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Evaluation of Patient-Centered Integrated Wound Team in Nursing Homes

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Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

Older adults (over 65) with chronic disease and mobility impairments have the highest risk of developing chronic wounds, and therefore the 1.5 million people who reside in nursing homes are disproportionately affected. These wounds can cause pain, infections, poor quality of life, and death. Chronic wounds also challenge viability of nursing homes and lead to lowered Medicare quality measures, which result in lower admission rates due to perceptions of poor care. Further, failure to properly manage chronic wounds results in expensive regulatory fines and litigation. This quantitative study involved measuring effects of a novel person-centered integrated wound team on nursing homes. A pre/posttest quasi-experimental design was used to measure both avoidable PI incidence rates and wound team behavior and clinical significance in terms of prevention of PIs and team behavior change. Nineteen homes adopted and sustained this program and were used as the sample in the study. Analysis consisted of paired t-tests for both PIs and TPOT behavior scores before and after the program. All nursing homes in the sample did have a reduction of PI rates. Teaming behavior scores did improve significantly. There was no statistically significant relationship between teamwork and lower PI rates. Findings may be used by nursing administrators to raise awareness of PIs and lower rates in the nursing home population.

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Chapter 1: Introduction to the Study

The intent of this study was to evaluate effects of a patient-centered integrated wound team program on team behavior and avoidable PIs within nursing homes. PIs and other types of chronic wounds are a global issue that can result in pain, suffering, impaired mobility, infection, and death (Au et al., 2019; Nussbaum et al., 2018). Chronic wounds are the result of complex chronic diseases, impaired mobility and nutrition, polypharmacy, dementia, and advanced age (Efraim et al., 2018). These same complex conditions and impairments, coupled with advanced age, increase the need for residency in nursing homes, thereby resulting in a disproportionate prevalence of chronic wounds within that population (Efraim et al., 2018). Chronic wounds are a root cause of suffering for nursing home populations, their families, caregivers, and nursing homes themselves (Fife et al., 2018). Person-centered integrated wound teams have the potential to improve outcomes for all those impacted by chronic wounds in nursing homes.

Person-centered care improves quality of life for those who reside in nursing homes, yet applying that approach to wound prevention and management is lacking for many reasons (Abdelhalim et al., 2017; James et al., 2016; Leena etal, 2020; Miller, 2016; Somayaja et al., 2017). First, the medical-centric model for wound management continues to persist in nursing homes. The medical-centric approach involves treating the wound solely, rather than addressing the patient with a wound. Alternately, a person-centered integrated team approach seeks to heal the person who has a wound, which in some cases, may mean providing comfort, palliation, and psychosocial support rather than aggressive wound treatments designed solely to heal the wound. The locus of control

in a person-centered approach resides with the patient or resident and their family or, in the case of cognitive impairment, a responsible party. They are empowered by the integrated team with information about possible options to help them make informed choices that are grounded in what matters most to them. What matters most may not be healing a wound, especially if treatments for healing can cause more pain, suffering, and impaired quality of life for older adults in nursing homes. Patient-centered care means residents or patients may opt for goals and interventions intended to minimize wound-related discomfort to improve quality of life, rather than more aggressive treatments for wound healing. Barriers to achieving patient-centered care within nursing homes involve knowledge and process deficits in key areas such as chronic wound care, discipline roles in wound management, patient-centered wound care goals, collaborative wound teamwork, and team communication (De Meyer et al., 2019; Worsley et al., 2017). Further, a successful patient-centered integrated wound team approach requires a heightened awareness of emotional burdens of chronic wounds in order to act with compassion (House, 2015).

This program is complex in that it involves shifting care delivery through bridging individuals from multiple disciplines with different backgrounds and varying degrees of wound knowledge to achieve wound team collaboration. Lack of education regarding chronic wound care and wound teams, is a foundational problem compounded by limited understanding of wound related discipline roles among all disciplines (DeMeyer et al., 2019; Patel & Granick, 2007; Worsley et al., 2017). Further, wounds can be real or perceived causes of suffering for residents, families, caregivers, and facilities (House,

2015). However, a patient-centered team approach, as opposed to a medical-centric approach, has successfully improved outcomes for other complex conditions such as diabetes and palliative care (Abdelhalim et al., 2017; James et al., 2016; Leena et al., 2020; Miller, 2016; Somayaja et al., 2017).

The literature review included key concepts related to prevention and management of chronic wounds in nursing homes, including chronic wounds, patient-centered care, teaming, nursing homes, and teamwork evaluations. I addressed the current state of wound management including evidence and gaps in literature involving wound management, as well as issues involving high PI rates, lack of teamwork, limited knowledge of chronic wounds or specific discipline roles in wound care, and limited information regarding regulatory wound prevention and management requirements. International wound care collaborative groups have endeavored to provide a conceptual model of a patient-centered wound team through the Universal Wound Model (UWM). This model includes five key elements: having a key leader, adopting a referral mechanism, creating team cohesion, ensuring alignment of the remuneration structure, and ensuring healthcare system readiness (Moore et al., 2013). However, each element must be considered in context with flexibility based on situational settings. Although many nursing homes are now endeavoring to provide improved wound management and prevention, there is no evidence regarding the UWM for nursing homes in the U.S. One organization has implemented a novel patient center program with the UWM as the framework. This program has a UWM lead, referred to as the skin health team lead, a new paid position with a job description involving team integration. Research is limited

regarding use of any theory to achieve and sustain behavior change, a needed requirement to shift the wound management paradigm in nursing homes from med-centric to a patient-centered. This novel program used Bandura's social cognitive theory (SCT) to inform the program's development, delivery, and support methods. Learning and behavior changes occur from dynamic and reciprocal interactions between the person and their ability to perceive, understand, and interpret, referred to as the cognition and the environment (Bandura, 2004; Kok, 2018). The environment is influenced through policy changes which involve endorsing and requiring this program. Second, SCT teaching methods involve observational learning by incorporating simulations of wound rounds and role-playing disciplinary team roles and interactions. Lastly, the SCT involves providing feedback loops for coaching and goal setting. To achieve that, a validated and reliable TeamStepps instrument was modified for wound management and referred to as the Wound-Team Performance Observation Tool (Wound-TPOT). The Wound-TPOT is used to analyze and coach team behavior and used for teams to set their own goals for improvement. The program under study used to develop a patient-centered wound team was structured using the UWM and Bandura's SCT. I evaluated the novel patient-centered wound team developed through this program within a group of nursing homes in the U.S. The intended outcome was to evolve individual disciplines, such as providers, nurses, and therapists that currently practice within a medical centric model of care delivery today to a new paradigm of patient-centered integrated wound teams. This holistic person-centered approach was used to address both prevention and management of chronic wounds and therefore reduce avoidable PIs as another intended outcome.

Person-centered integrated wound care and reduction of avoidable PIs would improve person/patient, family, caregiver, and staff satisfaction, while lessening the societal economic burden of chronic wounds. Patient-centered integrated team approaches for wound management are therefore applicable to all nursing homes as they could serve as effective methods to improve the culture of wound prevention and management, alleviating the suffering of those at risk, with, and impacted by chronic wounds. This is the first research evaluating the effect of this novel program, structured with the UWM, delivered, and sustained through the lens of the Bandura's SCT.

Chapter 1 includes foundational information regarding the problem of chronic wounds in the nursing home setting as well as gaps in current management, discuss barriers preventing success via a person-centered integrated team approach for wound management, and describe the structure of a novel wound program built using the UWM. Further, research questions are detailed as well as Bandura's SCT. I addressed chronic wounds, patient-centered care, team integration,, and the nursing home regulations. The quantitative design, key definitions, assumptions, scope and delimitations, and limitations are outlined. Chapter 1 also includes a discussion of the significance of this study and the gap in literature it addresses. Lastly, implications for social change are described, including how nursing homes may benefit.

Background

Chronic wounds are a global epidemic, disproportionately affecting aging adults and therefore increasing as populations age (Efraim et al., 2018). Chronic wounds are a significant problem for those people, their families, and, specifically, for nursing homes.

Chronic wounds can cause pain, suffering, embarrassment, and isolation for residents and their families (Fife et al.,2018). They can result in frustration and confusion for healthcare workers due to limited wound care education, lack of team integration, knowledge deficits involving patient-centered goal setting, and emotional wound-related triggers. Further, infectious outbreak conditions such as COVID-19 are harder to control in communal living spaces and further impair effective team integration of care. Due to these ongoing barriers, chronic wounds can result in expensive and unsuccessful treatments, substantial regulatory fines, and litigation, which can threaten the viability of nursing facilities. The UWM is suggested in literature as the new paradigm that is needed to effect positive change; however, this type of program had not yet been evaluated to determine outcomes in U.S. nursing homes.

Nursing homes have been endeavoring to achieve an overarching paradigm shift from medical-centric to a patient-centered model in all areas of patient care. However, the process to achieve this has yet to be elucidated. Further, team collaboration is essential for addressing complexity of those with chronic wounds. There is research supporting benefits of both patient-centered approaches and team approaches to care for complex conditions such as dementia and specific wound types such as diabetic foot ulcers, but there is no research regarding patient-centered team approaches for wound management in nursing homes. There is no research evaluating overarching person-centered chronic wound care within nursing homes. There are also numerous studies involving team training for other areas of clinical practice; however, there is a gap in literature regarding complexities and emotional burdens that are specific to chronic

wounds within nursing homes. Chronic wounds for patients, families, staff, and nursing homes require attention and change; however, most continue to use a medical-centric manner. In response to the need for such an approach and gap in literature, a nursing home organization in the U.S. has endeavored to initiate a patient-centered integrated wound team that is structured using the constructs of the UWM and delivered using Bandura's SCT of reciprocity between environment and cognition. This is the first study of its kind that evaluates effects of this program on team behaviors and PI prevention.

