

This quality improvement project is dedicated to hard-working nurses who put their whole hearts into their profession. Not only can nursing be physically demanding, it can also be emotionally and mentally demanding as well. For the nurses who work late night shifts, miss weekends and holidays with their families, and work grueling twelve-hour shifts, this is dedicated to you. Without the support of strong nursing staff, quality improvement projects like this one, would not be feasible or successful.

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Abstract

The hematology/oncology unit (8B) at the Children's Hospital of the King's Daughters (CHKD) focuses on the care of children diagnosed with blood disorders and oncologic diagnoses.

Problem Statement: Adolescents and young adults (AYAs) with sickle cell disease (SCD) face unique challenges. Longer hospitalizations increase their morbidity and mortality risks (Matthie & Jenerette, 2015).

Purpose: The purpose of this quality improvement project was to improve nursing practice at CHKD, to decrease length of hospital stay for AYAs with SCD by increasing their daily ambulation through the use of pedometers.

Methods: A nursing implemented ambulation protocol (*Walk It Out*) was created based on previous studies and evidence-based practice. A quasi-experimental pre-post design was used to compare the average length of hospital stay of AYAs with SCD before and after *Walk It Out* implementation. Prior to *Walk It Out* implementation 102 AYAs with SCD (44 males and 58 females) were admitted to 8B from August 1, 2017 – January 31, 2018. Nursing staff implemented *Walk It Out* from August 1, 2018 – January 31, 2019 at which time 62 AYAs with SCD were admitted to 8B (20 males and 42 females).

Results and Significance: There was a 30% decrease in the overall average length of stay for male and female AYA patients with SCD after *Walk It Out* implementation.

These results were significant because previous research indicated that a shorter length of

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hospital stay decreases patients' morbidity and mortality risks. Therefore, this small practice change is beneficial to patients' overall quality of life.

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Project Overview

Introduction

Sickle cell disease (SCD) is an autosomal recessive, genetic blood disorder that is passed on from parents to child (Smith, Reinman, Schatz, & Roberts, 2018). It occurs when a child receives two sickle genes or traits; one from each parent (Rees, 2016). The sickle cell trait is known to prevent malaria (Platt, Eckman, & Hsu, 2011). Therefore, many groups of people in regions heavily affected by malaria, such as Africa, have developed the sickle cell trait for protection (Platt et al., 2011). However, when two sickle cell traits are inherited, a mutation in the child's deoxyribonucleic acid (DNA) occurs that changes the structure of their hemoglobin that prevents proper function (Platt et al., 2011). Hemoglobin is a protein found in red blood cells (RBCs) and is responsible for delivering oxygen from the lungs to all of the tissues in the body (Platt et al., 2011). While, this disease is seen in many different ethnic backgrounds, in the United States, the majority of those affected by SCD are African Americans (Platt et al., 2011). One out of every five hundred African American live births result in a child having SCD (Matthie & Jenerette, 2015). About 80,000 people in the United States have SCD, making it the most commonly inherited blood disorder in the United States (O'Connor et al., 2014). Additionally, one out of every twelve African American live births result in a child having the sickle cell trait (Matthie & Jenerette, 2015). Those with only one sickle cell trait are not symptomatic of SCD, rather they could potentially pass the trait on to their

children, whom could be affected if they inherit another sickle cell trait from their other parent.

Problem Statement

Normally, a RBC lives within the human body for about one hundred twenty days (Rees, 2016). In contrast, sickled RBCs only survive about ten to twenty days, ultimately causing anemia (Rees, 2016). “Sickled red blood cells are stiff and unable to change shape causing occlusion of the microvasculature and ultimately decreased oxygen delivery to tissues” (Rees, 2016, p. 340). This not only causes the person with SCD pain, but potentially many other serious complications. Such complications could include: blood clots or hemorrhage in the brain, stroke, lung infarction, splenic sequestration, hematuria, anemia, retinopathy, congestive heart failure, skin ulcers, kidney disease, and / or hypertension (Rees, 2016). Regardless, pain is the number one cause of hospitalization in people with SCD (Rees, 2016). These pain episodes are referred to as vaso-occlusive episodes and are caused by the RBCs sickling and blocking blood vessels (Smith et al., 2018). Vaso-occlusive episodes may be precipitated by changes in temperature, stress, dehydration, physical exertion, or infection (Grove, Grove, & Michie, 2014). The frequencies of these episodes increase as a child gets older and moves into adulthood (Smith et al., 2018). “Young adults with SCD must be taught to approach activities in a way that minimizes excessive stress, exhaustion, dehydration, and extremes in temperature. Moderation and self-monitoring of exertion level is the rule” (Adams et

al., 2002, p.44). With improvements in disease therapy, more people with SCD are surviving to adulthood than ever before (Rees, 2016).

Prior to adulthood, comes adolescence. Adolescence, in general, is a mentally, physically, and emotionally difficult time in a young person's life. For young people coping with a chronic illness such as SCD, this period of time can be even more trying. For example, puberty may be delayed in adolescents with SCD (Platt et al., 2011). "Concern about issues such as body size, sexual function, pain management, and death often is expressed as rebellion, depression, or refusal to heed treatment plans and medical advice" (Adams et al., 2002, p. 33). Additionally, frequent hospitalizations can cause feelings of social isolation (Grove et al., 2014). Nurses have the opportunity to assist AYAs with SCD to navigate their chronic illness and improve their overall quality of life.

Purpose of Project

Unfortunately, ambulation is a nursing intervention that is often overlooked, whether it is due to short staffing, lack of time, or any other reason (Kalisch & Xie, 2014). Implementing a systematic ambulation protocol may help to ensure that this basic, but vital, nursing intervention is not disregarded. Encouraging patient ambulation during hospitalization is one way that nurses can help to improve the overall quality of life for AYAs with SCD. "Immobility in hospitalized patients... can lead to serious untoward events, such as hospital-acquired pneumonia, deep vein thrombosis (DVT), pressure ulcers, and loss of functional mobility" (Teodoro et al., 2016, p. 111). Any of these complications increase a patient's morbidity, mortality, length of stay, and costs

associated with hospitalization (Teodoro et al., 2016). Prior to August 1, 2018, although ambulation was encouraged, the inpatient pediatric hematology/oncology unit (8B) at the Children's Hospital of the King's Daughters (CHKD) in Norfolk, Virginia, did not require a standard ambulation protocol.

Clinical question – PICOT. Therefore, does the daily nursing implementation of an ambulation protocol for pediatric sickle cell patients ages twelve to nineteen years old, admitted to the inpatient hematology/oncology unit at the Children's Hospital of the King's Daughters from August 1, 2018 – January 31, 2019 help to reduce the average length of stay in this patient population?

Succinct Synthesis / Analysis of Supporting / Related Literature

Review of Literature

Electronic databases were used to search for literature that would address the clinical question that was the underpinning for this Doctor of Nursing Practice (DNP) quality improvement project (*Walk It Out*). The databases included: Health Source: Nursing/Academic Edition, Academic Search Complete, MEDLINE, and MEDLINE with Full Text. All articles were peer-reviewed and current, from years 2013 – 2018. Key words and Boolean operators that were used in database searches included: pediatric AND sickle cell disease, benefits AND patients out of bed, benefits of physical activity AND inpatient, benefits of physical activity AND sickle cell disease, inpatient AND sickle cell disease, sickle cell pain management AND adolescents OR teenagers OR young adults, chronic pain AND pediatrics, sickle cell disease AND hospitalizations,

ambulation AND nursing, walking intervention AND nursing, as well as ambulation rate AND nursing. Articles were excluded if they were not pertinent to this quality improvement project. Six printed journals were also reviewed. From this extensive review 1,214 articles were found (see Appendix A).

Themes

Nine of these articles were included within the review of literature and found to have similar themes including: quality improvement, self-efficacy, cognitive behavioral theory, and motivation. Quality improvement interventions that improved patients' quality of life were important topics in many of the articles reviewed. Since the *Walk It Out* quality improvement project focused on twelve to nineteen-year-old patients with SCD, literature on the AYA patient population was important. However, evidence-based quality improvement interventions that were related to the care of adults with SCD were of equal value. It was rationalized that nursing interventions that successfully reduced length of hospital stay or improved quality of life for adults with SCD would have similar benefits for AYAs with SCD. The literature revealed that specific nursing interventions could reduce or mitigate vaso-occlusive episodes, thereby reducing complications and thus length of stay in SCD patients. Teodoro et al. (2016) suggested that by implementing an ambulation program; patient health outcomes improved, and average length of stay decreased. Furthermore, evidence-based clinical practice guidelines for the care of patients with SCD, suggested that ambulation as soon as possible reduced complications and thereby decreased length of hospital stay (Matthie & Jenerette, 2015).

Another study stressed the quality improvement benefits of breathing exercises as an alternative pain control option, which was also related to the self-efficacy theme (Matthie, Brewer, Moura, & Jenerette, 2015).

Self-efficacy is the concept of believing in one's own success at a particular task (Akhtar, 2008). However, it may take the encouragement of healthcare providers to instill the confidence or self-efficacy that patients need to accomplish certain health related behaviors, such as breathing exercises and ambulation. For example, one study focused on self-efficacy in terms of chronic pain control and looked at increasing ambulation for patients using opioids to manage their chronic back pain (Krein, Bohnert, Kim, Harris, & Richardson, 2016). This related to the DNP project population of focus because patients with SCD deal with acute and chronic pain on a daily basis, as well as frequent opioid use to treat this pain. In the study by Krein et al. (2016), walking was found to be an effective intervention for controlling chronic pain in a veteran patient population. A qualitative study that focused on the parents of children with SCD noted that parents had difficulty and concerns about encouraging their children to participate in activities of daily living during vaso-occlusive episodes (Smith et al., 2018). Through qualitative data, Smith et al. (2018), found that more than half of the parents in their study wanted more information and guidance on how to assess their child's pain and to learn how and when to use non-medication-based approaches. This study focused on increasing parent self-efficacy in controlling their child's pain and cognitive behavioral theory.

Cognitive behavioral theory is based on the idea that how people think, feel, and act are interconnected (McLeod, 2015). In other words, how an individual perceives an event or situation affects how he or she will react emotionally and behaviorally to that event or situation (Hoermann, Zupanick, & Dombeck, 2019). Therefore, negative thoughts related to a SCD diagnosis could cause problems in one's behavior. In regard to the qualitative study of parents who had children with SCD, parents needed to be aware that their reaction to their child's vaso-occlusive episodes affected the way that their child coped with pain. According to research, AYAs who had better knowledge about SCD and had strong family support tended to have more positive outlooks on their chronic condition which lead to improved coping skills, self-efficacy, quality of life, and personal accountability over their medical care (John-Olabode, Awodele, & Oni, 2015). In contrast, adolescents with negative personal beliefs about how SCD affected them reported performing less exercise related activities than other children with SCD (Omwanghe et al., 2017). Nurses can help mitigate these negative personal beliefs by encouraging and motivating their patients to actively participate in their care and recovery in a way that increases their self-efficacy and improves their quality of life.

Encouraging ambulation is an example of a nursing intervention that requires patient motivation and active participation in order to be achieved. The many benefits of walking proved that ambulation was a vital nursing intervention that should not be overlooked. However, when a patient is in severe pain, as many patients with SCD are, it may be difficult to motivate them to get out of their beds when hospitalized. An example

of motivation in order to improve the health of AYA patients through ambulation came from the Children's Hospital of Orange County (CHOC) (Bergeron, 2015). CHOC nurses motivated their AYA oncology patients to walk laps around their unit; the patient with the most laps at the end of the day received a gift card (Bergeron, 2015). While this DNP project did not have monetary rewards for ambulation, the *Walk It Out* protocol helped to remind nurses to encourage their AYA patients with SCD to get out of bed and walk. The motivation at CHKD was more related to self-improvement. *Walk It Out* focused on the number of steps that a patient took during a day according to pedometers versus number of laps walked. Many patients were motivated to get out of bed and walk in order to complete more steps in a day than they had done the day before. In order for motivation to be effective nurses must have positive working relationships with their patients to elicit open communication and empowerment (Matthie & Jenerette, 2015). The PRISMA diagram (see Appendix A) and Table of Evidence (see Appendix B) provide more information regarding the literature utilized to support *Walk It Out*.

Conceptual / Theoretical Framework & QI / EBP Model

Conceptual Framework

A conceptual framework is a tool for integrating and interpreting information (Moran, Burson, & Conrad, 2017). It helps to organize and define concepts so that they provide a focus and rationale for a study or project (Moran et al., 2017). The Donabedian Model was used as the conceptual framework for this DNP project and is often utilized in appraising the quality of nursing services (Polit & Beck, 2016). This framework focused

on the structure, process, and outcome of the nursing implementations utilized in *Walk It Out* (Moran et al., 2017). It allowed for the assessment of specific nursing interventions on patient health outcomes (Polit & Beck, 2016).

Theoretical Framework

In addition to the Donabedian Model, this DNP project was also guided by the theoretical framework developed by Virginia Henderson known as the *Nursing Need Theory* (Petiprin, 2016). This theory emphasized activities of daily living and a patient's basic needs (Petiprin, 2016). It highlighted how nurses can help patients achieve maximum independence, so that when they are discharged from the hospital, they are able to fully function on their own (Petiprin, 2016). The four major concepts of this theory included the individual, environment, health, and nursing (Petiprin, 2016).