Problem Statement

Chronic wounds have a devastating impact on nursing home staff and threaten the viability of nursing homes (Fife et al., 2018; Nussbaum et al., 2018). Chronic wounds in nursing homes may be due to poor care, increasing legal scrutiny of nursing home facility and staff (Nussbaum et al., 2018). Further, misperceptions that effective management of chronic wounds involves solely the nursing discipline results in fragmented approaches. I refer to this as a band aid approach to wound management that focuses solely on wounds and topical treatment. The band aid approach fails to address complexities of individual wound outcomes involving comorbid conditions, circulation, medications, nutrition, mobility, and advanced therapies (Moore et al., 2015). Additionally, the band aid approach has not improved prevention of chronic wounds, some of which may be avoidable. Incidence of preventable wounds such as avoidable PIs can result in a lower Medicare star rating. This rating is a measure that directly influences nursing home reputations and therefore admissions, the lifeline of most nursing homes (Au et al., 2019). Finally, the presence of chronic wounds, especially avoidable PIs, increases Medicare

scrutiny during annual federal surveys. The Medicare F686 regulation requires patient-centered team approaches to prevention and care. Failing to pass this regulation results in survey deficiencies, Medicare fines, and added risks for expensive litigation (Au et al., 2019). To address these issues, a U.S. nursing home organization has adopted a novel patient-centered integrated wound program based on the constructs of the UWM and delivered and sustained using Bandura's SCT reciprocal relationship between cognition and the environment. However, there is no existing research regarding outcomes of patient-centric wound team programs specifically related to outcomes of team behavior changes or PI rate reductions within nursing homes.

The team approach of interprofessional collaboration is an effective delivery method for healthcare services that has improved outcomes for as palliative care, oncology, respiratory care, heart disease, and pediatrics (Lenna et al., 2020; Miller, 2016; Smallwood et al., 2019). Patient-centered team approach considers the patients and their family at the locus of control in terms of decision-making. Although this approach is recommended for wound management to improve patient outcomes, literature is lacking involving frameworks or insights in terms of theoretical approaches to implementation. However, what has been identified in literature are barriers to patient-centered integrated teams such as limited chronic wound knowledge among all disciplines as well as leadership, failed communication across disciplines, and lack of integration and teamwork (DeMeyer et al., 2017; Patel & Granick, 2007; Worsely et al., 2017;). Further, nursing homes have unique wound management challenges given specific regulatory requirements that all team members are required to comply. Nursing home regulations

involving injury prevention and wound care include specific criteria regarding documentation, risk assessment, wound assessment, interventions, infection control, quality measures, and wound reimbursement (Center for Medicare and Medicaid, 2018; Moore et al., 2015). Patient-centered integrated wound team programs must therefore also abide by unique regulatory guidelines to achieve success in nursing homes.

Patient-centered integrated team programs are opportunities to improve quality of life for the 1.7 million people who reside in 15,600 nursing homes in the U.S., as well as those who serve that population (Centers for Disease Control and Prevention [CDC], 2016). I evaluated effects of a novel patient-centered integrated wound team program on a group of U.S. nursing homes. I measured participant team behaviors with the Wound TPOT scale, incident rates of facility-acquired avoidable PIs, and mediating effects of teaming behaviors on PI rates. This work contributes to literature by demonstrating effects of novel patient-centered integrated team approaches for wound management in a group of nursing homes, providing a model for all nursing homes and potentially shaping policies involving wound prevention and management programs in nursing homes across the U.S.

Purpose

The purpose of this quantitative quasi-experimental pre/posttest study was to evaluate outcomes of a novel patient-centered integrated team program on wound prevention and management in a group of U.S. nursing homes. The program is complex in that different disciplines must all have knowledge of chronic wounds and their individual roles within wound management. The UWM was the model that was used to

structure teams using the five essential constructs including team lead, team aggregation, referral mechanism, enumeration, and healthcare systems that are sensitive to change (Moore et al., 2015). Further, Bandura's SCT was used to inform delivery and sustainability of the program. Bandura posited a reciprocal relationship exists between cognition and environment, and both must be addressed for behavior change to occur. The program's aim was to both achieve team collaboration in terms of patient-centered wound teaming and decrease PI rates. Participants were part of nursing home wound teams led by skin health team lead, who provide wound team leadership for nursing homes. The independent variable was the novel program structured according to the UWM and delivered using Bandura's SCT. The dependent variables included secondary data of team behavior scores collected by the nursing homes from the Wound TPOT instrument, as well as secondary resident outcomes of the avoidable PI rates. These variables were examined via analysis before and after the program implementation.

Research Question and Hypotheses

RQ1: What is the impact of a novel patient-centered integrated wound team program that was structured with the UWM and delivered using Bandura's SCT on avoidable PIs?

$H_0$1: There is no statistically significant impact of a novel patient-centered integrated wound team program that was structured with the UWM and delivered using Bandura's SCT on avoidable PIs?

RQ2: What is the impact of a patient-centered integrated wound team program that is structured with the UWM and delivered using Bandura's SCT on team member behaviors?

$H_0$2: There is no statistically significant impact of a patient-centered integrated wound team program that is structured with the UWM and delivered using Bandura's SCT on team member behaviors?

RQ3: What is the relationship between wound team behavior and avoidable PI rates?

$H_0$3: There is no statistically significant relationship between wound team behavior and avoidable PI rates.

Theoretical Framework

The program in this study intended to shift individual disciplines that practice within a med centric paradigm to a patient centered team. This program is novel given the theoretical framework, Bandura's SCT. Bandura posits that behavior change is influenced by a reciprocal interaction between the cognition and the environment (Bandura, 2004). For example, behavior change requires a cognitive shift that builds on learning to achieve a sense of efficacy. Efficacy within human behavior is a belief in one's capacity to achieve the desired behavior. Efficacy is influenced by the cognitive state of learners, their emotive states, and the environment in which they are learning or practicing. This novel patient-centered wound program attempted to achieve efficacy through the adoption of strategies to effect the cognition and the environment through leadership,

observational learning, role modeling, checklist tools, and feedback. For example, this program incorporated observational learning with videos depicting wound team interactions; practice sessions with wound case studies, and coaching observations to provide feedback and encouragement. To help influence the environment, leadership was provided training, a new policy was developed to support the team approach, and a new position of team leader was created. Lastly, the Wound-TPOT, a validated instrument, was used to guide expected leadership and team behaviors and to provide a mechanism for the observation and scoring of specific communication skills, leadership behaviors and teamwork skills. This tool was used to provide a team baseline for feedback and team goal setting. This is aligned with the SCT in which behavior efficacy occurs through both feedback as well as independent goal setting. Further, team interactions were guided by the Wound-TPOT, an objective tool that describes expectations for the team, a primary for psychological safety for all team members to participate. This is especially important to address the cognitive emotional states of team members when working with residents and families to address goal setting in the context of patient-centered care. Coaching strategies include providing samples of structured wound case studies that demonstrate a team approach followed by compassionate encouragement and validation of sharing. The structured case studies were provided to both demonstrate and practice intended behaviors, such as team member validation of wound recommendations using compassionate language that specifically acknowledge the difficulty and challenges of speaking up, specifically when recommendations are aligned with evidence and beyond the comfort of group think. Further, team coaches refer to the Wound TPOT findings to

provide direction and validate observed team behaviors referred to in SCT as a feedback loop. This feedback allows team members to comprehend expected behaviors and develop compassionate forms communication skills. The SCT provided key components of the wound program to improve efficacy of the interprofessional team and ultimately, behavior change for a patient centered approach.

Conceptual Framework

Wound experts recognized the benefit and need for patient-centered teams for wound prevention and management; however, defining a wound team in nursing homes has yet to be determined. Teaming for wound management in other settings identify team members, their roles, and clarity of leadership support. In 2014, wound specialists completed an extensive literature review to evaluate and determine best practices. The result of this work was the development of a new framework for wound teams, the new UWM. This model was published on behalf of the European Wound Management Association and endorsed by the Association for Advancement of Wound Care and Australian Wound Management Association. The UWM was the framework used to structure patient-centered wound teams for the program in this study. The UWM has five key elements essential for success that were adapted for this program. The first element is a designated key leader. The program in this study created a key lead job code titled the skin health team lead. This is essentially a wound specialist clinician who is dedicated to team integration. The second element is a referral mechanism, meaning or how to connect or refer to other disciplines. For this program of study, the disciplines were referred to automatically within the electronic medical record to alert all disciplines of

new wounds. The third element is team cohesion, achieved within this program of study with a single electronic medical record with wound photos used by all disciplines, guidelines, checklists, and use of the Wound TPOT instrument. The fourth element is alignment of remuneration. All nursing staff received a monthly bonus for meeting pressure injury rate goals. The last element is system readiness for change. Readiness for change was addressed through a series of leadership trainings and wound team policy. The UWM will be discussed further in Chapter 2.

Nature of the Study

This quantitative study involved using a quasi-experimental pretest/posttest design. Shek and Wu (2018) said the quasi-experimental design can be used to test effects of interventions. This differs from traditional experimental designs in that it lacks randomized selection. Although this threatens internal validity of outcomes, the quasi-experimental design allows for more generalizability of the outcomes to other nursing homes and offers researchers options when a control is not available or when random selection may not be possible or feasible. This design was selected for this study as it offered the ability to study the nursing homes within the organization that had implemented the novel patient-centered wound team program.

The following are methods used to improve validity of a quasi-experimental design. First, any data should be from a validated instrument. Second, efforts to limit bias during data collection should be demonstrated. Statistical tests should be appropriate. In this study, two sources of secondary data were analyzed. The first was center-based PI rates. This data is valid as the data collection is routinely collected using Medicare

definitions to minimize subjectivity and bias. Further, there are nursing home internal audits and random Medicare external audits. The PI rate is determined by incidence of PIs and is a standardized reporting method for center team and leadership, as per Medicare regulations, and further validated through internal company audits and external Medicare audits of wound photos. The second data set included the wound team behavior scores that were determined using the Wound TPOT, a TeamSTEPPS validated instrument. The TeamSTEPPS instrument was created by the department of defense for teamwork and modified by TeamSTEPPS for healthcare teams. TeamSTEPPS allows the teaming tool to be adapted to specific areas of practice, such as wound care, and may be used in any healthcare setting. The Wound TPOT is used to observe and score teaming behaviors including team lead situational monitoring, team compassion in communication, team documentation, team leadership and interprofessional participation. To limit bias, a Wound TPOT video training was provided to understand and score behaviors objectively. Finally, to improve validity, analyses were performed using IBM SPSS Statistics (Version 28).

A convenience sample of approximately 15-20 nursing homes from one organization that that adopted this patient-centered wound team program structured using the UWM and SCT were evaluated. The two dependent variables were PI rates and Wound-TPOT team behavior scores. Statistical analyses included Means with standard deviations (SD), reported for continuous outcome variables. Difference in means were assessed using a two-tailed t-test. Mean difference in pre- and post-test measures were evaluated with paired t-tests. Pearson correlation coefficient was used to assess linear

relationships between continuous outcome variables. All analyses were tested for statistical significance at the alpha=0.05 level. Statistical analyses were performed using IBM SPSS Statistics (Version 28).

Definitions

Biofilm: An exopolymer matrix that may not be visible that forms typically on chronic wounds, creating barrier that prevent healing (Omar, 2017).

Collective Efficacy: Belief in one's ability to achieve success that is felt among teams (Bandura & Wood, 1989).

Emotional Contagion Process: The literal spread of mood to the group, in the same way a germ is spread, infecting the group (Altabbaa et al., 2019)

Frailty Syndrome: A state of being that occurs during old age due to body, mind, and other stressors that impair overall health and ability to improve health (Varan et al., 2020).

F686 and 684: Medicare rules of participation for PIs and quality of care. These are federal regulations with expectations and requirements regarding prevention and management of PIs in nursing homes. Homes that fail to meet expectations are at risk of survey tags, fines, and termination of Medicare funding (Centers for Medicare & Medicaid Services [CMS], 2017)

Person-Centered Care: A model of care delivery in which the role of healthcare professionals is to evaluate patients and determine options, then provide those options in order to enable patients families to make informed choices about treatments or

interventions. This approach is designed to consider what matters most to patients and focus on their quality of life rather than treatment outcomes for providers.

PI/ulcer: A skin ulcer or injury that results from tissue ischemia caused by prolonged pressure and/or sheer force (Haesler & Carville, 2015).

Patient: A person receiving medical or therapeutic services and often referred to as a resident in a nursing home.

Psychological distress: Resulting internal emotions due to actual or perceived stimuli that can result in physiological, emotional, and physical responses (House, 2015).

Psychological Merging: Shared goals that result in collective vision (Altabbaa et al., 2019).

Psychological Safety: Internal measure of level of trust that is felt or perceived while working within a group (Dubrow et al., 2018).

Resident: Individual who lives within a nursing home.

Social Identification Theory (SCT): The creation of a group name by the group results in a perception of group cohesion (Altabbaa et al., 2019).

Team: A collective group with the same goal, vision, and sense of accountability (Moore et al., 2014).

Team Affective Tone: Mood felt within a collective team (Altabbaa et al., 2019).

Team Justice: Measure of perceived fairness within teams (Dubrow et al., 2018)

Team Efficacy: Common belief among teams that they can be successful (Bandura, 1977).

Assumptions

There were several assumptions within this study. First, I assumed that PI wound types are clearly recognized and truthfully reported. Further, staging a PI by severity is a standard of care so accuracy and honesty were assumed to effectively analyze pre and post PI rates. Second, I assumed that each participating nursing home team had a will to embrace a patient-centered integrated approach to wound care. Third, I assumed turnover and the use of agency staff within the nursing home did not disrupt the program or the accuracy in reporting the data. Finally, I assumed COVID-19 was no longer a primary issue since a center-wide requirement to focus on infection could derail success of any new program.

Scope and Delimitations

This study was focused on teams in nursing homes and may not be generalizable to other settings that may not have the same patient demographics, staffing patterns, or team members. Therefore, the concepts of the UWM applied to the nursing home patient centered wound teams may not be applicable or applied in the same way for other healthcare settings. Further, infectious outbreaks in this communal setting limits success of any program that may affect patient care. In a nursing home setting, infection rates within nursing homes are a priority focus for this vulnerable population and take staff focus away from a wound program. Additionally, infected staff are also not able to work or participate and limit staffing overall or require additional nursing agency staff who are unfamiliar with the wound program. Further, COVID-19 and other infectious diseases increase risks of chronic wounds and could inflate ulcer rates after the program,

regardless of improvements in the wound program. Finally, staffing in some nursing homes are at a crisis level and they must rely temporary agency staff and/or external wound providers who may be different every day or every shift and limit their ability to actively and or effectively engage in patient-centered teaming

Limitations

There are limitations related to the quasi-experimental design. First, nursing homes were a convenience sample selected because they adopted the patient-centered team approach to wound management. Therefore, they may have already had a readiness and ability to adopt an advanced program due to leadership and stable staffing. Secondly, actual team participants are not randomly selected but rather self-selected due to wound care interest or directed. In either case, the participants may be more or less willing to engage with the education and the teaming. However, the coaches for the program are wound specialists and invested in the outcome of the program, which could cause bias with the outcome. Additionally, staging of pressure injuries prior to the program start had an unknown level of accuracy and could therefore limit the outcomes. Further, pressure ulcer rates may include unavoidable terminal ulcers that are not preventable therefore not reflective of quality care or improvements in care. A potential barrier was staff turnover, which resulted in untrained staff members participating in this study. To address staffing education issues with turnover and agency, short video trainings were made readily available for just in time learning. To limit error in wound types and individual coach bias, random audits of wound types and PI stages were performed by a team of wound specialists throughout the program. To minimize the limitations of bias and lack of a

control group, statistical analysis using a T Test pre and post were completed with a statistical significance at the p=0.05 level..

Significance

Improving teamwork and preventing PIs in nursing homes impacts residents and their families as well as staff and nursing homes. There is ample evidence supporting disciplinary teaming and a patient-centered approach for other care areas, such as oncology, palliative care, dementia care and diabetes, however, the effects of patient center integrated wound teaming specifically within nursing homes is a gap in the literature (Gellis et al.,2018; Cox et al.,2016). Despite this gap in the literature for patient centered wound teaming, this approach is considered a best practice in nursing homes and required by Medicare regulations (CMS, F686). Additionally, there is also a lack of research related to implementing collaborative wound teams in nursing homes. Further, current wound education programs are typically discipline-specific, inadequate, and do not fully address best practices for teams (Patel & Granick, 2007; Welsh, 2018). Siloed education further contributes to lack of team approaches and staff work-place satisfaction and may contribute to high turnover rates in nursing homes (Rajamohan et al., 2019). Fragmented approaches to education and wound care in nursing homes today may contribute to poor wound outcomes, nursing home outcomes, and staff satisfaction.

Given that chronic disease and chronic wounds are increasing in the nursing home population, poor wound outcomes are anticipated to escalate for patients, families, staff, and nursing homes (Demarre et al., 2015). Further adding to the complexity of poor outcomes is SARS-CoV-2. The global pandemic has led to shutting down traditional

onsite wound educational programs, requiring innovative approaches to training. As rates of chronic wounds continue to rise in parallel with infectious outbreaks, population aging, and chronic diseases, they will continue to disproportionately affect nursing home residents, causing pain, suffering, hospitalizations, and death, while simultaneously stressing nursing home staff and viability of facilities. Successful patient-centered collaborative programs have the potential to alleviate resident suffering through teamwork, improved management, and reduction of in-house acquired PIs. This would also affect viability of nursing homes by meeting the Medicare regulations and therefore preventing financial burdens of Medicare fines. Ultimately, the reduction of wounds in the nursing home population has the benefit of improving staff satisfaction, improving quality of life for patients and families, and decreasing Medicare fines for the nursing home and Medicare burden to society. Therefore, this novel program may result in evidence-based guidelines for a paradigm shift involving prevention and care of chronic wounds in nursing homes. This shift from a singular nursing or medical-centric to integrated team and patient-centered approach will alleviate suffering caused by avoidable chronic wounds for those who reside and work in nursing homes.

Summary

I evaluated effects of a person-centered integrated wound team program in a group of nursing homes. The program is based on the UWM and used a structured approach that involves incorporating essential elements such as having a team leader, identified team roles, a singular medical record, and PI metrics. Further, the core elements of the SCT had been used to develop methods and tools to achieve efficacy

needed for team behavior change. These methods and tools included feedback loops, role modeling and leadership training with a validated instrument, the Wound TPOT tool. This program is the first of its kind to evaluate effects of PI rates and team behavior change using secondary data from nursing homes PI reports and team Wound-TPOT scores.

In Chapter 2, I address how the UWM and SCT were used to create the methods and tools to implement and sustain this program. Next, I explore key constructs of patient-centered interdisciplinary wound teams in nursing homes, as well as chronic wounds, patient-centered care, integration of teams or teaming, and nursing home regulations. I provide an overview of wound team evaluation methods and discuss evidence supporting use of the Wound-TPOT. I then summarize evidence and gaps in literature that resulted in this study.

Chapter 2: Literature Review

Chronic wounds are a societal issue, affecting quality of life for aging populations and their families and leading to significant societal and economic burdens. They are often the result of chronic conditions or conditions that are more prevalent with advanced age, such as diabetes, cancer, vascular diseases, mobility impairments, nutritional disorders. Chronic wounds disproportionately affect those older than 65, and therefore are a significant issue within nursing homes. There are more than 15,000 nursing homes today in the U.S., most of which are funded by Medicare and Medicaid. It is estimated that 15% of the Medicare population have chronic wounds (Nussbaum, Carter, Fife, et al, 2018). Given that those that reside in nursing homes are generally older than 65 and mainly Medicare and Medicaid recipients, the prevalence of chronic wounds disproportionately affect those who reside in nursing homes compared to general society or even other care settings, such as hospitals. Chronic wounds can impair quality of life for those who have them, causing depression, embarrassment, pain, infection, hospitalization, and death (Varan et al., 2020). They require expensive treatments and can be the cause of nursing home regulatory scrutiny and litigation. Poor healing rates of chronic wounds can also be distressing to nurses as wound care is perceived as a nursing responsibility or fault with a focus purely on healing the wound, even if that is not possible. However, older people with comorbid conditions may not heal wounds as they may not have the ability or desire to improve or correct chronic conditions that directly cause wounds, act as contributing causes, and/or impair the ability to heal. Informing the patient and family what it takes to prevent or heal chronic wounds in order to realistically

goal set is a significant paradigm shift that can improve quality of life for patients, improve prevention of avoidable conditions such as PIs, and improve team satisfaction, while reducing regulatory and legal risks. Despite the success of this person-centered team approach in other areas of practice, there is a significant gap in literature in terms of how to implement a patient centered wound team program in nursing homes.