Additionally, nursing care should include these fourteen key components:

1. Breathe normally.
2. Eat and drink adequately.
3. Eliminate body wastes.
4. Move and maintain desirable postures.
5. Sleep and rest.
6. Select suitable clothes-dress and undress.
7. Maintain body temperature within normal range by adjusting clothing and modifying environment.
8. Keep the body clean and well groomed and protect the integument.

9. Avoid dangers in the environment and avoid injuring others.
10. Communicate with others in expressing emotions, needs, fears, or opinions.
11. Worship according to one's faith.
12. Work in such a way that there is a sense of accomplishment.
13. Play or participate in various forms of recreation.
14. Learn, discover, or satisfy the curiosity that leads to normal development and health and use the available facilities. (Petiprin, 2016, para. 4)

AYAs with SCD would greatly benefit from the implementation of this nursing theory on a regular basis. This theory is holistic because it addresses a patient's mind, body, and spirit. Ideally, when putting this theory into practice, nurses are assisting and advocating for their patients so that they can independently perform activities of daily (Petiprin, 2016). The goal is to prepare the patient for discharge as soon as possible with ample independence that allows them to function properly at home. By encouraging AYAs with SCD to ambulate daily, 8B nurses were actively following the *Nursing Need Theory*. As evidence by the two components that relate to patient mobility which suggest that nurses must ensure that their patients "move and maintain desirable positions" and "play or participate in various forms of recreation" in order to achieve maximum independence (Petiprin, 2016, para. 4).

EBP Model

Although ambulation was encouraged, unit 8B at CHKD, did not require a standard ambulation protocol prior to August 1, 2018. This DNP project introduced a

standardized ambulation protocol for AYA patients ages twelve to nineteen-years-old with SCD. Changing a practice that is already in place or introducing a practice that has not yet been made routine within a healthcare organization, can be challenging.

Therefore, having systematic steps to overcome these challenges is important. In order to enact an evidence-based practice (EBP) change, models such as the Star Model were created to “systematically guide the implementation of EBP” (Melnyk & Fineout-Overholt, 2015, p. 274). The Star Model helps to simplify the vast amount of research that is available to healthcare professionals so that it can be applied to hands-on clinical practice (Melnyk & Fineout-Overholt, 2015). It breaks down the steps for implementing research findings to practice into five stages or points (Melnyk & Fineout-Overholt, 2015).

Project Design

Methodology

Study Design

A quasi-experimental pre-post design was used to compare the average length of hospital stay for patients with SCD, hospitalized on the 8B unit, ages twelve to nineteen-years-old before and after the implementation of *Walk It Out*. As previously stated, the Donabedian Model and *Nursing Need Theory* provided frameworks for this DNP project. Additionally, the STAR Model was utilized to systematically implement *Walk It Out* on 8B. The five stages or points of the STAR Model are as follows: Point One – *Discovery Research*, Point Two – *Evidence Summary*, Point Three – *Translation to Guidelines*,

Point Four – *Practice Integration*, and Point Five – *Process Outcome Evaluation*

(Melnik & Fineout-Overholt, 2015). These points are discussed in more detail as related to this project in the “Materials and STAR Model Procedure” section.

Setting

The setting for this quality improvement project was a twenty-bed pediatric hematology/oncology unit (8B) at CHKD, located in Norfolk, Virginia. The location of CHKD makes it an ideal place for comprehensive pediatric care for patients across the states of Virginia and North Carolina. It is the only freestanding children’s hospital in Virginia and recently was named a level 1 trauma center. As a unit, 8B generally has high acuity patients. However, the nurse to patient ratio maximum is four patients to one nurse. Depending on the acuity of the patients on the floor, nurses may only have two patients if they require more critical attention. Nursing care partners are certified nursing assistants who assist registered nurses with vital signs, activities of daily living, input, output, daily weights, and linen changes. There are usually six to seven nurses and two to three nursing care partners on the floor per twelve-hour shift with an average daily census of about fifteen patients.

Participants

Walk It Out nursing interventions were implemented by nurses and nursing care partners with a convenience sample of patients ages twelve to nineteen-years-old, diagnosed with SCD, and admitted to 8B for inpatient medical treatment. Patient age, gender, and length of stay data were collected strictly from CHKD’s Health Information

Management (HIM) department. This information was not collected directly from the patients. Patients were not required to release any personal information or complete any surveys. *Walk It Out* was a quality improvement project that sought to improve nursing practice so that nurses were empowered to encourage their patients to ambulate more.

Inclusion and exclusion criteria. Children included in this quality improvement project were twelve to nineteen-years-old, had a diagnosis of SCD, and were admitted to 8B for inpatient medical treatment. They all had a doctor's order that stated that their activity status was 'up ad lib.' This indicated that they could ambulate as much as possible or as much as their bodies would allow. The interventions that nurses implemented were visual and verbal reminders for their patients to get out of bed and walk more frequently so that they could reduce the risks for health complications that occur from immobility. Exclusion criteria were any children with SCD less than twelve years old or young adults with SCD older than nineteen, as well as any patients who did not have SCD, or patients who did not have a doctor's order to be out of bed ad lib.

Materials and STAR Model Procedure

Point one – discovery research. *Walk It Out* was based on *STEP-UP: Study of the Effectiveness of a Patient Ambulation Protocol* by Teodoro et al. (2016). Many other relevant and current quantitative studies, meta-analyses, randomized control trials, quasi-experimental studies, and qualitative studies were reviewed. These studies focused on a variety of relevant topics to this project such as SCD in general, SCD and its effects on AYAs, managing chronic pain, and the benefits of ambulation.

Point two – evidence summary. The review of evidence showed that ambulation benefited patients, but that as a nursing intervention, it is often overlooked. “Prolonged bed rest is associated with extended hospital stays” (Drolet et al., 2014, p. 198). According to Drolet et al. (2014) and Teodoro et al. (2016), nurse driven ambulation protocols have been shown to increase patient ambulation. An increase in ambulation could help decrease the length of hospital stay for AYAs admitted to 8B with SCD.

Point three – translation to guidelines. Following the review of research and summary of evidence, evidence-based practice was translated into guidelines based on previous research completed by Teodoro et al. (2016). 8B-nursing staff were educated on the guidelines that made up the *Walk It Out* protocol in July 2018. This included review of the quality improvement project’s goals, procedures, expected outcomes, and nursing staff responsibilities. Education included a handout (see Appendix C) and a short PowerPoint presentation (about ten minutes) that was shared with nursing staff members during the July staff meetings by the DNP student. The education handout (see Appendix C) was explicit and gave nurses all of the information that they needed regarding the *Walk It Out* protocol and ambulation encouragement in step-by-step format. In addition to the face-to-face education session, the DNP student also created a binder that contained the nurse education handout (see Appendix C) and PowerPoint presentation slides. The binder was kept at the front desk for all nursing staff to reference if they had any questions regarding the ambulation protocol.

After nursing staff education, implementation of *Walk It Out* began August 1, 2018. From that point on, patients who met inclusion criteria and their families were given an educational handout on the importance of walking upon their admission to 8B (see Appendix D). The 8B secretaries helped to ensure that this handout was included in admission packets for all SCD patients who met the inclusion criteria. Research has shown that the average American reads at or below an eighth-grade reading level (Stossel, Segal, Gliatto, Fallar, & Karani, 2012). Therefore, patient education materials were created at or below this level. The handout (see Appendix D) used for this quality improvement project met this criterion because it read at a 3.9 grade level per the Flesch-Kincaid Grade Level that was provided by Microsoft® Word for Mac (2017). It was also available in Spanish (see Appendix E).

Similar to the study by Teodoro et al. (2016), each morning the day shift nurse would write daily walking goals for their patients participating in *Walk It Out* on the whiteboard of their hospital room. If the patient's ability to walk was limited, the goal was to walk at least twice with assistance to the threshold of the nursing pod in which the patient's room was located. If the patient's ability to walk was not limited, the goal was to walk a minimum of three times around the unit. The next day, the patient's goal was to double the steps they did the day before. Nurses taking care of patients utilizing the *Walk It Out* protocol communicated to one another their patients' goals for that day in their change of shift report. In addition to the goals written on the white board each day of hospitalization, there were also reminder cards at the patients' bedside tables and

interior doors to promote walking (see Appendix F). The reminder cards were also available in Spanish (see Appendix G).

Each patient who received the *Walk It Out* ambulation protocol received a wrist pedometer at 0700 from his or her day shift nurse. The nurse made sure that the pedometer was set at zero prior to helping the patient fasten it to their wrist. The patient was instructed and encouraged by nursing staff to not remove the pedometer. At 2300 the night shift RN removed the pedometer from the patient and recorded the number of steps taken for that day on the patient's whiteboard so that they could meet or increase their number of steps for the next day's goal. The number of steps were not recorded anywhere else. This number was simply used as motivation for the patient and to give them an idea of how much they were walking each day. The night shift RN charged the pedometers overnight in a locked medication room so that they would be ready for patient use the next day.

Point four – practice integration. *Walk It Out* was integrated into nursing practice from August 1, 2018 - January 31, 2019. Reminders to continue to implement *Walk It Out* interventions were frequently announced through email reminders from the DNP student and at nurse huddles prior to every shift. A nurse huddle is something that the nurses on 8B perform before every shift whether it is day or night. During this time, the oncoming staff gather at the charge nurse desk and the off-going charge nurse announces any important announcements that staff may need to know, whether it is for that shift or for future reference. If nurses had any questions regarding the *Walk It Out*

ambulation protocol, they had the DNP student's contact information which included her mobile phone number, university email address and work email address.

Point five – process outcome evaluation. The length of stay, gender, and age data for all patients with SCD ages twelve to nineteen-years-old admitted to 8B pre-*Walk It Out* implementation (8/1/2017 – 1/31/2018) and post-*Walk It Out* implementation (8/1/2018 – 1/31/2019) were collated by the CHKD HIM department. The purpose of collecting this data was for secondary data analysis. When the information was released to the DNP student it was de-identified. For example, the medical record number, name, and birthdate were not included to ensure patient privacy and confidentiality. The DNP student was unable to identify specific patients from the information received. After receiving this information, the DNP student entered the data into an Excel spreadsheet for secondary data analysis. After the data were entered, the documents with de-identified patient health information were shredded and discarded to protect patient privacy.

Data analysis. A power analysis indicated that a total sample of 128 patients was needed to detect medium effects ($f=0.25$) with 80% power and $\alpha=0.05$. This was achieved with 102 patients meeting inclusion criteria pre-implementation and 62 patients post-implementation for a total of 164 patients. The following statistical tests were used to analyze data using Microsoft Excel: mean, median, mode, standard deviation, Pearson correlation coefficient, and one-way ANOVA tests. The dependent variable was length of stay, and the independent variables were gender, age, and *Walk It Out* implementation interventions. Descriptive statistics were used to display gender and age data.

Risks/Benefits Analysis

In order to implement *Walk It Out* and obtain data, patients were expected to get out of their beds and walk around the nursing unit. Walking posed minimal risks to patients. If for any reason they felt like they could not walk or did not wish to walk further, then they were allowed to stop at any time. However, the patients were not being asked to do anything more than their prescribed doctor's orders. This quality improvement project gave nurses a tool to help them to encourage more frequent ambulation for their AYA patients with SCD. Doctors and nurses were present at all times if any medical need arose during ambulation due to physical exertion.

The benefits of ambulation in hospitalized patients outweighed the risks. However, risks included: falling, increased pain, shortness of breath, and potentially psychosocial stress involved with getting out of bed and walking with nursing staff. To prevent risks, nurses or nursing care partners assisted patients in walking if necessary. Even though there were potential risks, they were minimal, and the benefits of walking were greater. "Mobilizing hospitalized patients can decrease the risk for or prevent pneumonia and DVT, provide benefits to physical function (pain, fatigue), decrease anxiety and depression, and improve patient satisfaction" (Teodoro et al., 2016, p. 111). Therefore, even though there may have been risks to walking, patients were encouraged to do so regardless in order to prevent health complications related to hospitalization. There was also a minor risk for the breach of personal health information of patients. However, since the DNP student completed a secondary analysis of de-identified data,

the risk for personal health information being disclosed was low. Documents that contained the de-identified data were shredded once entered into Excel. All appropriate measures were taken to protect patient health information as well as to physically protect the patients as they were encouraged to ambulate.

Confidentiality statement. Patient confidentiality was maintained at all times. No identifiable demographic information was collected from the patients. The data that were gathered from past medical records (length of stay, age, and gender) were not accompanied with any identifiable patient information to ensure patient privacy and confidentiality. The secondary data were entered and stored in an Excel spreadsheet that was password protected on the DNP student's personal computer. No one else knew or were given the password; nor did anyone else have access to the DNP student's computer. Confidentiality was of high importance, and all necessary precautions were taken to ensure that this was maintained at all times. After compilation into the cumulative DNP project for dissemination of findings, the Excel spreadsheet will be kept secure and maintained for three years before deletion. This deletion will occur July 1, 2022.

Disclosure statement and consent form. This was a quality improvement project, not human subjects research. It directly evaluated current practice of how nurses on the hospital unit 8B encouraged ambulation in their patients with SCD. Please see Appendix H for Salisbury University IRB approval and Appendix I for agency approval (CHKD). The *Walk It Out* ambulation protocol did not require patients to do anything

beyond what they were already prescribed to accomplish by their attending physician for their own health benefits. Therefore, patient or parent consent was not applicable. Upon admission to the hospital, parents are required to sign a document authorizing their consent for medical treatment of their son or daughter at CHKD. This document was part of each patient's medical record and gave nurses and doctors the authority to treat the pediatric patients admitted to 8B. Therefore, improving nursing practice by implementing new strategies to encourage ambulation did not require additional consent from the parents or children.

Organizational System Analysis (SWOT)

CHKD proved to be an appropriate setting to implement *Walk It Out* following a thorough SWOT analysis. A SWOT analysis looks at positive and negative factors within and outside of an organization that may influence the success or failure of a project (see Appendix J) (Moran et al., 2017). SWOT stands for strengths, weaknesses, opportunities, and threats (Moran et al., 2017). As an organization, an internal strength of CHKD and more specifically 8B as a nursing unit, was exemplary teamwork and interprofessional collaboration. In addition to nurses, nursing care partners, and physicians working well together, the SCD social workers were also involved and supportive of *Walk It Out*. They would often take the patients for walks while they spoke to them about their psychosocial needs and concerns. Additional internal strengths were a motivated nursing and physician staff, supportive administration and leadership, as well as a culture that supported continuous quality improvement in order to provide optimal

patient care. Internal weaknesses for CHKD included a high staff turnover rate, short-staffed shifts, and budget constraints. Due to high nurse and nursing care partner turnover rate, 80% of the shifts during *Walk It Out* implementation were short staffed. Another internal weakness was that prior to *Walk It Out* there had not been a standardized ambulation protocol, thereby potentially creating a challenge to gain nursing staff and patient buy-in. Budget constraints on the 8B nursing unit was another internal weakness that made purchasing pedometers difficult, which presented a barrier to the unit fully embracing *Walk It Out*.

In addition to the internal strengths and weaknesses of CHKD, external opportunities and threats were also acknowledged (see Appendix J). An opportunity was to take positive outcomes gained from *Walk It Out* on 8B to lay the ground-work for creating a hospital-wide ambulation protocol that would include all CHKD patients. A main external opportunity was the partnership that CHKD had with the Eastern Virginia Medical School (EVMS). As a teaching hospital, CHKD utilizes the EVMS pediatric residency program, which has created a culture of continuous learning that welcomes quality improvement opportunities like *Walk It Out*. As the only children's hospital in the region, CHKD provided an excellent opportunity for healthcare professionals to take care of many patients with SCD and lead the way in evidence-based nursing care for this patient population. External threats were factors outside of CHKD's control that could have impeded the implementation of *Walk It Out*. The developmental stage of the AYA population was one external threat. AYAs may appear to be stubborn and unwilling to

participate in ambulation or other aspects of their healthcare due to their current developmental stage. This could make it hard to encourage them to participate in *Walk It Out*. Another external threat was Virginia’s unpredictable weather. Its abrupt changes in temperature are known to instigate vaso-occlusive episodes in patients with SCD. Therefore, individual patient factors and environmental factors may have contributed to longer hospital stays regardless of the increased ambulation initiatives created by *Walk It Out*.

Implementation Timeline

Despite weaknesses and threats, the implementation of *Walk It Out* began August 1, 2018 and continued through January 31, 2019. The following figure (see Figure 1) displays a graphical depiction of the implementation time line.

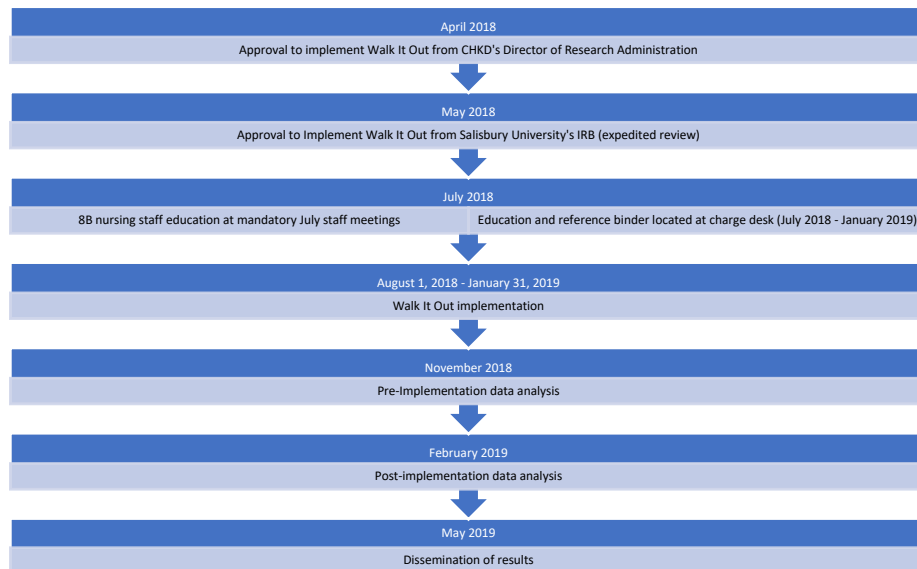


Figure 1. Implementation timeline for *Walk It Out*.

IRB and Agency Approval

Agency approval from CHKD was granted to Elizabeth Webb, BS, RN on April 23, 2018 (see Appendix I) by the Director of Research Administration, Amy Quinn, at CHKD. This did not require approval from the EVMS Institutional Review Board (IRB) because the nature of the project was for quality improvement purposes that would benefit patient care, not human subjects research. IRB approval from Salisbury University was granted to Dr. Debra Webster, EdD, RN-BC, CNE and Elizabeth Webb, BS, RN on May 24, 2018 (see Appendix H). This was an expedited review process because of the quality improvement nature of the DNP project. After approval from CHKD and Salisbury University the DNP student was able to implement *Walk It Out*.

Project Implementation

Barriers and Facilitators

Barriers

Barriers to implementation occurred from the beginning. The original pedometers that had been purchased did not accurately record the patients' steps. Therefore, five wrist pedometers were purchased instead. Originally, the patients were going to be able to take the pedometers home with them at discharge. However, the wrist pedometers were too expensive for the DNP student to afford for each patient to keep their pedometer. Instead of taking the pedometers home, the patients were asked to give the pedometers back to their nurse before they were discharged. Unfortunately, three of the five pedometers were misplaced, thrown away, or taken home by patients. To prevent this

from happening again, five more pedometers were purchased and a sign out sheet was created to keep better track of the pedometers and to hold nursing staff accountable. All pedometers and other *Walk It Out* materials were placed in the locked medication room on 8B. Only registered nurses could enter the medication room with their personal identification badges. These modifications allowed the quality improvement project to smoothly continue.

Facilitators

Despite some barriers at the beginning of project implementation, patients, families, and nursing staff were all eager and willing to participate in *Walk It Out*. Many of the patients were visibly motivated to see how many steps they could achieve in one day. Additionally, the project motivated nursing staff to take opportunities to have conversations with patients about the importance of walking. Patients and parents were receptive in learning about why ambulation was important. They showed understanding of the importance of walking by active participation. Additional facilitators included supportive administration and hospital leadership, as well as a culture that supported continuous quality improvement.

Summative Evaluation of Implementation Process

The implementation process went well as evidenced by nursing staff and patient participation. Nurse education through staff meetings and the binder of written education materials located at the charge nurse desk (see Appendix C) helped to reinforce implementation. The DNP student continually reminded staff to initiate and continue

Walk It Out through emails and daily nurse huddles prior to each shift. *Walk It Out* utilized pedometers and visual reminders to help remind patients to walk and remind nurses to encourage ambulation. Patient participation in *Walk It Out* validated to 8B nursing staff that simple interventions could be easily initiated and successful. One patient was so motivated by *Walk It Out*, that his mom purchased him his own wrist pedometer. Every day he that he was admitted, he would compete with his mom to see who could obtain the most steps. This was a good example of how beneficial these interventions could be on patient health.

Analysis and Discussion of Findings

Analysis and Discussion of Pre- and Post-Implementation Data

The following figures and tables depict the pre and post-implementation data obtained from CHKD's HIM department under the authorization of Whitney Horsley, MSN, RN, nursing director of the hematology/oncology department. The independent variables for both the pre and post-implementation data were age, gender, and whether or not *Walk It Out* interventions had been implemented. The dependent variable for both groups of patients was length of hospital stay.

Between August 1, 2017 and January 31, 2018, there were 102 sickle cell patients admitted and treated on 8B; ages twelve to nineteen-years-old. Of these 102 patients, 44 were male and 58 were female (see Figure 2). In other words, 57% of pre-implementation patients were female and 43% were male. Descriptive, nominal gender

data shows that the gender mode for the pre-implementation group was female (see Figure 2).

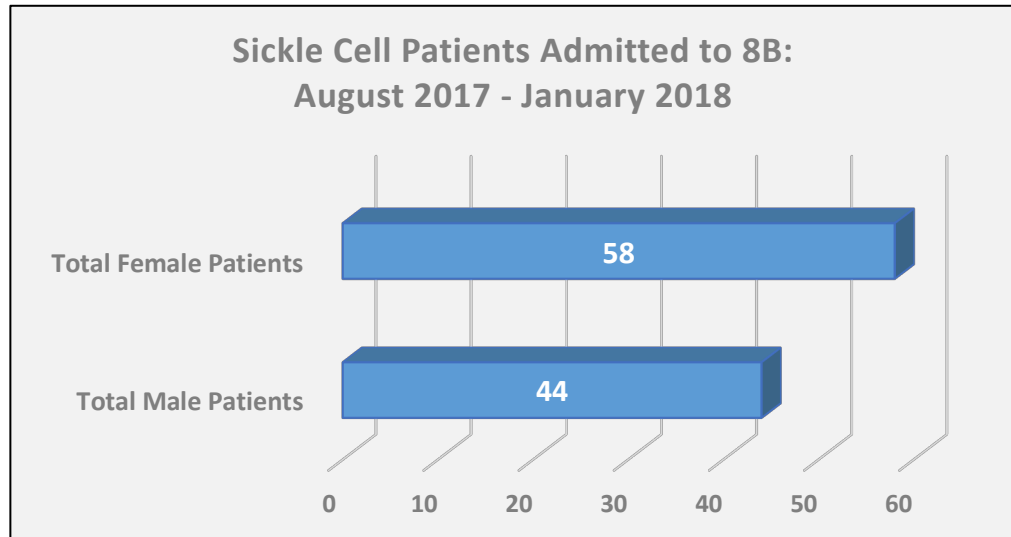


Figure 2. Patients with SCD admitted to 8B pre-implementation.

Similarly, of the patients who participated in *Walk It Out* in the post-implementation group, 68% were female and 32% were male (see Figure 3). Between August 1, 2018 and January 31, 2019, there was a total of 62 patients with SCD admitted and treated on 8B who fit inclusion criteria. Of these 62 patients, 20 were male and 42 were female (See Figure 3).

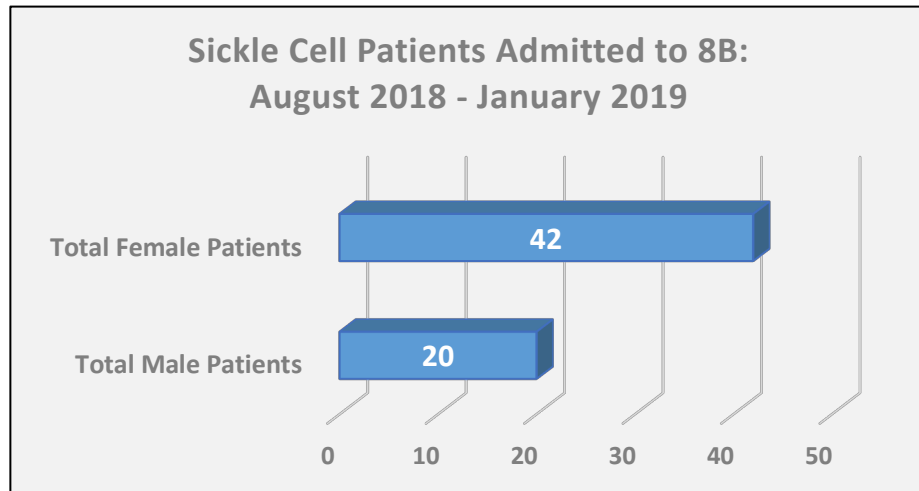


Figure 3. Patients with SCD admitted to 8B post-implementation.

Therefore, the post-implementation gender mode was also female. In addition to being admitted to the hospital more often than males, data showed that female patients with SCD also stayed in the hospital longer for both groups (see Figure 4 and Figure 5). However, regardless of gender the average length of stay decreased after the implementation of *Walk It Out* (see Figure 4 and Figure 5).