The purpose of this research was to evaluate the effect of a person-centered integrated wound program within nursing homes. This program addresses chronic wounds, interprofessional teamwork patient-centeredness, within a group of the nursing homes. There is a gap in the evidence for patient centered wound team programs in nursing homes. The UWM was the program framework used to structure the program with elements consisting of a team lead, leadership support, policy, reimbursement, and a unified medical record. However, the program also sought to achieve interprofessional teamwork behavior change using Bandura's SCT. Bandura (2004) acknowledged the reciprocal triad of behavior change, cognition, and environment. This program attempted to change behaviors through role modeling with coaching using wound case studies, improve cognitive through education and feedback loops with a validated tool while creating an environment for change with leadership training and guidelines. The intent of this program was to create patient-centered integrated wound teams while the aim of this research was to evaluate effects of this program on PI rates and team behavior.

Patient centered clinical programs embrace models and frameworks for communication and compassion in care, subsequently improving team approaches and outcomes (Huang et al., 2019). However, as wound care continues to be perceived as

solely a nursing responsibility, team approaches have not been applied to wound management programs in nursing homes (Smallwood et al., 2019). In outpatient settings, collaborative team approaches have been applied to some specific wound types with success, such as diabetic neuropathic ulcers. However, a team collaborative approach is not yet the standard approach in nursing homes for wound management (Moore et al., 2015). Federal guidelines require patient-centered care for all nursing home resident needs. Patient centered care implies that the patient is the primary decision maker and the team collaborates to inform the patient of the benefits and risks of options to help with decision-making. However, team training and integration in nursing home wound programs remains fragmented limiting a patient-centered approach and often providing wound management in a historical med-centric approach that does not consider what may matter most to the patient. (Moore et al., 2015).

Additional barriers exist in terms of patient-centered care and functioning as a team, including vulnerability of this population to infectious diseases such as influenza and SARS-CoV-2. These situations are more common in communal settings and continuously challenge effective programing and care delivery. Further, infectious situations have a direct effect on wound outcomes, further stressing the need for a team-based approach that addresses all unique challenges in a nursing home setting. Patient-centered team approaches may serve to address obstacles unique to nursing homes and provide options to improve continuity of quality care, regardless of situation.

Literature Search Strategy

Selected articles related to team approaches to patient care, patient-centered care, integrated wound management, and wound management in nursing homes are addressed here. I used the following databases: Thoreau Multi-Database, CINAHL, MEDLINE, ERIC, SAGE Knowledge, Science Direct, SAGE Journals, Political Science Complete, Psychology Database Combined Search, and Google Scholar. I used the following search terms: *pressure ulcer*, *PI*, *chronic wound*, *post-acute care*, *long-term care*, *skilled nursing*, *nursing home*, *integrated wound team*, *teamwork*, *Teamstepps*, *palliative teams*, *patient-centered care*, *patient driven care*, and *social cognitive theory*.

Theoretical Foundation

Teamwork in healthcare is a recommended practice overall but wound teams in nursing homes, is not found in literature, decreasing transferability into practice. Gellis et al. (2018) studied interprofessional palliative teamwork using Bandura's SCT and recommended additional research to study SCT for teamwork to improve generalization for other areas clinical practice, such as wound management. This study evaluated the effort of a new patient centered wound team program that was established using Bandura's SCT in nursing homes.

Bandura (2004) posited human behavior is the result of observation and modeling, self-efficacy, and behavior change that occurs from a push and pull between cognition and the environment. This is referred to as reciprocal determinism between actual behavior, individual cognitive/emotional states, and the environment (see Figure 1). Therefore, learning, skill acquisition, and behavior changes are not solely based on

agency or environment alone, but rather both together. Bandura's SCT contains several constructs. The first is observational learning, whether by direct experience or through vicarious observation of others. Bandura (2004) found that children demonstrate learned behaviors of through observation of models. This program adopted that theory with wound certified coaches to demonstrate desired wound team leadership and behavior through case studies. Secondly, Bandura found that efficacy or belief in one's own ability to do a behavior was a requirement of integrating a specific behavior into one's routine performance. One method to achieving efficacy was through feedback loops, encouragement, and self-goal setting. This program aligned with Bandura's SCT in that it used the Wound TPOT. The Wound TPOT is a validated instrument that team members used to determine desired behaviors, receive coaching and positive feedback of their behavior in order to develop their own goals. Additionally, the program provided roles of team members, guidelines, and resources are all reinforced through leadership oversight. Expected teaming behaviors such as mutual respect, compassion, and situation monitoring are modeled via observation learning, instructor role modeling, video simulations, and instructor feedback (see Figure 2).

Figure 1

Bandura's SCT

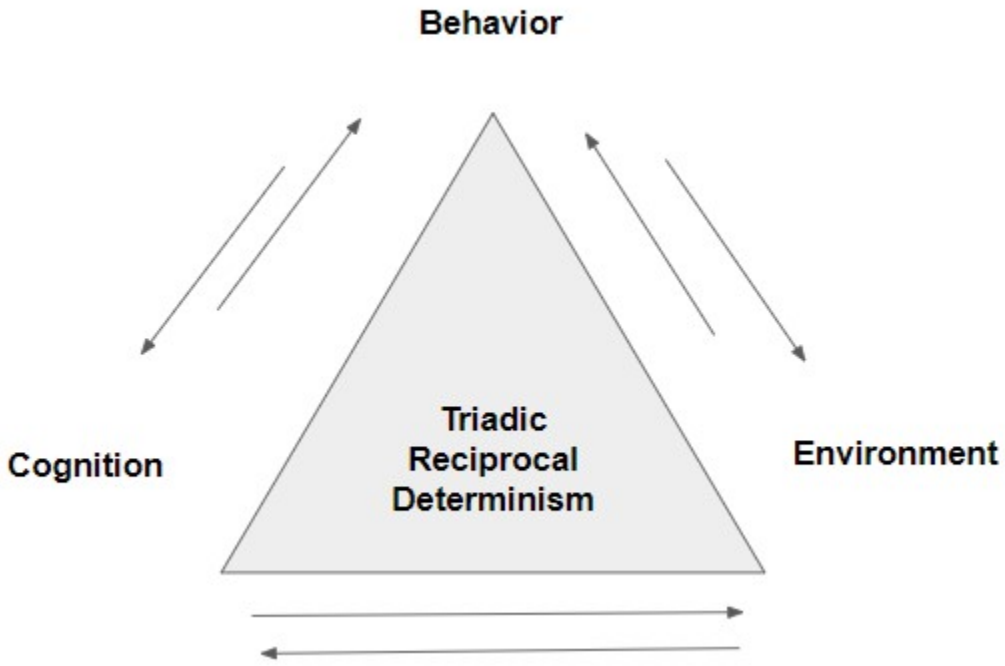
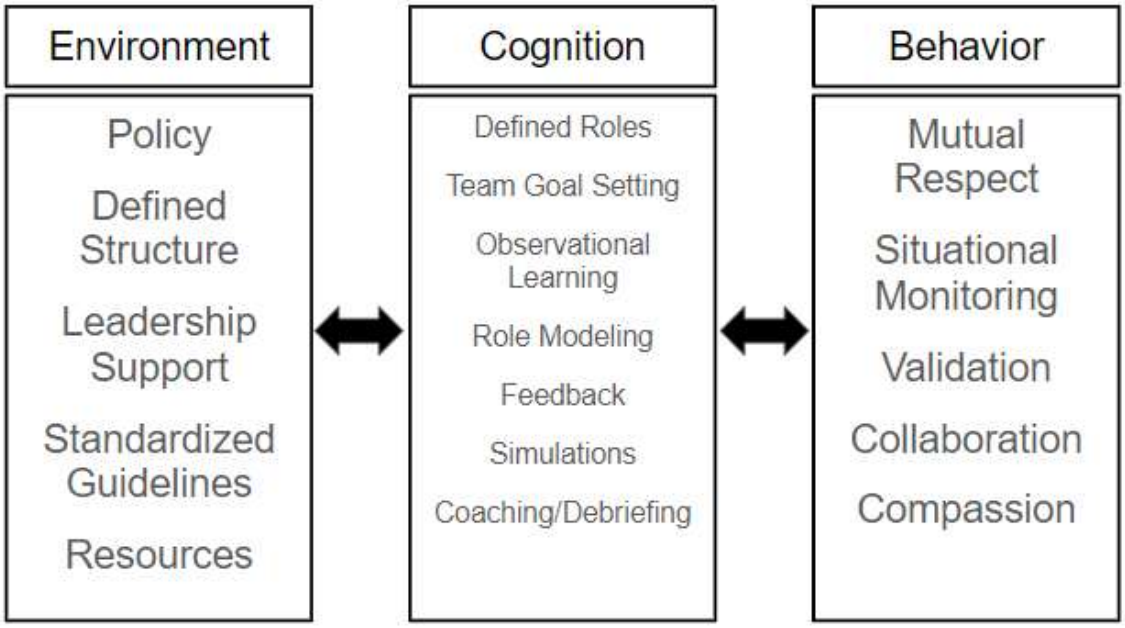


Figure 2

Bandura's SCT Applied to Patient-Centered Wound Teams in Nursing Homes



Conceptual Framework

UWM

The UWM was based on an 18-year retrospective literature review of outcomes related to wound teams. This model not only provides the structure of a wound team, but also is a specific call to action for research to evaluate the effect. The UWM consists of five key elements, including: implementing a key leader, adopting a referral mechanism, creating team cohesion, ensuring alignment of the remuneration structure, and ensuring health care system readiness. These five elements are the structure used in this program of study (see Figure 3).

The elements of the UWM have been supported in literature within other settings for teamwork. Similar to the first element of the UWM of a key lead, the WUWHS

primary recommendation was to have a key lead, or advocate, to conduct the team approach and to serve as navigator for the wounded person. Another alignment with the UWM is the recommendation for a referral mechanism, a single plan of care created by the team, and leadership support for the team approach. Through the UWM, this program of study was able to adopt both the team lead, a single plan of care and leadership support.

Patient-centered care is a significant aspect of wound teaming, increasing not only quality care but also staff collaboration and satisfaction. Research by Hung et al. (2019) supports to this approach with their research on person-centered care in 16 nursing homes in Taiwan. They used a used a hierarchical multiple regression analysis to evaluate responses from a survey of 366 caregivers using the Person-Centered Care Questionnaire (PCCQ). Their finding was the positive effect of person-centered care on productivity and job satisfaction. Worsley et al. (2017) added to the discussion of teaming by summarizing their work in this one important statement; “no one profession has all required skills”. Therefore, patient-centered care improves the quality of care and staff satisfaction by collaboration.