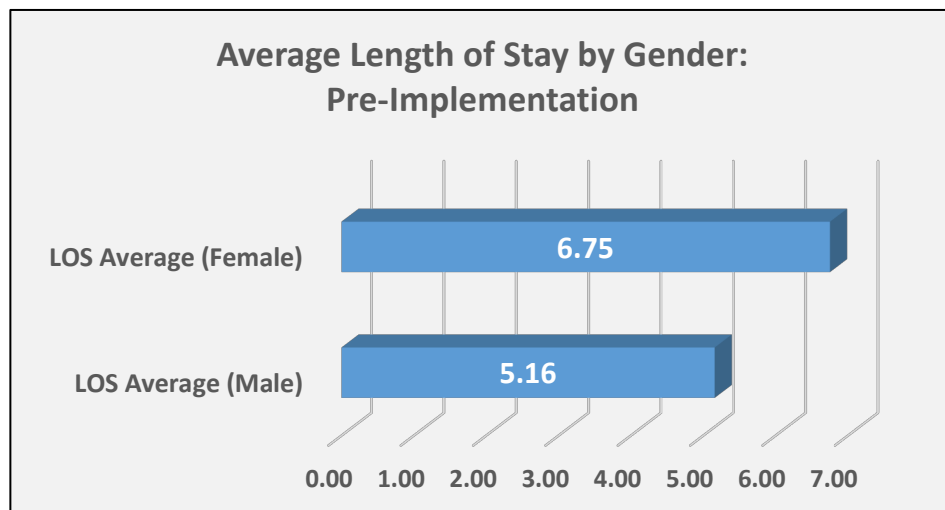


Figure 4. Pre-implementation average length of stay by gender.

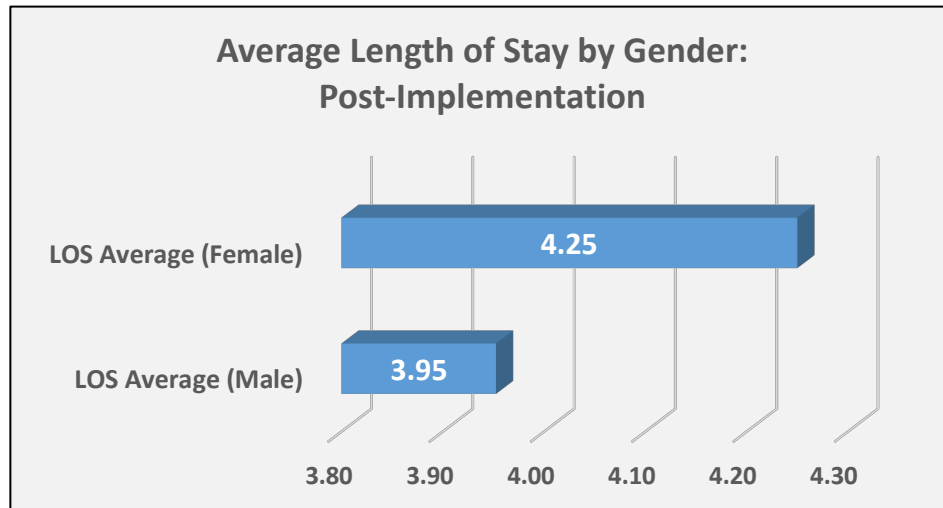


Figure 5. Post-implementation average length of stay by gender.

Another observation from the data was that the total number of patients in the pre-implementation group was much higher than the post-implementation group, however, the reason behind this is unknown. A possible explanation for this observation could be that the winter of 2017-2018 in Norfolk, Virginia was much colder than the winter of 2018-2019¹ (U. S. Climate Data, 2019). For example, on January 3rd and 4th of 2018, there was a blizzard and Norfolk was noted to have had 13.15 inches of snow accumulation during the entire month of January (U. S. Climate Data, 2019). Conversely, from August 2018 – January 2019 there was no snow precipitation recorded.

¹ All weather data was obtained from the U. S. Climate Data website. Please see Reference section for further details.

Therefore, it could be possible that AYAs with SCD had less vaso-occlusive episodes from 2018-2019 because the weather was milder (see Figure 6).

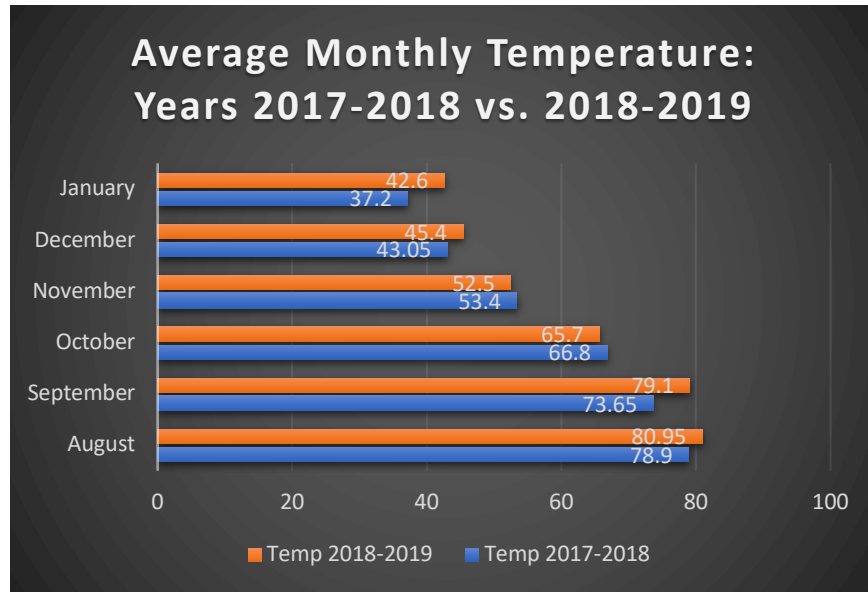


Figure 6. Norfolk, Virginia: Average Monthly Temperatures¹

In order to fully understand the implications of *Walk It Out* implementation, measures of central tendency were analyzed for both groups (see Table 1 and Table 2).

Table 1

Pre-Implementation: Length of Stay Statistics (all genders included)

| Mode | Average | Median | Standard Deviation |
|------|---------|--------|--------------------|
| 5.24 | 5.95 | 4.57 | 5.50 |

Table 2

Post-Implementation: Length of Stay Statistics (all genders included)

| Mode | Average | Median | Standard Deviation |
|------|---------|--------|--------------------|
| 2.8 | 4.15 | 2.87 | 3.30 |

These tables show a 30% decrease in average length of stay. The overall average, or mean, length of stay for all pre-implementation patients with SCD on 8B was 5.95 days (see Table 1) and the overall average length of stay for all post-implementation patients with SCD was 4.15 days (see Table 2). All of the measures of central tendencies for the post-implementation patient group were lower than those of the pre-implementation group. Standard deviation is a linear measurement that was calculated from the distance between the length of stay data points and the group mean (Mateo & Foreman, 2014). The larger the standard deviation, the larger the variability within that specific group (Mateo & Foreman, 2014). The standard deviation for the pre-implementation data was 5.5 (see Table 1), while the standard deviation for the post-implementation data was 3.3 (see Table 2). In other words, before *Walk It Out* was initiated, the average length of stay for patients with SCD had more variation or was less consistent than after the initiation of *Walk It Out*. Therefore, by having a standardized ambulation protocol for patients with SCD, their average length of stay seemed to be not

only shorter, but also more consistent. This could have been because nursing staff was more cognizant of reminding their patients to ambulate because of *Walk It Out*.

In addition to looking at the average length of stay in relation to gender; age was also a variable that was considered. The most frequently appearing age for admission to 8B in the pre-implementation data group was nineteen-year-olds, with twelve-year-olds' frequency of admission being similar in number (see Table 3 and Figure 7). While nineteen-year-olds and twelve-year-olds were admitted to 8B the most frequently in the pre-implementation phase, twelve-year-olds had longer average hospital length of stay at 6.32 days in comparison to nineteen-year-olds with an average length of stay of 4.8 days. Table 5 depicts in detail the frequency of patient ages and their corresponding length of stay, while Figure 7 gives a more visual representation.

Table 3

Pre-Implementation: Age Frequency and Length of Stay (LOS) Table

| Age | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|-------------|-------|-------|------|------|-------|-------|-------|------|
| LOS in Days | 7.47 | 11.50 | 1.85 | 1.75 | 6.01 | 5.65 | 22.24 | 5.13 |
| | 7.47 | 3.07 | 3.88 | 5.24 | 6.43 | 4.97 | 22.24 | 5.13 |
| | 2.58 | 4.22 | 5.82 | 2.83 | 4.56 | 5.56 | 22.24 | 2.65 |
| | 2.27 | 2.59 | 3.38 | 4.13 | 9.52 | 5.56 | 4.57 | 6.16 |
| | 2.10 | 2.73 | 1.94 | 3.79 | 1.91 | 3.36 | 7.83 | 6.16 |
| | 4.58 | 2.73 | 4.53 | 4.50 | 1.43 | 2.28 | 2.15 | 5.36 |
| | 6.25 | 1.97 | | | 6.41 | 23.51 | 1.47 | 6.02 |
| | 6.25 | 0.87 | | | 10.92 | 11.76 | 10.95 | 6.54 |
| | 5.35 | 31.64 | | | 3.64 | 2.25 | 10.95 | 8.86 |
| | 5.12 | 1.99 | | | 7.87 | 5.44 | 2.77 | 4.43 |
| | 1.22 | 8.35 | | | 1.05 | 3.17 | | 3.88 |
| | 1.75 | 8.35 | | | | 1.81 | | 6.63 |
| | 17.80 | 3.61 | | | | 1.49 | | 2.05 |
| | 23.01 | 8.53 | | | | 1.41 | | 3.74 |
| | 0.97 | 9.74 | | | | 1.42 | | 1.68 |
| | 5.24 | 7.15 | | | | | | 8.29 |
| | 5.24 | 2.41 | | | | | | 2.70 |
| | 9.17 | | | | | | | 2.70 |
| | | | | | | | | 3.18 |
| Frequency | 18 | 17 | 6 | 6 | 11 | 15 | 10 | 19 |
| Average LOS | 6.32 | 6.56 | 3.57 | 3.71 | 5.43 | 5.31 | 10.74 | 4.80 |

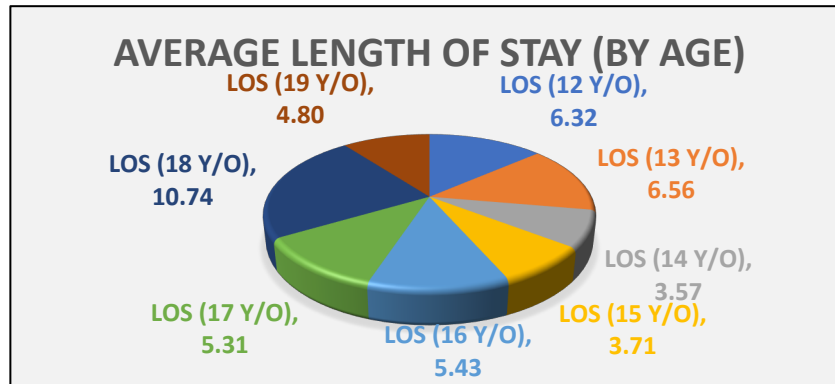


Figure 7. Pre-implementation average length stay by age.

In comparison to the pre-implementation group, the most frequently appearing age for admission to 8B in the post-implementation group was eighteen-year-olds followed closely by thirteen-year-olds. This was only a year off from the pre-implementation group (nineteen-year-olds and twelve-year-olds) for both of the top two most frequently occurring age groups. Just as the nineteen-year-olds in the pre-implementation group had shorter lengths of stay compared to their twelve-year-old counterparts, the post-implementation group had similar results. While eighteen-year-olds and thirteen-year-olds in the post-implementation group had more frequency of admissions than the other age groups, the eighteen-year-olds had shorter lengths of stay compared to the thirteen-year-olds (2.77 days versus 3.32 days respectively). This similarity between groups shows that the pre- and post-implementation groups were comparable to one another which increases the validity of the results for the *Walk It Out* quality improvement project. For further analyzation of data, Table 3 and Figure 7

should be compared to Table 4 and Figure 8, which depict the post-implementation age and length of stay data.

Table 4

Post-Implementation: Age Frequency and Length of Stay (LOS) Table

| Age | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|-------------|--------|------|------|------|------|-------|------|-------|
| LOS in Days | 3.46 | 1.78 | 7.69 | 3.58 | 4.13 | 2.5 | 1.76 | 10.46 |
| | 3.46 | 2.8 | 7.69 | 5.94 | 1.9 | 0.67 | 0.89 | 4.72 |
| | 1.75 | 2.8 | 1.55 | | 1.85 | 1.62 | 4.86 | 5.64 |
| | 2.52 | 4.03 | 9.78 | | 0.55 | 2.94 | 5.22 | 2.78 |
| | 13.72 | 4.03 | 9.78 | | | 3.51 | 2.8 | 2.78 |
| | 13.72 | 4.32 | 3.96 | | | 2.57 | 1.26 | 1.97 |
| | | 5.35 | 5.63 | | | 5.35 | 2.73 | |
| | | 3.49 | 5.63 | | | 18.02 | 2.52 | |
| | | 2.56 | 3.76 | | | 2.05 | 1.15 | |
| | | 2.78 | 2.69 | | | 2.63 | 3.72 | |
| | | 2.62 | | | | | 4.03 | |
| | | | | | | | 2.36 | |
| | | | | | | | 2.74 | |
| Frequency | 6 | 11 | 10 | 2 | 4 | 10 | 13 | 6 |
| Average LOS | 6.44 | 3.32 | 5.82 | 4.76 | 2.11 | 4.19 | 2.77 | 4.73 |
| Key: | Female | Male | | | | | | |

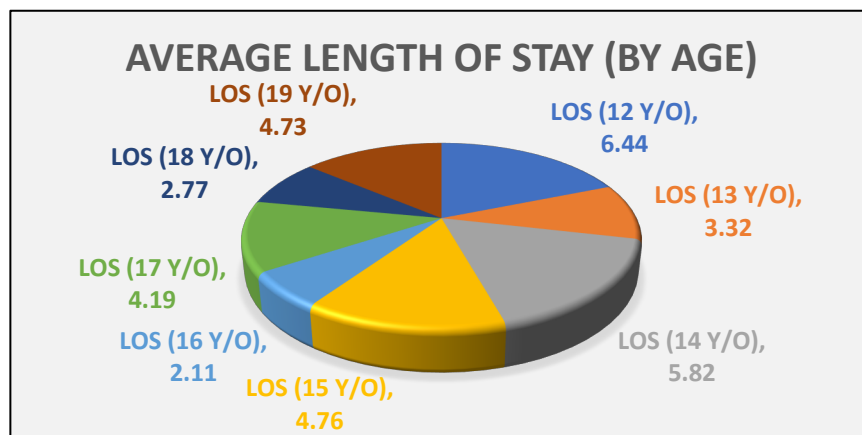


Figure 8. Post-implementation average length of stay by age.

Overall, the eighteen-year-olds in the pre-implementation group were hospitalized the longest, and the fourteen-year-olds had the shortest average length of stay (see Table 3 and Figure 7). In contrast, the sixteen-year-olds in the post-implementation group were hospitalized the longest and the twelve-year-olds had the shortest hospital stays (see Table 4 and Figure 8). To further assess whether or not specific ages affected hospital length of stay, a Pearson correlation coefficient ('r') was calculated for pre- and post-implementation data. The closer 'r' was to 1.0 indicated a correlation between the independent variable of age and the dependent variable, length of stay (Lurie Children's, 2018). In contrast, if 'r' was closer to 0, than it indicated that the two variables were not correlated (Lurie Children's, 2018). The Pearson correlation coefficient for pre-implementation data was calculated to be 0.0036. This value was very close to zero, which shows that age did not influence length of hospital stay for those in the pre-implementation group. However, the post-implementation data had a Pearson correlation coefficient of -0.18. A negative number signifies an inverse or negative relationship (Lurie Children's, 2018). This value showed that in regard to the post-implementation group there was reason to believe that the older the patient was at time of admission, the shorter time they would spend in the hospital (see Figure 9). One could ascertain that the *Walk It Out* protocol was more effective for older age groups, which could explain why older ages were correlated with a shorter length of stay. However, according to the scatter plot below (see Figure 9) and the fact that 'r' was not extremely close to -1, the assumption of an inverse relationship between age and length of stay for the post-

implementation group is somewhat weak (Statology, 2019). If the points on the scatter plot (see Figure 9) had more of a diagonal slope pattern than the strength of the relationship between age and length of stay would have been considered to be stronger (Polit & Beck, 2016).

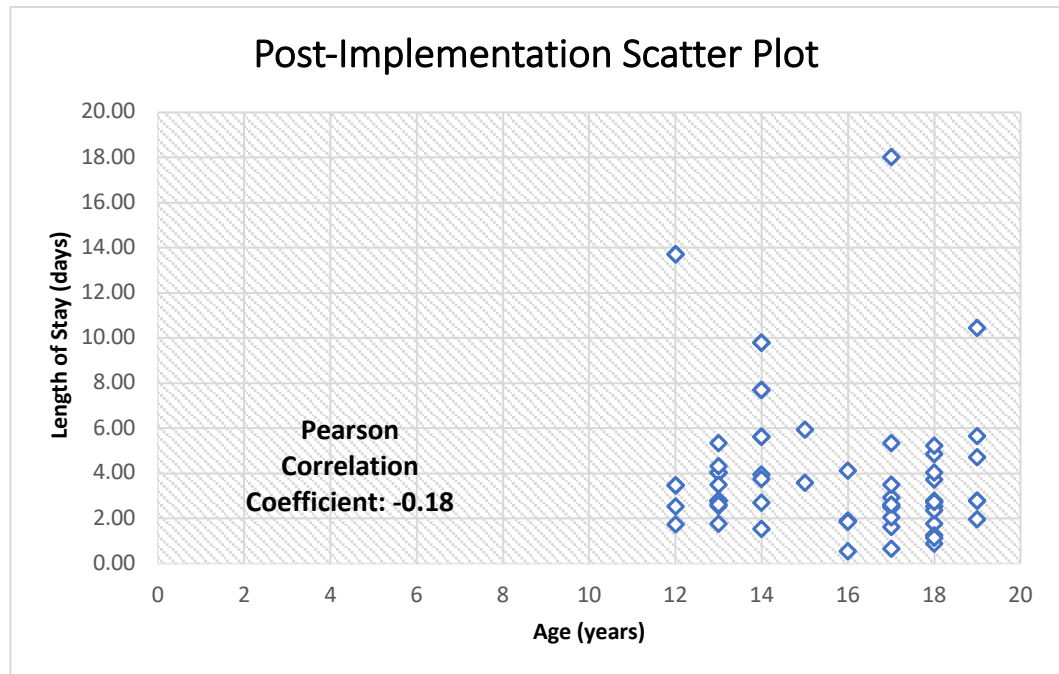


Figure 9. Post-implementation data: Relationship between age and length of stay.

To further elaborate and determine if there were statistically significant differences between the pre-implementation group and the post-implementation group, several different ANOVA tests were conducted (see Tables 5-). All ANOVA tests had an alpha value set at 0.05. “A significance level of 0.05 indicates a 5% risk of concluding that a difference exists when there is no actual difference” (Minitab Inc., 2017, para. 2). The goal of an ANOVA is to determine whether or not the differences between group means are statistically significant (Fain, 2017). If a groups’ p-value is less than alpha

(0.05), than the differences noted between the two groups are statistically significant (Fain, 2017). To begin, the first ANOVA test (see Table 5) demonstrated that the difference in length of stay between the male and female patients in the pre-implementation group were not statistically significant. In other words, gender did not affect length of stay. This is evidence by a p-value of 0.92 and a very low F-statistic (Fain, 2017).

Table 5

Pre-Implementation: Gender Comparison in Length of Stay

ANOVA: Single Factor

SUMMARY

| <i>Groups</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|---------------|--------------|------------|----------------|-----------------|
| Pre_Female | 58 | 347.93 | 5.9987931 | 32.0361161 |
| Pre_Male | 44 | 259.09 | 5.88840909 | 28.5190044 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups | 0.30485467 | 1 | 0.30485467 | 0.00998746 | 0.92059422 | 3.93614299 |
| Within Groups | 3052.3758 | 100 | 30.523758 | | | |
| Total | 3052.68066 | 101 | | | | |

The difference in length of stay between male and female patients in the post-implementation group were also insignificant with a p-value of 0.74 (see Table 6).

Table 6

Post-Implementation: Gender Comparison in Length of Stay

ANOVA: Single Factor

SUMMARY

| <i>Groups</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|---------------|--------------|------------|----------------|-----------------|
| Post_Female | 42 | 178.5 | 4.25 | 10.4917512 |
| Post_Male | 20 | 79.05 | 3.9525 | 12.2165355 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|----------|----------------|---------------|
| Between Groups | 1.19911694 | 1 | 1.19911694 | 0.108636 | 0.74285032 | 4.00119138 |
| Within Groups | 662.275975 | 60 | 11.0379329 | | | |
| Total | 663.475092 | 61 | | | | |

When comparing pre-implementation females' length of stay to post-implementation females' length of stay and pre-implementation males' length of stay to post-implementation males' length of stay there was also not a strong level of significance when looking at the p-values for each ANOVA (see Tables 7 and 8). This means that when looking at female and male patients separately, the addition of *Walk It Out* did not affect length of stay.

Table 7

Female: Length of Stay Pre and Post-Implementation

ANOVA: Single Factor

SUMMARY

| <i>Groups</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|---------------|--------------|------------|----------------|-----------------|
| Females_Pre | 58 | 347.93 | 5.9987931 | 32.0361161 |
| Females_Post | 42 | 178.5 | 4.25 | 10.4917512 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups | 74.4996355 | 1 | 74.4996355 | 3.23592687 | 0.07511769 | 3.93811108 |
| Within Groups | 2256.22042 | 98 | 23.0226573 | | | |
| Total | 2330.72005 | 99 | | | | |

Table 8

Male: Length of Stay Pre and Post-Implementation

ANOVA: Single Factor

SUMMARY

| <i>Groups</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|---------------|--------------|------------|----------------|-----------------|
| Males_Pre | 44 | 259.09 | 5.88840909 | 28.5190044 |
| Males_Post | 20 | 79.05 | 3.9525 | 12.2165355 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups | 51.5314801 | 1 | 51.5314801 | 2.19067681 | 0.14391209 | 3.99588713 |
| Within Groups | 1458.43136 | 62 | 23.5230865 | | | |
| Total | 1509.96284 | 63 | | | | |

However, when both genders were combined, and the groups were looked at as a whole regardless of their gender, the differences in pre-implementation and post-implementation groups' length of stay were statistically significant (see Table 9). This is made evident by the p-value being less than alpha at 0.02 (see Table 9). Therefore, one could conclude that the 8B nursing staff's implementation of the *Walk It Out* ambulation protocol was successful in reducing overall hospital length of stay for both males and females.

Table 9

Length of Stay Comparison: All Genders and Age Groups

ANOVA: Single Factor

SUMMARY

| <i>Groups</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|---------------|--------------|------------|----------------|-----------------|
| Pre | 102 | 607.02 | 5.95117647 | 30.224561 |
| Post | 62 | 257.55 | 4.15403226 | 10.8766409 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|------------|-----------|------------|------------|----------------|---------------|
| Between Groups | 124.541436 | 1 | 124.541436 | 5.42918921 | 0.02103627 | 3.89950244 |
| Within Groups | 3716.15575 | 162 | 22.939233 | | | |
| Total | 3840.69719 | 163 | | | | |

Recommendations

Economic Considerations

A statistically significant decrease in hospital length of stay leads one to question how the nursing unit 8B could continue to economically maintain this intervention for the benefit of future patients. From the data, 8B decided to continue the implementation of *Walk It Out* but the nursing leadership team determined that at \$10.00 per wrist pedometer, this type of purchase was not within their budget. The leadership team thought of ways to revise the protocol to meet their needs and budget. A cost-effective

option to obtain pedometers would be to see if materials management could order pedometers that 8B could then charge to patients just as bag valve masks, dressing change kits, pulse oximeters, or TED stockings are charged. This would make the pedometers more readily available and eliminate the risk of losing equipment. The patients could also take the pedometers home with them at discharge, which could encourage the continuation of increased activity while at home. Another option would be to ask one of CHKD's many philanthropic donors to donate pedometers to 8B. Either option would allow the patient to keep their pedometer, which would help encourage them to continue to maintain an increased activity level at home.

In addition to shorter hospital stays and improved quality of life, increased ambulation could save the hospital money as a whole institution due to using less resources. Singh, Jordan, and Hanlon (2014), state that the average length of hospital stay related to SCD in the United States is 5.1 days. This is consistent with the average length of hospital stay in the pre-implementation group at CHKD. According to Singh et al. (2014), this average length of stay (5.1 days) costs approximately \$7,637.95 per SCD patient. Therefore, the ability to reduce the length of time that a patient requires hospitalization saves hospitals, insurance companies, and patients money. Economic benefits are incentives that may help ensure that evidence-based practice is accepted and supported by hospital executives. However, first and foremost comes patient care and safety. Quality improvement initiatives that save an institution money should most importantly be beneficial to patients and improve their quality of life.

Implications for Practice

The decrease in average length of hospital stay for AYAs with SCD on 8B reinforced the idea that *Walk It Out* would be beneficial to all patients with different diagnoses and ages admitted to 8B. These benefits include prevention of pneumonia, deep vein thrombosis, pressure ulcers, and loss of functional mobility (Teodoro et al., 2016). Specifically, to the SCD patient population, by preventing hospital acquired pneumonia, nurses can help to prevent acute chest syndrome (ACS) (Yacobovich & Tamary, 2014). This is important because ACS is the leading cause of death in patients with SCD (Yacobovich & Tamary, 2014).

Additionally, ambulation can also improve mood (Teodoro et al., 2016). Post-operative patients would benefit from *Walk It Out* because some of the other benefits of encouraged ambulation are a quicker recovery after surgery and faster return of bowel function after abdominal surgery (Le, Khankhanian, Joshi, Maa, & Crevensten, 2014). To summarize, the vast majority of reviewed literature shows that ambulation benefits a milieu of patients. The benefits of ambulation outweigh the risks that are associated with immobility.