Wound teams require both team training on roles and wound team integration, which includes communication skills and wound knowledge. The research by Worsely et al. (2017) was measuring pressure ulcer prevention team behaviors and attitudes that impact pressure ulcer management. They identified specific themes, including a lack of training and education regarding roles and perceived roles as well as the difference between the medical models versus person-centered care. This work was limited to only

one hospital and a small sample size, decreasing generalizability. However, these findings align with the outcomes and structure of the UWM. Leena et al (2020) supported the UWM element of team integration with the evaluation of a team approach in acute care focusing on solely the management of stage 3, stage 4, and UN PIs. The researchers found that team communication resulted in improved wound outcomes and decreased pressure ulcer rates. However, this was a limited study that took place in only one hospital and the outcomes may have been related to the Hawthorne effect and sustainability is unknown. Additional research is recommended to measure the effect of a wound team program.

Overall, the extensive 18-year retrospective literature review of teaming that resulted in the UWM has continued research to support each of the UWM elements. However, there is no research today that evaluates the effect of a patient-centric wound team in nursing homes built using UWM structure and delivered through the lens of the SCT. Refer to diagram three for details on the UWM elements applied to the nursing home setting.

Table 1

UWM Elements Applied to Patient-Centered Wound Teams In Nursing Homes

UWM Elements	Patient-Centered Wound Team, Nursing Home
Implementing a key leader	The RN or PT Skin Health Team Lead- a paid full time position; a detailed job description that includes system thinking, patient/family advocacy.
Referral Mechanism	Roles are defined with areas of practice and options provided to the team. Key leader identifies specialty resources (Vascular, Derm, testing/labs, etc..). Key leader and team provided structure and guideline for referrals. Telehealth and advanced wound photo apps used for teaming and referral needs.

Team Cohesion	Incorporation of Team Training modules (SCT); Team Wound Tool (communication for rounds), Checklists, and the Wound-TPOT for team behavioral coaching.
Alignment of Remuneration Structure	Metrics for wound types and documentation drive center level reimbursement for care and dressings. Bonus program for all clinical staff, including CNAs, based on PI prevention and healing rates.
Health Care System Readiness	Patient-centered Team Policy Leadership training on program and expectations to support the approach Leadership incentivized by PI outcomes

Literature Review

Chronic Wounds

Aging and Chronic Wounds

There is a relationship between increased wound prevalence and advanced aging, causing a disparate prevalence of wounds in the nursing home population. The U.S. population of those 65 and over is estimated to double, reaching 83.7 million by 2050 (US Census Bureau). In that same timeframe, there will also be an estimated 228% of those older than 85 years of age (Yazdanyar & Newman, 2009) and therefore a significant increase of chronic wounds in the nursing home population.

Chronic diseases increase with aging and are the primary cause of morbidity and mortality (Fabbri et al., 2015). Sierra (2016) reported that chronic diseases result in an estimated spending of 1 trillion dollars per year. However, the dramatic demographic shift of population aging is expected to result in 100% increase in Medicare spend (CDC, 2016). Accounting for this significant expense is the compounding of chronic diseases, for example, 77% of the older adult population have at least two or more chronic diseases (CDC, 2016). The most common chronic diseases include heart disease, stroke, cancer,

and diabetes, consuming more than 75% of the national health care spend (NCHA). The expense related specifically to chronic wounds, and/or the subsequent pain, suffering, infection, hospitalization, and death is not accounted for in these estimates. However, it is these chronic diseases that serve as the primer for chronic wound development, chronic wound recidivism, chronic wound recalcitrance, and chronic wound decline. Therefore, as the rate of chronic diseases increases in parallel to population aging, the rate of chronic wounds is subsequently increasing, disproportionately affecting older adults.

This relationship of populating, chronic wounds was further supported while detailing the expense in a retrospective analysis of the Medicare 5% limited data set for the year 2014, more than 8 million Medicare beneficiaries, or 15%, were determined to have a chronic wound type (Nussbaum, Carter, Fife, et al, 2018). The Medicare expense was estimated to fall between 28.1-96.8 billion, highlighting that the disproportionate impact of chronic wounds on older adults is also a significant economic societal burden. The societal burden of the expense, along with the increasing chronic wound prevalence among the aging population is a call to action to investigate programs that may have impact on the outcomes of those who suffer from chronic wounds and those who struggle to care for those with chronic wounds (Nussman et al., 2018).

Chronic Wounds and Frailty

Frailty is a geriatric syndrome that impacts wound risk, non-healing, and is an issue for nursing home residents. Frailty impairs an individual's homeostatic reserve, preventing the maintenance of health with any added stressor, which increases risk of new wounds or non-healing of existing wounds for this population (Varan et al., 2020).

Frailty can be best understood as a state of vulnerability caused by advanced age and multiple conditions, the very conditions of those that reside in nursing homes. In some cases, frailty may increase the risk of a PI, in other cases, a PI may increase the risk of frailty. In either case, there is a relationship between frailty and wounds in the geriatric population.

Frailty may also be an impediment to healing of an existing wound regardless of etiology and require a patient-centered team approach. Franz et al (2020) evaluated the relationship between chronic wounds and frailty in a cross-sectional analysis and found that 23.2% of those with frailty had a concurrent chronic wound. The most common wound type in that population was non-healing surgical wounds, followed by PIs, venous and arterial leg wounds, and lastly by diabetic foot ulcers. The necessity of addressing frailty and the relationship on wounds for those in long-term care is necessary to help the resident choose their care options (Efraim, 2018). However, the diversity of chronic wounds require specialty skills unique to each discipline on a team. Therefore, frailty and the impact on chronic wounds require a multi-professional team approach to evaluate the multifactorial issues that not one discipline has the full skillset to address.

Nutrition and Chronic Wounds

Nutrition impairment can lead to sarcopenia, weight loss, systemic issues, difficult healing, skin failure, chronic wounds, and death and require a team approach (Delmore et al., 2020). Delmore et al. performed a retrospective case-control study from a New York hospital system and analyzed 415 incidences of PIs. A step-up logistic regression was applied to determine that weight loss, along with frailty, supported

previous hypotheses of a relationship with skin failure. The hallmark of nutritional impairment in older adults is weight loss. However, other indicators of metabolic health may include labs. For example, Schott et al. (2020) completed a 7-day longitudinal study of patients in acute care and found those that with anemia had statistically significantly higher risk of PI incidence. A holistic approach to address medical issues related to nutritional deficits is an important part of a team approach.

Nutritional impairment and weight loss in older adults is also not solely an issue of not receiving enough calories, or the simple act of adding supplementation would suffice. Chen et al. (2017) contributed to this knowledge with an analysis of a cross-sectional study with 94 geriatric participants in a Taiwan hospital. The statistically significant outcome found that declining nutrition is a predictor of PI. Yap et al. (2020) published a randomized controlled study in Canadian nursing homes that detail the various causes of nutritional deficit and the relationship to PI incidence. There are reasons beyond food that can cause nutritional impairment. For example, someone with a neurological impairment may develop dysphasia, or a weakness with swallowing that can result in pocketing food, choking, and aspiration. In other cases, a person may have contractures or weakness in their arms or hands, making holding utensil independently difficult or impossible. In other cases, it could be poorly fitting dentures that make chewing impossible or a vision impairment that prevents an individual from seeing their plate or food. Another cause of weight loss could be related to malabsorption from diseases or from lack of taste or smell from medications or infection. Sometimes the issue resides in purely resident preference for different foods, in some cases those foods that

are more culturally familiar. Lastly, depression and cognitive impairment are both major causes of weight loss and nutritional impairment. A team approach that extends beyond a supplement is essential in understanding weight loss and the nutritional needs for wound prevention and healing

The dietitian is a key member of the team and can evaluate and lead the team in an effective nutritional approach that extends beyond the simplistic addition of a supplement. The dietitian may recommend dental care for ill-fitting dentures, speech therapy for swallowing, occupational therapy for adaptive equipment for eating, psychology for mental health, medical management of disease processes and/or pharmacist for medication changes. In a person-centered team approach, the dietitian will evaluate the individual and collaborate with their family and interprofessional team to determine the root cause of weight loss in order strategically intervene.

Sleep Hygiene and Chronic Wounds

A team approach that engages the leaders for system changes to improve sleep is needed to improve wound outcomes in nursing homes. Sleep disturbances have a negative holistic impact on the entire spectrum of human health and therefore sleep deprivation is likely to increase the risk of skin breakdown and impair wound healing (Walia & Mehra, 2016). The specific number of hours of sleep and quality may be more individualized rather than a set population need, however, < 5 hours was found to increase skin aging and increase transdermal water loss (Walia and Mehra, 2016). Nursing homes challenge all the optimal conditions needed for quality and quantity of sleep. First, most nursing homes today continue to have shared rooms with at least one

roommate. If the roommate was a mate or spouse, that may be preferred to foster comfort, but in most cases this is not a choice and is a stranger. Further, it is important to keep in mind that it is likely that one or both residents will have support needs in terms of mobility, incontinence, memory care, etc... In addition to the routine disturbances for care of the roommate, it is also likely that the bedroom door is kept open to the light and noise of caregivers in the hall. Further, it is likely that this may be the first time in many years that the resident will now be expected to sleep on a twin-size mattress. The noise, the light, the disturbances, the strangers as roommates, the odors from incontinences, the embarrassment, the twin bed width, and comfort, all of these are basic examples of what may keep a person up at night. A team approach, specifically engaging the nursing home leaders, is needed to address all of these issues with sleep in order to maximize outcomes at a systems level.

There are additional factors that could also impair sleep at an individual level and require interprofessional evaluation and a team approach to address. These factors may be pain, depression, and polypharmacy. All those factors alone could cause skin risk or impair healing, but the direct effect on sleep loss could also directly affect skin. Wilson et al. (2018) studied the physiology of healing induced blisters on humans who were sleep deprived and found a direct relationship between the lack of sleep and a decrease in immunity and impaired wound healing. Therefore, an important part of a patient-centered wound team is addressing sleep at an individual level in order to improve wound outcomes.

Mobility and Chronic Wounds

Impairments in mobility or lack of exercise can cause a variety of health issues, including chronic wounds (Chen et al., 2017). Impaired mobility may present as a decline or inability to ambulate and/or body part that has impaired mobility. Arroyo-Lopez et al. (2022) evaluated mobility scores of 1335 new admissions to an ICU. They found that mobility score, or rather impaired mobility, was associated with PI development (95% confidence interval: 85-89%). Simoes et al. (2022) had similar findings in a longitudinal prospective study that evaluated the incidence of PIs after elective hip surgeries, they evaluated the skin at admission, 24 hours after surgery (7.4% incidence), and 30 days after surgery (24% incidence). An odds ratio was used to examine the relationship and found that factors such as sex (female), weight (increased), depression, and impaired mobility had a statistically significant relationship with PI development. Although the sample size was only a sample 40, this work is aligned with current guidelines finding mobility as a major risk factor for PI development.

Immobility could also imply a section of the body or skin from a fixed device on the skin such as any medical device immobilizes not only the body part but also the skin. This is referred to in the literature as a medical device-related PI. Erbay et al. (2021) performed an observational cohort study of ICU patients for over one year. The incidence of MDPI in this cohort was 48.8% or 84/172 patients, most of which were mucosal and unable to be staged, followed by stage 1 PIs. The most likely devices included endotracheal tubes, urinary catheters, nasogastric tubes, and non-invasive masks. A multivariate analysis was performed to yield additional insights on the most likely risk

factors for PI development included, vasopressor use, ventilator use, length of ICU stays, advanced age, and cardiovascular disease. This work contributes both the findings related to impaired mobility as a risk but also the multifactorial risk factors that require a multidisciplinary approach.

Chronic Wounds and Biofilm

Chronic wounds are non-healing or recalcitrant and require a team approach to investigate possible causes In most circumstances, healing requires mitigation of the cause, meaning an actual change in medical status, mobility status, nutritional status, or circulatory status. However, in the case that the causal factors have been mitigated, the recalcitrance may be related to the microbiome changes within the open tissue (Omar, 2017). This phenomenon is emerging as a common cause of recalcitrance and infection that can be worsened with antibiotics and mitigated with proper treatments including debridement. Although specific wound causes and specific wound treatments are not the scope of this study, biofilm is potentially a subcategory as important as other primary standard risks, like mobility, nutrition, and moisture. Therefore, team awareness is imperative to recognize and discuss as a potential factor with non-healing.

Biofilm is another cause of chronicity and requires a team approach to assess and treat. Biofilm refers to a grouping of planktonic organisms that work together, communicate, and create an exopolymer protective shell (Omar, 2017). Detecting biofilm is not possible with solely visual observation. Harika et al. (2020) evaluated different biofilm from 92 wound isolates. The isolates were screened for biofilm with three different methods, based on statistical analysis. Tissue Culture Plate method was the most

effective and should be considered the Gold Standard. Biofilms are found in up to 80% of skin and wound conditions, accounting for 1.96 non healing skin and wound conditions and subsequent 268,000 deaths in the United States alone (Omar, 2017). Biofilms are resistant to antibiotics, grow in strength and number, and are persistent in re-growth efforts, even after full debridement. Biofilms infiltrate any wound type and are the major reason of chronicity, infection, and death. Biofilms must be addressed both in the wound and within the human. Biofilms can be treated with topical solutions, modalities, surgical interventions but the health of the host should also be addressed for best outcomes and extends beyond one discipline. Therefore, biofilm management also require a team approach to not only remove from the wound, but to create a wound environment for healing, including a holistic approach to improve the health of the host.

Emotion, Compassion, and Chronic Wounds

Sen (2019) discussed that those with wounds suffer increased loneliness and depression, both of which decrease healing rates and needs to be addressed by the team. Negative stressors actually impair cellular healing and impair immunity. This means that our psyche can prevent healing and increase risk of infection. A buffer to stress is compassion, defined as the recognition of and response to the distress and the suffering of others (Lown et al., 2016). Compassion in health delivery is a way of being that can be taught, modeled, and expected. Lown et al (2016) posit that a collaborative team approach that lacks compassion will fail to meet the emotional and psychosocial needs of the patients and their families. Therefore, training a team in both emotional and

pychosocial care as well as communicating with compassion can make a positive impact on outcomes.

The combination effect of team compassion and collaboration in care, defined by Lown et al as the Triple C, is the platform needed to maximize the Triple Aim, improved health outcomes, improved satisfaction, and lower costs. The foundation of this platform is leveled communication, breaking down the medical social norms and breaking through typical professional silos. The result is a shared partnership of the team, including the patient and family as active team members. This compassionate approach to collaborative care not only empowers everyone on the team, but also improves the overall team communication quality (Lown et al., 2016). Quality communication in collaborative care has rendered improved health outcomes, improved patient satisfaction, improved quality of life, decreased hospitalizations, decreased medical errors, and decreased malpractice (Lown et al., 2016). This is an essential approach for wound teams in nursing homes.

. Compassionate behaviors, such as active listening, acknowledging the whole person, self-reflection, acknowledgement and response to emotions, and fostering health professional resilience, are all directly applicable to wound teams. Specifically, the compassion construct of a ‘whole person’ approach, rather than ‘seeing’ just a disease is very fitting as too often professions see a just a ‘wound’ or a the ‘hole’ in the person, rather than the person. This is an easy concept to help the wound team ‘see’ beyond the band aid- approach to a whole-body approach, addressing the complexity of the individual from a physical, functional, emotional, and psychosocial perspective. Further, Lown et al. (2016) recommend that patients and their families are a part of developing

process changes. Lown et al. (2015) summarizes literature reviews that discuss the outcomes of compassionate care on patients, including: increased immune response, improved psychological adjustment, improved diabetes control, decreased hospitalizations, and decreased ICU at the end of life. All areas that could be beneficial for the older chronically wounded patient as well. This is a thought-provoking idea that could lead to additional insight in team building for wound teams.

Compassion is a key component of patient centered wound care and recognized by other patient centered frameworks. For example, the AAWC Conceptual Framework of Quality Systems in wound care exemplifies the need for compassion in wound management. This framework details the vulnerability of the wounded patient and explains how they are frequently not included in choice, they may receive inappropriate care, and they are often not seen as a partner. Given that, the wounded patient may develop negative sense of wellbeing, poor outcomes, and loss of trust in the wound team.

The complexity of the wound itself, whether it is heal-able at all, or whether it is a symptom of disease or related to external causes further complicates communication and trust. A collaborative patient-centered approach can better determine accuracy with wound type and determine, together, patient-centered goals and likely wound outcome. Like other advanced disease processes, not all ailments of the integumentary system are heal-able, some may be heal-able but the aggressive nature of the ‘cure’ may be worse than the ‘wound’. In any case, it takes a collaborate compassionate approach to fully assess and develop the plan of care suited for each patient.

Compassion also address the issue of wound esthetics. Meaning, wounds can be very hard for patients and their families to literally look at. Wounds drain. Wounds often have an unpleasant odor. Wounds are often perceived to be related to poor care. The wounded patient may be embarrassed, in pain, or angry. Their family may also be upset, have feelings of guilt, or anger. Compassion is not just the right approach; it may truly be the glue that holds the team together as they navigate these sensitive conversations while addressing their emotional and psychosocial needs. Compassion, therefore, may be the strength of a wound team. Lown et al., (2016) suggest that behaviors of compassion can be baked into existing competencies for all health professionals. In alignment with Lown et al and others, this programs SCT training program addresses compassion with interactive case studies to role-play emotion and response of team members

House (2015) examined psychological distress on wound healing that makes a compelling argument about a compassionate team approach for wound management. Essentially, stressors, such as anxiety, fear, depression, and upset, all have a physiological outcome have been demonstrated to impair healing at every phase. According to Seiler et al. (2020) and Kiecolt-Glasener (1995), biopsy healing rates were compared in those that served as a caregiver of those with Alzheimer's versus an age-controlled control group that was not. They found a 24% delay in healing. In study after study, they found similar conclusions of higher stress; therefore, the conclusion of review was that higher stress equates to delay healing. Wound needs can improve healing outcomes by providing a compassionate approach to patient centered care.

Psychosocial health also needs to be addressed by the wound team. There is a relationship between higher depression and increased infection risk as well as slower healing by 50% (Nelson et al., 2022). Another important finding was in those with diabetes. They found that depression had a mediating effect on the development of wounds in those with diabetes demonstrating a two-fold increase of ulcer formation in a sample size of 4839. A team approach understanding the role of pychosocial health in wound management can improve wound outcomes.

Acute stress can also affect healing and is another factor a wound team needs to be aware of to properly address. One study contributed to the knowledge about acute emotional impact by studying couples in relationships (House, 2015). In this study, 42 married couples were all 'blistered' with a suction device followed by engagement in 30 min conversations. The control group had a neutral conversation, and the experimental group had an emotionally triggered conversation. Then, fluid samples were evaluated. Those couples who had emotional upset had 60% delayed physiological response to healing. Those who had a degree of calm cognitive processing in upset had some mediating effect; however, those without upset had normal physiological response to healing. A significant finding was that certain mediators can boost healing even in the case of upset, for example, talking or writing about your feelings, called emotional disclosure, can enhance wound healing rates. These are important and tangible recommendations that a wound team can adopt.

Ultimately, this literature synthesis supports compassion by caregivers for wounded residents, which has carry-over effect on healing. Wound team evaluations that

extend beyond the medical and physical, and into the psychosocial, such as inquiry on emotions and coping, as well as supporting an environment for sleep, exercise, and nutrition, all impact quality of life- and wound management and require a team approach.

Primary Types of Chronic Wounds

Chronic wound is an umbrella term that broadly defines any wound condition that persists, non-healing, for > 3 weeks (Martinengo et al., 2019). Their most common chronic wounds include PIs, venous leg ulcers, diabetic neuropathic ulcers, arterial ulcers. Martinengo et al. (2019) provided more insight on the prevalence through a global meta-analysis of chronic wounds and reported a rate of 2.2 chronic ulcers per 1000. Lindsay et al. (2017) had previously reported 4.5 million PIs, 9.7 million venous leg ulcers, and 10 million diabetic neuropathic ulcers, the expense for these rates far exceed previously estimated expenditure. Sen (2019) reported that the rate of chronic wounds is higher for those older than 75 years of age. Each of the primary chronic wound types; including, PIs, diabetic neuropathic, arterial, and venous leg ulcers, along with any related disease factors, are investigated in this section of the literature review to explore the impact on aging and a patient-centered team approach.