Knowing this information, the 8B leadership team met during January 2019 to discuss the continuation of *Walk It Out*. At this meeting there was concern that it was difficult for nurses to find pedometers when they were ready to walk with their patients. A possible solution that was suggested was to inquire on whether or not CHKD's materials management department or donors would be able to provide pedometers that

would be chargeable or donated to individual patients. If so, this would help to maintain *Walk It Out* as a permanent nursing practice change. If acquiring pedometers was not feasible, it was decided that all elements of *Walk It Out* would remain the same, but instead of counting steps the patients could keep track of their laps around the unit and write the number on their whiteboards in their rooms. The goal would be to meet or increase that number of laps for the next day. Nursing staff would still need to encourage ambulation and update their patients' whiteboards to help increase their motivation and self-efficacy. *Walk It Out* has the potential to become the foundation for a new ambulation policy that would include all patients admitted to 8B. When considering age, patients younger than five-years-old may not be able to understand the concept of tracking their steps or laps. An alternative for this younger age group would be for nursing staff to encourage the use of toys from the Child Life department that the patient would be able to push or ride around the unit. This would encourage them to get up and walk around the unit by making walking more like a game. In turn this could increase the likelihood that younger patients maintain an appropriate activity level while hospitalized.

Process and Outcome Recommendations

A quality improvement project is defined as “a systematic and continuous process that leads to measurable improvement in healthcare services and the health status of targeted groups” (Moran et al., 2017, p. 134). The desired outcome for this DNP project was to decrease the average length of stay for sickle cell patients ages twelve to nineteen thereby improving health outcomes for this population. The process of *Walk It Out* was

to provide tools for nursing staff to be able to actively remind patients to walk more frequently and motivate them to push themselves by utilizing pedometers. The nature of a quality improvement project is to be open to continuous improvements. In order to improve the health outcomes of more patients, beginning in February 2019, *Walk It Out* was broadened to include all patients from pre-school aged children to AYAs admitted to 8B. A nursing culture of continuous quality improvement was maintained by discussing how to improve *Walk It Out* with nursing staff during and after implementation. *Walk It Out* interventions will still need to be continually assessed to make sure that it remains beneficial to patient health outcomes.

Dissemination Plan

To conclude, “dissemination of DNP project results is critical to impacting health care outcomes” (Moran et al., 2017, p. 414). It is important to disseminate one’s results because this helps to close the gap between evidence-based practice and the implementation of care (Moran et al., 2017). The results of this DNP project were presented to 8B staff at the mandatory May staff meetings. During this short presentation, the DNP student conveyed the *Walk It Out* length of stay data that was obtained before and after implementation. The DNP student also posted the results of *Walk It Out* on a bulletin board on one of the hallways of 8B for parents, patients, and staff members to review. She also created a poster for the CHKD Patient Care Services Annual Research and Evidenced-Based Practice Poster Fair that was held on Tuesday, April 30, 2019.

However, the DNP student's main goal was to have her quality improvement project published in the *Journal of Pediatric Hematology/Oncology Nursing*. This professional journal is associated with the Association of Pediatric Hematology/Oncology Nurses (APHON). By disseminating the results from *Walk It Out*, evidence-based practice was shared with the greater healthcare community in the hope that this knowledge may improve the health outcomes of other pediatric patients in the future. The more often DNP graduates disseminate their work, the more exposure other healthcare professionals will have to nurses whom have clinical practice doctoral degrees. This will help to increase the validity and importance of DNPs within the academic setting and workplace. However, most importantly, the dissemination of quality improvement projects provides practicing healthcare professionals with the most current evidence-based practice, that will improve patient health outcomes and provide them with an overall better quality of life.

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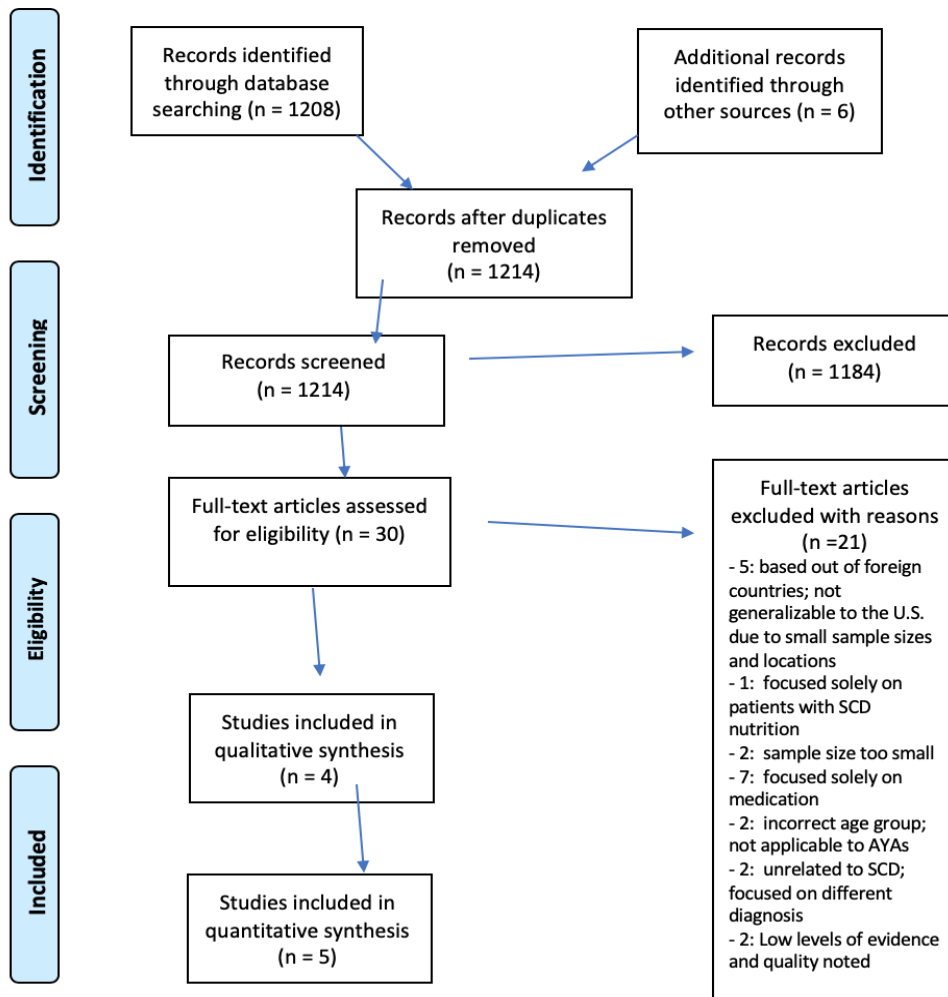
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Appendices