Diabetic Neuropathic Ulcers and Diabetes

Diabetes significantly contributes to the problem of chronic wounds in two ways, first, diabetes can cause neuropathy and a subsequent chronic neuropathic ulceration, and second, poor glycemic control can impair healing of any chronic wound regardless of etiology. The World health Organization (2020) cites the global prevalence of diabetes at 422 million, 25% of which are at high risk of a diabetic neuropathic ulcer, and 24% of

those are at risk of lower extremity amputation. In a global meta-analysis, Saeedi et al. (2019) estimated a slightly higher number of diabetes prevalence at 463 million. Further, they projected an increase to 578 million by 2030 with the current trends in lifestyle, poor diet, and population aging.

Diabetes increase with aging is further confirmed with the data from the American Diabetic Association (2020) reporting that 25% of those with diabetes are 65 years of age or older. Sen (2019) reported the same finding within the United States where the prevalence of actual and pre-diabetes exceeds 100 million and those 65 years of age and older account for >25% of that count. Given the higher prevalence of diabetes for those older, it is expected that nursing homes have a high rate of diabetes.

The higher rate of diabetes in nursing homes was confirmed through with a European survey of 12 countries from 2004-2010 that collected a sample of 48,464 adults that determined diabetes alone to be a predictor of nursing home placement that increased with population aging (Rodriguez-Sanchez et al., 2017). This is consistent with earlier work by Zarowitz et al. (2015) who retrospectively examined the nursing home population in the United States using the Minimum Data Sets required by Medicare. They reported a prevalence rate of diabetes at 35.4%, validating the assumption of higher rates of diabetes within the nursing home population in the United States. This rate is alarming as this population is not only at risk for diabetic foot wounds, but diabetes is also a risk factor for other chronic wounds and can impede healing of any wound.

Diabetes, especially poorly controlled, can result in foot ulcers, prevent healing of any wound type, and increase risk of wound infection and amputation. Lorber et al.

(2021) evaluated the glycemic control of residents with diabetes in four nursing homes.. Despite medical care, aging alone was associated with higher A1C, meaning, the older the adult, the less glycemic control, and therefore higher risk of neuropathy and infections.

Diabetes also contributes to nonhealing of existing wounds that worsens with advanced aging. Alfonso et al. (2019) found that diabetes is a significant risk factor for PI surgical deep wound infections (7.0 vs 4.3%; p=0.001) surgical cite dehiscence (5.2 vs. 2.7%;p<0.001) and increased re hospitalization (12.8 vs. 8.9%; p=0.001). A systemic review and meta-analysis of diabetic foot ulcers from more than 800,000 participants from 67 studies resulted in a global prevalence of diabetic foot ulcers at 6.3% (95% CI: 5.4-7.3%). Although this was not solely within nursing homes, there was an increased rate of diabetic foot ulcers associated with aging (Zhang et al., 2017).

Diabetes can increase complexity of wound management. Meloni et al. (2020) analyzed prospective data of a cohort of 1,198 adults with diabetic foot ulcers in their clinic. Although this was more likely a non-institutionalized population, the average age was consistent with the nursing home population. However, only those patients who were considered medically healable and/or were candidates for revascularization were included. This excluded the medically complex nursing home residents. The aim was to evaluate the healing outcomes of a healable population and therefore not translatable to an older nursing home population with poor glycemic control and unlikely surgical candidacy. Regardless, the statistical analysis of the data was useful in understanding the complexity of diabetes and wound healing.

Diabetes complicate overall outcomes, including wound management and requires a team approach. Meloni et al (2020) had significant findings about general outcomes as it relates to diabetes. First, failure of revascularization procedures and end stage renal disease were both predictors of wound healing failure and amputation. Second, heart failure and the presence of five or more co-morbid conditions were predictors of death. Third, those that had a successful revascularization experienced wound healing at approximately 35 weeks. In addition to these important wound related outcome findings, the framework is applicable to a patient-centered team as it recognized the interprofessional management of the diabetes that included medical and nutritional management of blood sugars, strict off-loading, and topical wound treatments.

There is a dearth of research for diabetes and teamwork. For example, Ranjani et al. (2017) conducted a retrospective cohort study in a Canadian health clinic evaluating those with chronic diabetic foot ulcers. The cohort included those who participated with an interprofessional approach to care, including vascular management, infection management, foot care, footwear, and wound bed preparation. They referenced V.I.P. approach, vascular, infection and pressure off-loading as the framework. They had 308 participants with a mean age of 64. They concluded that an interprofessional approach to diabetic ulcer care resulted in improved wound diagnosis accuracy ($p< 0.001$), dressing change frequency decreased (4.31/week to 3.54/week; $p = 0.03$), pain scores decreased from 2.18 to 1.67, and ability to recognize infection increased ($p= 0.04$). Ogrin et al. (2015) completed a longitudinal observational study of a team-based approach to those with diabetic ulcers in an outpatient clinic. Eighty-three patients participated with a mean

age of 58 years. Although three died, one lost a toe and another a below knee amputation, the average healing duration was approximately 7.4 weeks; a rate significantly better than those reported globally for this wound condition. In all examples,, an interprofessional approach is recommended to improve patient outcomes related to diabetes and diabetic ulcers.

Venous Leg Ulcers

Venous ulcers are the most prevalent lower extremity chronic ulcer in the United States and those in nursing homes are at high risk. First, venous insufficiency and subsequent venous ulcers are most common in those older than 65 years (Sen, 2019). Second, healing takes a considerably long time and requires a lifetime of behavioral changes, both of which are factors that could significantly impact the quality of life for a nursing home resident. In the best-case scenario that the venous ulcer is easily managed, the resident has adequate blood flow and overall good health for healing, and is agreeable to compression therapy, the average time to healing is still at 52 weeks (Sen, 2019). Nursing home wound teams need to have a thorough understanding how to evaluate and care for those with venous ulcers.

Non-healing chronic leg wounds are at risk of infection, cellulitis, and limb loss and require a team approach. Venous wounds are high risk for increasing bioburden and biofilm. Further, venous related edema can cause excessive drainage, edema, discomfort, and impair overall quality of life. Management of a venous ulcer requires first ensuring accurate wound diagnosis followed by evaluation of circulation, mobility, co-morbid conditions and medications, cognition, and wound characteristics. Once the diagnosis is

clear, discussion around options is then possible. However, patient/person involvement in this discussion is critical to fully understand what it takes to get to healing, the extent of time, and the possibly of maintenance goals given certain factors like anticipated life span of the individual, cognition, ambulation status, and circulatory status.

Team evaluation for health literacy of the person and their family to provide specific and targeted education and support for behavioral change is also imperative, as management of venous insufficiency requires life-long changes. Therefore, successful management, whether the goal is healing or maintenance goals that focus on quality of life, a person-centered team approach is necessary to meet the complexity.

Arterial Ulcers and Peripheral Arterial Disease

Peripheral arterial disease (PAD) disproportionately effects older adults. PAD is a vascular disease that prevents blood and oxygen perfusion within arteries. The damage from this tends to occur further away from the heart, at the distal end of arteries and therefore more often in the legs than the arms. This is so significant that it is now referred to as lower extremity arterial disease, or LEAD. The risk factors for this include any type of heart disease, atherosclerosis, genetics, smoking, and advanced age. The prevalence for younger adults is less than 14.9% whereas older adults range form 15-20% (Byant, 2016). Byant (2016) reported that up to one third of those older than 65 years have LEAD.

At a global level, >200 million suffer with LEAD at all ages and it increases with smoking. These rates, although alarming, is not fully recognized in how they connect to the advent of a new wound, or how they relate to non-healing or other factors that impact

quality of life, especially for older adults in nursing homes that may not be candidates for revascularization surgeries.

The wound team requires education on the effect of LEAD and wound outcomes. There is a direct connection between LEAD, arterial wounds, and non-healing of any lower extremity wound. LEAD causes distal artery ischemia resulting in a chronic arterial wound that without improved blood flow can result in gangrene, cellulitis, limb loss, and death. For those who may have both LEAD and have a wound from other causes, the LEAD can prevent healing of that wound type or even result in unavoidable decline. Therefore, those with any lower extremity wounds of any etiology must have a lower extremity exam to evaluate for LEAD. If LEAD is present, improvement or restoration of blood flow must be addressed with lifestyle changes, exercise, medication, nutrition, modalities and surgical revascularization procedures.

LEAD can change patient-centered goals. For example, without restoration of blood flow to any existing wound, the LEAD may cause chronicity, prevent healing and result in pain, wound decline, limb loss or death. Despite the gravity of LEAD on outcomes and quality of life, assessment for LEAD, beyond checking pulses, is not a common or routine assessment within nursing homes. Therefore, it is probable that without wound team training, the non-healing nature of a wound may not be recognized or fully understood, leading to unrealistic healing goals, or missed opportunities for interventions.

LEAD and the impact on wounds is an under recognized issue for the nursing home population. For example, nursing home residents are fully recognized for having PI

risk and therefore nurses and other team members perform pressure risk assessment routinely. However, the prevalence of LEAD is generally higher than that of PIs for this population, yet screening for this, a task that can be simply performed with a Doppler and leg observations, is not generally taught, expected, performed or even federally required. This is concerning as LEAD can convert even a minor skin tear on the lower extremity to a chronic ulcer at risk of decline and causing limb loss.

The increased prevalence of arterial disease and subsequent lower extremity chronic wounds is increasing due to population aging and other factors such as increasing diabetes, hypertension and hyperlipidemia (Star, 2020). The annual expense of lower extremity chronic wounds exceeds $20 billion annually. The expense is matched by approximately 200,000 subsequent partial and full amputations that also exceed $25 billion annually. Given that older adults have highest prevalence, the nursing home population is at highest risk. A person-centered team approach is required for preventative and management of the older adult in this setting. Any aggressive measures, such as surgical procedures for revascularization, must consider factors like anticipated life span and overall effect on quality of life. It is essential for the patient/person, family, and team to recognize that in certain cases, healing the person with a focus on quality of life may be more important than healing the wound.