Appendix A: PRISMA Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org

Appendix B: Table of Evidence

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|--|--|--|---|--|--|---|---|--|--|
| <p>Bergeron (2015)</p> <p><i>Creating the ideal adolescent and young adult environment at CHOC Children's Hospital</i></p> | <ul style="list-style-type: none"> -quality improvement - improving care for the adolescent and young adult population (AYA) | <ul style="list-style-type: none"> - expert opinion (non-research evidence) | <ul style="list-style-type: none"> - AYAs = 15 – 39-year-olds - key developmental milestones include “getting a driver’s license, graduating from high school or college, discovering the intimate relationships, having a job, living on their own for the first time, and establishing a family” (Bergeron, 2015, p. 5) | <ul style="list-style-type: none"> - <i>Rock the Halls</i> is a fitness activity implemented at CHOC “that motivates AYA patients to stay active by doing laps around the inpatient cancer unit. The patient with the most documented laps for the day wins a gift card” (Bergeron, 2015, p. 5) | <ul style="list-style-type: none"> - number of labs completed by patients | <ul style="list-style-type: none"> - n/a | <ul style="list-style-type: none"> - AYAs need unique psychosocial support for unique developmental issues - physical environment should be age appropriate | <ul style="list-style-type: none"> - While this article is directed toward AYA oncology patients, the <i>Rock the Halls</i> idea that was implemented at CHOC could be used with the AYA sickle cell population at CHKD. - This article is the basis for DNP project - DNP student will build on the ideas in this article, but customize it to benefit and obtain data on the AYA SCD patients at CHKD | <ul style="list-style-type: none"> - Level 5 - Quality B |
| <p>Lin, Evans, Wakeman, & Unterbrink (2015)</p> <p><i>A mixed-methods study of pain-related quality of life in sickle cell vaso-occlusive crises</i></p> | <ul style="list-style-type: none"> - quality improvement | <ul style="list-style-type: none"> -mixed-methods study - retrospective cohort study - cognitive interviewing - qualitative interviews | <ul style="list-style-type: none"> - 57 adult patients with SCD -VOC - all adults admitted for VOC in 2-year period - large urban academic medical center - interviewed 9 participants with > 3 admissions per year | <ul style="list-style-type: none"> - patient and hospitalization effects on length of stay (LOS) | <ul style="list-style-type: none"> - pain - LOS | <ul style="list-style-type: none"> - descriptive statistics found using EHR -Stata Software version 12 - hierarchical logistic regression to assess for predictors of 30-day readmission | <ul style="list-style-type: none"> - 182 admissions for VOC from 57 participants in 2-year study period - Hgb genotypes did not have affect LOS - longer LOS with PCA use and RBC transfusion -median LOS 6 days (<i>national expected LOS is 4 days for SCD VOC</i>) | <ul style="list-style-type: none"> - while this study focused on adults the findings could still apply to the AYA population - Specifically studied VOC, which would be the inclusion criteria for DNP project - DNP project will also be looking at length of stay - small sample size; may not be generalizable | <ul style="list-style-type: none"> - Level 3 - Quality A |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|--|--|--|--|--|---|---|---|---|--|
| <p>Krein, Bohnert, Kim, Harris, & Richardson (2016)</p> <p><i>Opioid use and walking among patients with chronic low back pain</i></p> | <ul style="list-style-type: none"> -Motivational theories - self-efficacy -complementary and alternative medicine | <ul style="list-style-type: none"> - RCT - secondary analysis | <ul style="list-style-type: none"> - 118 usual care - 111 walking intervention - veterans receiving care in 1 health system - back pain > 3 months - sedentary - weekly access to computer with internet and USB port - English speaking - community residence - ability to walk 1 block - not pregnant | <ul style="list-style-type: none"> - walking intervention - back pain - daily step counts via pedometer - baseline - 6 months - 12 months - self-reported opioid use - sex - age - BMI - depression scale | <ul style="list-style-type: none"> - self-reported opioid use via survey - electronic pharmacy records - severity of back pain measured via numeric scale 0-10 - Roland & Morris Back Pain Disability Questionnaire - Exercise Regularly Scale | <ul style="list-style-type: none"> - change in daily steps calculated by subtracting baseline from 6 & 12 months - t-tests & chi-square tests: - compare those who took opioids baseline & those who did not - t-tests & chi-square tests: - compare step-counts, pain, & opioid use between control group and intervention group - linear mixed-effects model with difference in daily steps from baseline at 6 & 12 months - statistical tests two-tailed, with $p<0.05$ statistically significant | <ul style="list-style-type: none"> - intervention participants decreased pain at 6 months - no significant difference between groups at 12 months - 99 participants (40%) opioid use at baseline - 68% long term use - average daily step counts lower in baseline opioid users at baseline, 6 months, & 12 months compared to those that did not report opioid use - opioid users assigned to intervention group: >1400 steps from baseline at 6 & 12 months (greater than opioid users in control group) - intervention/control not significantly different in non-opioid users - pain severity lower at 6 & 12 months | <ul style="list-style-type: none"> - missing data from some participants - may not be reliable - age range is not related to AYA SCD; but can use data generated by walking intervention to support <i>Walk It Out</i> - exercise therapy can help reduce chronic pain (r/t SCD) - "patients receiving opioids were both willing and able to engage in walking to help manage their back pain" especially with support | <ul style="list-style-type: none"> - Level 1 - Quality B |
| <p>Bergeron (2015)</p> <p>Creating the ideal adolescent and young adult environment at CHOC Children's Hospital</p> | <ul style="list-style-type: none"> -quality improvement - improving care for the adolescent and young adult population (AYA) | <ul style="list-style-type: none"> - expert opinion (non-research evidence) | <ul style="list-style-type: none"> - AYAs = 15 – 39-year-olds - key developmental milestones include "getting a driver's license, graduating from high school or college, discovering intimate relationships, having a job, living on their own for the first time, and establishing a family" (Bergeron, 2015, p. 5) | <ul style="list-style-type: none"> - Rock the Halls is a fitness activity implemented at CHOC "that motivates AYA patients to stay active by doing laps around the inpatient cancer unit. The patient with the most documented laps for the day wins a gift card" (Bergeron, 2015, p. 5) | <ul style="list-style-type: none"> - number of labs completed by patients | <ul style="list-style-type: none"> - n/a | <ul style="list-style-type: none"> - AYAs need unique psychosocial support for unique developmental issues - physical environment should be age appropriate | <ul style="list-style-type: none"> - While this article is directed toward AYA oncology patients, the Rock the Halls idea that was implemented at CHOC could be used with the AYA sickle cell population at CHKD. - This article is the basis for DNP project - DNP student will build on the ideas in this article, but customize it to benefit and obtain data on the AYA SCD patients at CHKD | <ul style="list-style-type: none"> - Level 5 - Quality B |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|---|---|--|--|---|---|---|---|---|----------------------------------|
| <p>Lin, Evans, Wakeman, & Unterbrink (2015)</p> <p>A mixed-methods study of pain-related quality of life in sickle cell vaso-occlusive crises</p> | <p>- quality improvement</p> | <p>-mixed-methods study - retrospective cohort study - cognitive interviewing - qualitative interviews</p> | <p>- 57 adult patients with SCD -VOC - all adults admitted for VOC in 2-year period - large urban academic medical center - interviewed 9 participants with > 3 admissions per year</p> | <p>- patient and hospitalization effects on length of stay (LOS)</p> | <p>- pain - LOS</p> | <p>- descriptive statistics found using EHR -Stata Software version 12 - hierarchical logistic regression to assess for predictors of 30-day readmission</p> | <p>- 182 admissions for VOC from 57 participants in 2-year study period - Hgb genotypes did not have affect LOS - longer LOS with PCA use and RBC transfusion -median LOS 6 days (national expected LOS is 4 days for SCD VOC)</p> | <p>- while this study focused on adults the findings could still apply to the AYA population - Specifically studied VOC, which would be the inclusion criteria for DNP project - DNP project will also be looking at length of stay - small sample size; may not be generalizable</p> | <p>- Level 3 - Quality A</p> |
| <p>Krein, Bohnert, Kim, Harris, & Richardson (2016)</p> <p>Opioid use and walking among patients with chronic low back pain</p> | <p>-Motivational theories - self-efficacy -complementary and alternative medicine</p> | <p>- RCT - secondary analysis</p> | <p>- 118 usual care - 111 walking intervention - veterans receiving care in 1 health system - back pain > 3 months - sedentary - weekly access to computer with internet and USB port - English speaking - community residence - ability to walk 1 block - not pregnant</p> | <p>- walking intervention - back pain - daily step counts via uploading pedometer - baseline - 6 months - 12 months - self-reported opioid use - sex - age - BMI - depression scale</p> | <p>- self-reported opioid use via survey - electronic pharmacy records - severity of back pain measured via numeric scale 0-10 - Roland & Morris Back Pain Disability Questionnaire - Exercise Regularity Scale</p> | <p>- change in daily steps calculated by subtracting baseline from 6 & 12 months - t-tests & chi-square tests: compare those who took opioids baseline & those who did not - t-tests & chi-square tests: compare step-counts, pain, & opioid use between control group and intervention group - linear mixed-effects model with difference in daily steps from baseline at 6 & 12 months - statistical tests two-tailed, with p<0.05 statistically significant</p> | <p>- intervention participants decreased pain at 6 months - no significant difference between groups at 12 months - 99 participants (40%) opioid use at baseline - 68% long term use - average daily step counts lower in baseline opioid users at baseline, 6 months, & 12 months compared to those that did not report opioid use - opioid users assigned to intervention group: >1400 steps from baseline at 6 & 12 months (greater than opioid users in control group) - intervention/control not significantly different in non-opioid users - pain severity lower at 6 & 12 months</p> | <p>- missing data from some participants ... may not be reliable - age range is not related to AYA SCD; but can use data generated by walking intervention to support Walk It Out - exercise therapy can help reduce chronic pain (r/t SCD) - "patients receiving opioids were both willing and able to engage in walking to help manage their back pain" especially with support</p> | <p>- Level 1 - Quality B</p> |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|--|---|--|--|---|---|--|---|--|-------------------------------------|
| <p>Bergeron (2015)</p> <p><i>Creating the ideal adolescent and young adult environment at CHOC Children's Hospital</i></p> | <p>-QI</p> <p>- improving care for the AYA population</p> | <p>- expert opinion</p> | <p>- AYAs = 15 to 39-year olds</p> <p>- key developmental milestones include: driving, graduating from high school or college, intimate relationships, new careers, and establishing a family</p> | <p>- <i>Rock the Halls</i> = fitness activity implemented at CHOC that "that motivates AYA patients to stay active by doing laps around the inpatient cancer unit. The patient with the most documented laps for the day wins a gift card" (Bergeron, 2015, p. 5)</p> | <p>- number of laps completed by patients</p> | <p>- n/a</p> | <p>- AYAs need unique psychosocial support for unique developmental issues</p> <p>- physical environment should be age appropriate</p> | <p>- While this article is directed toward AYA oncology patients, the <i>Rock the Halls</i> idea that was implemented at CHOC could be used with the AYA sickle cell population at CHKD.</p> <p>- This article helped to formulate the idea for a DNP project</p> <p>- DNP student took the idea from this article & customized them to benefit AYA SCD patients at CHKD</p> | <p>- Level 5</p> <p>- Quality B</p> |
| <p>Lin, Evans, Wakeman, & Unterbrink (2015)</p> <p><i>A mixed-methods study of pain-related quality of life in sickle cell vaso-occlusive crises</i></p> | <p>- QI</p> | <p>-mixed-methods study</p> <p>- retrospective cohort study</p> <p>- cognitive interviewing</p> <p>-qualitative interviews</p> | <p>- 57 adult patients with SCD</p> <p>-VOC</p> <p>- all adults admitted for VOC in 2-year period</p> <p>- large urban academic medical center</p> <p>- interviewed 9 participants with > 3 admissions per year</p> | <p>- patient and hospitalization effects on LOS</p> | <p>- pain</p> <p>- LOS</p> | <p>- descriptive statistics via EHR</p> <p>-Stata Software version 12</p> <p>- hierarchical logistic regression to assess for predictors of 30-day readmission</p> | <p>- 182 admissions for VOC</p> <p>- 57 patients in 2-year study period</p> <p>- Hgb genotypes did not have affect LOS</p> <p>- longer LOS with PCA use and RBC transfusion</p> <p>-median LOS 6 days</p> <p><i>(national expected LOS is 4 days for SCD VOC)</i></p> | <p>- while this study focused on adults the findings were still applicable to AYAs</p> <p>- DNP project was also analyzing LOS</p> <p>- small sample size; may not be generalizable</p> | <p>- Level 3</p> <p>- Quality A</p> |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|--|---|--|---|---|--|--|---|--|----------------------------------|
| <p>Krein, Bohnert, Kim, Harris, & Richardson (2016)</p> <p><i>Opioid use and walking among patients with chronic low back pain</i></p> | <p>-Motivational theories - self-efficacy -complementary & alternative medicine</p> | <p>- RCT - secondary analysis</p> | <p>- veterans receiving care in 1 health system - 118 received usual care - 111 received walking intervention - Inclusion criteria of veterans = back pain > 3 months, sedentary lifestyle, weekly access to computer with internet & USB port, English speaking, reside in community residence, & ability to walk 1 block -Exclusion criteria = pregnancy</p> | <p>- walking intervention - back pain - daily step counts via uploading pedometer data at baseline, 6 months, & 12 months - self-reported opioid use - sex - age - BMI - depression scale</p> | <p>- self-reported opioid use via survey - electronic pharmacy records - severity of back pain measured via numeric scale 0-10 - Roland & Morris Back Pain Disability Questionnaire - Exercise Regularly Scale</p> | <p>- change in daily steps calculated by subtracting baseline from 6 & 12 months - t-tests & chi-square tests: compared those who took opioids baseline & those who did not - t-tests & chi-square tests: compared step-counts, pain, & opioid use between control group & intervention group - linear mixed-effects model with difference in daily steps from baseline at 6 & 12 months - statistical tests two-tailed, with $p < 0.05$ statistically significant</p> | <p>- decreased pain at 6 months after walking intervention - no significant difference between groups at 12 months - 99 participants (40%) opioid use at baseline (68% = long term use) - average daily step counts lower in baseline opioid users at baseline, 6 months, & 12 months compared to those that did not report opioid use - opioid users assigned to intervention group had more steps than those in usual care group - pain severity lower at 6 & 12 months</p> | <p>- missing data from some participants could reduce reliability - age range was not related to AYAs with SCD; but the data generated still supports the walking intervention in <i>Walk It Out</i> - exercise therapy can help reduce chronic pain (w/t SCD) - "patients receiving opioids were both willing and able to engage in walking to help manage their back pain," especially with support (Krein et al., 2016, p. 112)</p> | <p>- Level 1 - Quality B</p> |
| <p>Acipayam, Dorum, Ilhan, Ersoy, Oktay, & Helvaci (2014)</p> <p><i>Predictive value of pain intensity in the clinical severity of painful crises in children and adolescents with sickle cell disease</i></p> | <p>- QI</p> | <p>- retrospective chart review - quantitative</p> | <p>- children & adolescents admitted for VOC from 09/2012 to 09/2013 - 146 VOC - 79 patients < 18yo with a SCD VOC - 11.5 yo = average age - Turkey - Antakya State Hospital</p> | <p>- severity of pain - complication rate - duration of pain days - age - gender - fever - transfusion - exchange transfusion - type of VOC - factors triggering VOC</p> | <p>- Faces Pain Scale - Verbal Descriptor Scale</p> | <p>- mild - moderate - severe - Mann-Whitney U test - Chi-square test - mean - standard deviations - Pearson's chi-square test - p value of 0.05 was considered significant</p> | <p>- mean LOS higher in severe pain group - duration of pain longer in severe pain group - complications rose with severity of pain - 15 mild pain; LOS ~ 3 days - 71 moderate pain; LOS ~ 5 days - 60 severe pain; LOS ~ 7 days</p> | <p>- May not be generalizable to U.S. population - Focuses on LOS which was also the focus of DNP project</p> | <p>- Level 3 - Quality B</p> |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|---|---|--|--|--|---|--|--|---|--|
| <p>Smith, Reinman, Schatz, Roberts (2018)</p> <p><i>Parent perspectives on pain management in preschool-age children with sickle cell disease</i></p> | <ul style="list-style-type: none"> - Adult learning - Cognitive Behavioral Theory | <ul style="list-style-type: none"> - parent pain mgmt. survey - non-experimental study - qualitative | <ul style="list-style-type: none"> - parents of children with SCD ages 2- 6 - 42/51 parents participated - recruited from health maintenance visits at SCD specialty clinic - Southeastern children's hospital - October 2013 to September 2014 | <ul style="list-style-type: none"> - parents' current pain mgmt. practice - parents' attitudes toward participating in a pain mgmt. program - age - sickle cell genotype - frequency of VOC | <ul style="list-style-type: none"> - 95% confidence interval - descriptive statistics | <ul style="list-style-type: none"> - SPSS - descriptive data - Pearson correlation used to explore co-occurring pain mgmt. strategies - alpha level 0.01 | <ul style="list-style-type: none"> - on average participants hospitalized for pain 1-2 times/year - mgmt. of VOC at home 1-2 times over the last year - 88% relied on medications to treat pain - Parents had the most difficulty encouraging their children to complete ADLs when they were in pain - most parents preferred obtaining pain mgmt. information from a HCP | <ul style="list-style-type: none"> - This age group does not apply to the DNP project age group, but information is still applicable - Validated the difficulty involved in encouraging AYAs to perform ADLs when in pain - showed that nursing interventions to get AYAs out of bed would be beneficial | <ul style="list-style-type: none"> - Level 3 - Quality C <p>Survey was not validated, and small sample size noted.</p> |
| <p>Teodoro, Breault, Garvey, Klick, O'Brien, Purdue, Stolaronek, Wilbur, & Matney (2016)</p> <p><i>STEP-UP: Study of the Effectiveness of a Patient Ambulation Protocol</i></p> | <ul style="list-style-type: none"> - QI | <ul style="list-style-type: none"> - pretest / posttest RCT - implemented a formalized patient ambulation program called STEP-UP (Study of the Effectiveness of a Patient Ambulation Protocol) | <ul style="list-style-type: none"> - convenience inpatient med/surg unit - North eastern U.S. - 48 patients - 22 ambulation intervention - 26 usual care - LOS ~ 3 days - > 18 yo - 3-day study period | <ul style="list-style-type: none"> - patient ambulation - age - sex - reason for admission | <ul style="list-style-type: none"> - pedometer readings on day 1 (pretest data) - pedometer readings day 2-3 from 0700 – 2300 (posttest data) | <ul style="list-style-type: none"> - analysis of variance - level of significance was $p < 0.05$ - t-test - chi-square | <ul style="list-style-type: none"> - ambulation in intervention group increased after intervention - the "usual care" group had a decrease in ambulation compared to their pretest ambulation data | <ul style="list-style-type: none"> - average LOS data on the study - Mobilization benefited patients and decreased their LOS - This article was the basis for the DNP project (modified by DNP student to be applicable to CHKD SCD patients) | <ul style="list-style-type: none"> - Level 1 - Quality A |
| <p>Omwanghe, Muntz, Kwon, Montgomery, Kemiki, Hsu, Thompson, & Liem (2017)</p> <p><i>Self-reported physical activity and exercise patterns in children with sickle cell disease</i></p> | <ul style="list-style-type: none"> - self-efficacy | <ul style="list-style-type: none"> - 58-item survey - qualitative | <ul style="list-style-type: none"> - 100 children with SCD, grades 6-12 - compared to responses of national sample of respondents to National Health and Nutrition Examination Survey & Physical Activity Questionnaire - 2 large urban pediatric institutions in Chicago | <ul style="list-style-type: none"> - PA | <ul style="list-style-type: none"> - National Health and Nutrition Examination Survey & Physical Activity Questionnaire | <ul style="list-style-type: none"> - Pearson's chi-square - Fisher's exact test | <ul style="list-style-type: none"> - Children with SCD were less active than children without SCD - Negative personal beliefs about the impact of SCD on one's life = barrier to PA - 90% children with SCD participated in gym class - "inverse relationship between age and PA with SCD could be explained by worsening disease severity with age in SCD" (p. 393) | <ul style="list-style-type: none"> - "physical activity has a positive influence on growth and development in children and adolescents with health benefits that track from youth into adulthood" (p. 388). | <ul style="list-style-type: none"> - Level 3 - Quality A <p>Potential for recall bias.</p> |

| Citation | Conceptual Framework | Design & Method | Sample & Setting | Major Variables Studied | Measurement of Major Variables | Data Analysis | Study Findings | Appraisal of Worth to Practice | Strength & Quality of Evidence |
|--|---|---|---|--|--|--|---|---|--------------------------------|
| Matthie, Brewer, Moura, Jenerette (2015) <i>Breathing exercises for inpatients with sickle cell disease</i> | - QI - patient education | -descriptive pilot study - survey - qualitative study | - adults with SCD ages 20-74 - 53 female - 31 male - University of NC at Chapel Hill - convenience sample | -incentive spirometer breathing exercises -demographics | - survey responses | - descriptive statistics calculated | -30 people (36%) stated that used breathing exercises as a complementary therapy to reduce pain - young adults try to manage at home to avoid hospital - 23% would be interested in trying breathing exercises | - not generalizable - opioids can cause problems, so it is important to incorporate alternative methods to reduce pain in patients with SCD - Another alternative method = ambulation - breathing exercises can prevent atelectasis, & acute chest | - Level 3 - Quality B |
| Matthie & Jenerette (2015) <i>Sickle cell disease in adults: Developing an appropriate care plan</i> | - EBP - improve clinical practice - improve health outcomes for SCD patients - collaborate with patients for plan of care - nurses as advocates for patients with SCD | - Clinical Practice Guidelines -some subjective comments describing SCD by patients included | - adult SCD patients | - pain - coping mechanisms: crying, grimacing, laughing, or ignoring the pain | - numeric rating scale from 0-10 - open communication | - clinical practice guidelines; no data analysis - when pain not treated appropriately SCD patients at risk for longer hospital stays | - encourage ambulation and activity as soon as possible - nonpharm. approaches = local heat or distraction -Young adults often ignore the pain or use heat, cold, massage, or distraction to cope -Many HCPs have false impressions that patients with SCD are drug seeking or exaggerating their symptoms | - AYA SCD patients must transition to the adult healthcare world, therefore it is important to understand the care that adults with SCD require because it will be similar to that of the AYAs with SCD - ICS & early ambulation shown to reduce ACS & LOS - A motivational ambulation intervention associated could be considered a distraction to help alleviate pain | - Level 4 - Quality A |

Table of Evidence Key

| Abbreviation | Meaning | Abbreviation | Meaning |
|--------------|--------------------------------------|--------------|----------------------------|
| SCD | sickle cell disease | QI | quality improvement |
| mgmt. | management | n/a | not applicable |
| IV | independent variable | RBC | red blood cell |
| DV | dependent variable | r/t | related to |
| AYA(s) | adolescent and young adult(s) | ~ | about |
| HCP | healthcare provider | ADLs | activities of daily living |
| yo | years old | med/surg | medical/surgical |
| VOC | vaso-occlusive pain crisis (episode) | EBP | evidence-based practice |
| EHR | electronic health record | ICS | incentive spirometer |
| LOS | length of stay | | |
| Hgb | Hemoglobin | | |
| PCA | patient-controlled analgesia | | |
| nonpharm. | nonpharmacological | | |
| PA | physical activity | | |

Appendix C: Nurse Education and Reference Binder Handout

0630 – 0700: At this time, the off-going night shift registered nurse (RN) gives report to on-coming day shift RN. If taking care of a patient receiving the *Walk It Out* ambulation interventions, the RN must state the previous days goals.

-Goals:

- *Limited mobility* = walk at least twice with assistance to the threshold of the nursing pod in which the patient's room is located
- *Unlimited mobility* = the goal should be to walk a minimum of three times around the unit (Teodoro et al., 2016)
- The next day, the patient's goal should be to double whatever they did the day before (Teodoro et al., 2016)

0700: The day shift RN should check to make sure that the pedometer is set to zero. She or he will then place the pedometer to the patient's gown or garment. The day shift RN should then write the goals for the present day on the patient's whiteboard as agreed upon with night shift RN.

0700 – 1830: The day shift RN encourages the patient to achieve their ambulation goals throughout the day.

1830 – 1900: The day shift RN gives report to the on-coming night shift RN. He or she explains what the patient's ambulation goals were for that particular day and what they have accomplished.

1900 – 2300: The night shift RN continues to encourage the patient to achieve that day's ambulation goals.

2300: Finally, the night shift RN takes off the pedometer and records number of steps for that day on the patient's whiteboard in their room.

This document will be available to nursing staff in a binder that will be kept at the charge nurse desk.

Appendix D: Educational Handout

**The Importance of Walking**

- 👣 Not walking while in the hospital can cause breathing problems, pressure ulcers, loss of muscle mass, and balance disturbances.
- 👣 Research shows that many patients are not walking as much as they should.
- 👣 How to prevent complications:
 - Get out of bed *several* times a day and walk around!
 - Don't just walk around your room. Walk around the unit.
 - Set a goal for walking each day. Each day increase the amount that you walk.
- 👣 Make sure pain is managed so you can walk more easily.
- 👣 Call us to help you! We can make sure you stay steady and manage your pumps and poles. Together we can **Walk It Out** and get you home faster!!

Adapted from Ambulation Program by Teodoro et al. (2016).

(Flesch-Kincaid Grade Level: 3.9) (Microsoft® Word for Mac, 2017)

Appendix E: Spanish Educational Handout for Families

**La importancia de caminar**

- 👣 No caminar mientras está en el hospital puede causar problemas respiratorios, úlceras por presión, pérdida de masa muscular y trastornos del equilibrio.
- 👣 La investigación muestra que muchos pacientes no están caminando tanto como deberían.
- 👣 Cómo prevenir complicaciones:
 - ¡Levantarse de la cama varias veces al día y caminar!
 - No solo camine por su habitación. Caminar alrededor de la unidad.
 - Establecer un objetivo para caminar todos los días. Cada día aumenta la cantidad que caminas.
- 👣 Asegúrate de que el dolor esté controlado para que puedas caminar más fácilmente.
- 👣 ¡Llámenos para ayudarlo! Podemos asegurarnos de que se mantenga estable y administre sus bombas y postes. ¡Juntos podemos **Caminar Hacia Afuera!!**

Adaptado del programa de deambulación por Teodoro et al. (2016).

Appendix F: Patient Reminder Cards

The following will appear as a tent on participating patients' bedside tables:

"If you can't fly, then run, if you can't run, then walk, if you can't walk, then crawl, but whatever you do, you have to keep moving forward." -- Martin Luther King Jr.

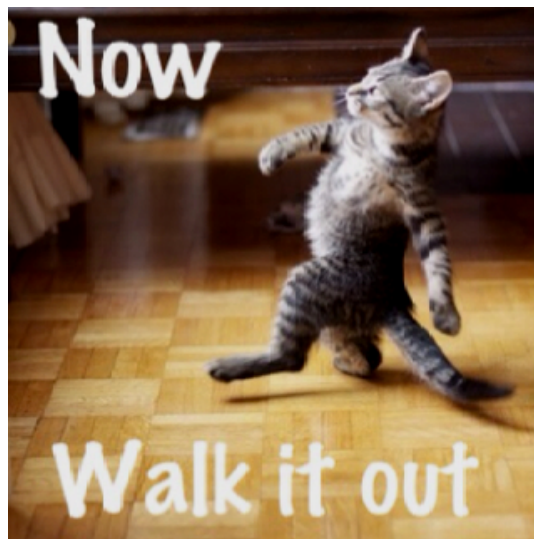
(Flesch-Kincaid Grade Level: 8.8) (Microsoft® Word for Mac, 2017)

REMEMBER TO WALK TODAY



(Clipart Library, n.d.)

The following image will be hung on the inside of the patient's door to their room: (Flesch-Kincaid Grade Level: 6.9) (Microsoft® Word for M, 2017)



(Pinterest.com, n.d.)

Appendix G: Patient Reminder Cards in Spanish

Bedside Table:

“Si no puedes volar, corre, si no puedes correr, luego camina, si no puedes caminar, luego gatea, pero hagas lo que hagas, debes seguir avanzando.” --- Martin

Luther King Jr.

RECUERDA CAMINAR HOY



Image hung on the inside of
the patient’s door to their
room:



Appendix H: Salisbury University IRB Approval

Salisbury

A Maryland University of National Distinction

Salisbury University
Institutional Review Board
Committee on Human Research
Phone: (410) 548-3549
Fax: (410) 677-0052
Email: humanresearch@salisbury.edu

IRB Research Protocol Approval Notification

Date: 5/24/18

To: D. Webster
RE: Protocol #51
Type of Submission: Expedited
Type of IRB Review: Expedited
Protocol is scheduled to begin 6/18 end 5/2019

Approval for this project is valid from 5/24/18 to 5/31/19.

CONGRATULATIONS.

This letter serves to notify Debra Webster that the Salisbury University (SU) Institutional Review Board (IRB) approved the above referenced protocol entitled, Pediatric Sickle Cell Patients "Walk it Out" to Reduce Length of Hospital Stay: A Children's Hospital of the King's Daughters Pilot Study on May 24, 2018.


Pursuant to Federal regulations 21 CFR 56.109, the IRB has determined that this protocol qualifies for Expedited review.

Federal regulation 45 CFR 46.103 (b)(4)(iii) requires Primary Investigators (PI), except when a subject is in immediate danger, to assure any change to an approved protocol is not initiated prior to IRB review and approval. Additionally, the PI must also inform the IRB of unanticipated problems involving risks to participants.

These same federal regulations require **continuing review** of research be conducted by the IRB at intervals appropriate to the degree of risk. Your research is scheduled to begin 6/18 and end 5/19. When necessary, the PI will receive a continuing review reminder notice prior to the date protocol approval ends; however, it is the PI's responsibility to submit continuing review reports in a timely manner (at least 3 weeks prior to scheduled end date on the protocol approval).

The SU IRB is organized and operated according to guidelines of the United States Office for Human Research Protections and the United States Code of Federal Regulations and under Federal Wide Assurance No. FWA00020237.

If you have any questions about this review or questions, concerns, and/or suggestions regarding this process, please do not hesitate to contact the Office of Graduate Studies and Research at 410-548-3549 or humanresearch@salisbury.edu.


Chair, IRB Committee on Human Research

Appendix I: Agency (CHKD) Approval



April 23, 2018

Debra Webster, EDD, RN-BC, CNE
Associate Professor
Associate Chair, Dept. of Nursing
Salisbury University
1101 Camden Avenue
Salisbury, MD 21801

Dear Dr. Webster,

I have been working with Ellie Webb to obtain all the necessary permissions for her to implement her quality improvement project at CHKD. Per her request, I am writing to confirm the following:

- 1- Since this has been deemed quality improvement, she will not be required to submit the project to our IRB.
- 2- The Information Services Dept. will be able to provide her with de-identified patient data from CHKD medical records.
- 3- No consent will be needed in order for patients to participate in the intervention.
- 4- Ellie has permission to collaborate with CHKD on this project.

If there is any other information that you need, please feel free to contact me.

Sincerely,

Amy Quinn
Director, Research Administration
Children's Hospital of The King's Daughters

Appendix J: SWOT Analysis: CHKD – Unit 8B

| | Positive | Negative |
|-----------------|--|---|
| Internal | <ul style="list-style-type: none"> - <u>Strengths</u> - Excellent team work - Motivated nursing and physician staff - Supportive work environment - Supportive administration and leadership - Culture that supports continuous quality improvement (CQI) | <ul style="list-style-type: none"> - <u>Weaknesses</u> - Short staffed 80% of shifts - High nurse and nursing care partner turnover rate - No standard protocol to get adolescent and young adult sickle cell patients out of bed - Budget constraints - No official ambulation protocol in place |
| External | <ul style="list-style-type: none"> - <u>Opportunities</u> - CHKD is a teaching hospital – learning environment - There is the potential to change nursing policy to require ambulation protocol like <i>Walk It Out</i> so that more patients can benefit (external to 8B in that a policy change would need to be hospital-wide) - Only children’s hospital in the region, opportunity to take care of many patients with SCD and lead the way in evidence-based nursing care. | <ul style="list-style-type: none"> - <u>Threats</u> - Nursing budget is limited - Teenagers can be stubborn due to their developmental stage in life - Virginia weather is unpredictable, therefore, the abrupt changes in temperature can instigate vaso-occlusive episodes - Individual patient factors and other environmental factors such as the weather or illnesses may contribute to longer hospital stays regardless of increased ambulation initiatives |