Surgical consultation may be a team consideration. Revascularization can restore blood flow and, in many cases, decrease LEAD pain, support wound healing and prevent amputation. However, this invasive surgery poses risk for frail individuals, such as many older adults in nursing homes. For those with impaired cognition, multiple co-morbid

conditions, and frailty, this procedure could result in further cognitive decline, infection, and death. Takahara (2021) evaluated frail adults, many of which resided in nursing homes, and found that those who received revascularization had no significant improvement in regard to one-year mortality or limb loss vs. those that did not have the procedure.

A surgical approach may not improve the wound outcome by Takahar (2021) did note that there was a significant decrease in intermittent claudication pain for those who received the procedure, therefore, improving their quality of life. However, this study points to the importance of the team exploring the benefits and risks of options to support the resident/person and family in their decision-making. In the case of an older individual with multiple co morbid conditions who may have pain properly managed, the treatment of revascularization could be a deadly risk that is unlikely to result in any significant change in their outcome. Therefore, wound maintenance goals in which minimizing infection risk and maximizing comfort may have a preferred outcome on their quality of life.

PIs/Ulcers

Pressure injures are caused by prolonged pressure or pressure combined with shear force (NPIAP, 2019). A team approach is needed to address the complex risk factors. Risk factors include impaired mobility, nutritional deficits, moisture impairments, older age, anemia, oxygen perfusion deficits, neuropathy, impaired sensation or cognition, infection, as well as chronic diseases and polypharmacy. It is

believed that through a team approach that addresses mobility, nutrition, specialty surfaces, and skin care, most PIs can be prevented most of the time.

A team approach is essential in determining if a PI was unavoidable. There are cases in which those that are actively dying may develop skin failure, an unavoidable PI breakdown. These unavoidable may occur, not heal, or even decline despite interventions to mitigate risk, alluding to a complexity related to integumentary changes with aging and at life's end (Scarborough, 2018; Ayello et al. 2019).

VanGilder, et al. (2017), reported PI prevalence. 36,115 residents surveyed in the nursing home settings, of which 11% had PIs, those that were acquired within the facility ranged from 3.3% to 5.6%. Nursing residents were found to be age 74.7 to 77.2 years of age on average, older than any other setting. Although this study only had 3% of the national nursing home portfolio, Livesley and Chow (2002) found early on that 70% of those with PIs were geriatric.

The risks of PI development are multifactorial and require a team approach. Blackburn et al (2020) recognized the high risk for such residents given that > 25% had limitations with basic activities of daily living and require physical assistance for mobility, the primary PI risk factor. Mitchell et al (2009) found that 40% of nursing home residents with advanced dementia had a PI at the time of death. Given the mobility and cognitive risk factors alone in the nursing home population, the rate of PIs may exceed the estimations based on the small sample from VanGilder.

PIs are from pressure however, the breakdown occurs due to a complexity of issues, especially in the aging population. Those who have PIs are more likely to have

frailty, dementia, low BMI, anemia, and use of a urinary catheter (Jaul, 2013). PIs can cause pain, suffering, infection, hospitalization, and death (Effraim, 2017). Those hospitalized with a concurrent diagnosis of a PI have higher expense (Wang et al., 2019). Further, the presence of PIs can also negatively impact families, staff and the facility. Population aging will increase both the need for care for older adults with chronic disease management and mobility impairments, both of which significantly increase the risk of PIs (Kwong et al., 2020).

Alderden et al. (2018) evaluated the decline of stage 1 PIs in 6,377 patients in acute care and contributed to the literature in regards to risk factors for pressure development. The factors that were most significant for stage 1 decline included old age (> 60), increased serum lactate (related to renal failure and dialysis), low hemoglobin, and decreased oxygen rates. This is important as it speaks to the medical aspects of pressure ulcer development and decline that cannot be mitigated by nursing measures alone. This builds the interprofessional curriculum for providers to better understand the connection between medical conditions and PI risk and decline.

Nursing Homes

Nursing homes in the U.S. are federally regulated by the CMS. The first regulation for PIs was F314 in 2004. In 2017, this regulation was updated and relabeled as F686 (CMS, 2017). The intent of the regulation is that residents of nursing homes do not develop unavoidable PIs, and those with PIs receive care to promote healing. There are four constructs in this tag that must be met to meet the standard of the regulation for both prevention and management. These four constructs include: risk factor

identification prior to breakdown (including medical factors), provision of person-centered and standard of care interventions prior to breakdown, monitoring those interventions for any issues and identification of early changes in skin, and revision of intervention upon need (CMS, 2017). There is no evidence in the literature today examining the effect of these regulations, the understanding or interpretation of these regulations, or the validity of these regulations. However, the team approach requires examination of these constructs to determine unavoidable status.

The evaluation of an effect of teamwork is essential to guide patient centered care. Harrington et al (2014) found that litigation had most impact on quality care. However, this was a broad review and not specific to wound prevention or care. In a comparative review of international PI policies for prevention, there was a wide gap in use of evidence for guidelines (Jackson et al., 2016). Further, the researchers found that attention was more often placed on compliance, penalty and product use rather than the context of care delivery design and or nursing work structure.

Integrated Teaming

Integrating professionals into teams has been researched and supported in education to improve outcomes. Cox et al. (2016) published a meta-analysis of systematic reviews on health-related IPE from 2010-2014. This review list of recommendations to address current gaps in the research emphasized the benefits of interprofessional education on teamwork and outcomes. Although this work was not specific to wound teams, there has been emerging research in the area of interprofessional teams for decades, specifically for the geriatric population (Hyer et al., 2000). Further, PIs are

considered a safety issue and Stelfox et al. (2003) published a call to action and to expand research efforts to evaluate the impact of interprofessional teams.

Teamwork is a possible solution toward a more holistic approach to care. Worsely et al (2017) identified specific themes, such needed training and education regarding roles and perceived roles as well as the difference between the medical models versus person-centered care. This work was limited to only one hospital and a small sample size, decreasing generalizability. However, the findings were consistent with other team training research in terms of both the recognized benefits as well as the clear gaps with understanding interdisciplinary roles, a paradigm shift from medical-centric thinking to patient-centered and need to develop team-training skills.

Wound prevention and management today are expected to be performed based on evidence but continues to be a fragmented approach with disparity within the same discipline or same setting, between multidiscipline within the same setting or across settings, as well as between types of settings, states or countries (Moya-Suárez, 2018). Further, hierarchies continue to exist among team members, undermining trust in teams and or resulting in group-thinking (Moore et al., 2015). Incorporating evidence-based guidelines can help direct an effective team approach. Stern et al (2014) evaluated a wound team approach using an advanced practice nurse as the lead and was able to demonstrate an economic improvement through the decrease of expensive products that were not appropriate. The research did not yield a statistically significant improvement in healing rates; however, staff turnover rates and lack of leadership buy-in were both factors that may have prevented success. Campbell et al. (2006) evaluated the delivery of

evidence-based wound care using regional wound teams in a socialized health care system. Through a comprehensive review, they provide examples to discuss the availability of evidence-based guidelines now available and how those practices are seldom performed or evaluated in practice. This lack of awareness on all levels has resulted in disjointed care that increases mortality and morbidity and causes considerable expense to the healthcare system.

Howell et al. (2018) added to the conversation about teaming in their evaluation of a formal evidence-based framework in an electronic medical record for providers to use for wound management and as a tool to guide medical practice. The researchers provided a foundation for why this is needed by providing basic information on the complexity of managing wounds given all influencing factors. This speaks to the complexity of wound management and helps to guide on key factors for the providers role in the team. Although none of the cited studies provide research directly related to interprofessional wound teams in United States nursing homes, each have similar themes of success by teaming for improved patient and staff satisfaction in wound management and can be applied.

At a global level, the World Health Organization published the WHO Framework for Action in 2010 to support policy change to endorse interprofessional education for students and professions to improve health outcomes. Further, this framework provides supportive evidence for claims that collaborative practice is superior to independent practice. Areas that are generalizable to wound management include: appropriate use of a specialist for clinical care, improved outcomes for those with chronic disease, improved

patient safety, decreased staff turn-over, reduced risk of negative outcomes such as hospital admissions and medical errors. Additionally, collaboration results in improved patient and career satisfaction and increased acceptance of treatment by the patient (WHO, 2010; Sheehan et al., 2017) the benefits of an interprofessional teams are recognized at a national and global level, what and who constitutes a team, and specifically a wound team, continues to emerge.

Aligned with a patient-centric approach, the wounded person is a team member. The professionals on the team need to assess the knowledge base, history, and health literacy of the wounded person to create an individualized approach that the team can adopt. As per the AAWC Patient Bill of Rights (2014), the wounded person should have explanation of wound type etiology, proposed treatments, and risks, communicated in layman's terms.

Moore et al (2014) proposed a team approach to wound management and found that there were 13 unique published guidelines on wound care at that time, all of which recommended a team approach for any type of wounds all supported a team approach. Moore et al (2014) recognized that who and what constitutes the wound team lacks consistency. For example, teams vary from settings (acute care, surgical office, wound center, skilled nurses) to specialties (podiatry, vascular led) to wound types (diabetes, pressure, venous leg, etc.). Further, wound care teams may focus on either management of actual wounds or focus on prevention of wounds, such as with PI. Moore et al (2014) completed an 18-year retrospective literature review of outcomes related to wound teams and created the UWM. The benefits of approaching wound management as an

interprofessional team include decreased limb amputations, decreased pressure ulcer rates, improved healing outcomes, improved patient behaviors (related to adhering to a wound program), and improved patient satisfaction and quality of life.

Modeling/Simulation

Team collaboration, particularly across disciplines in health care often requires a new and shared mental model that can be formulated through modeling. Modeling teamwork can be achieved with videos, simulations, and/or scripts that teams can practice learning new ways of interaction. Moore et al. (2014) described a barrier to patient-centered team approach is the lack of both professional education to teams and socialization of professionals. They recommend that programs intended to teach a team approach have a primary objective of teaching the team to have a common goal and the curriculum should include role-play, simulation, and moderated case discussions. Simulation may be especially useful for team members of different disciplines to then emulate their specific role. Gellis et al. (2018) demonstrated simulation learning with their evaluation of interprofessional teams of students consisting of: medicine, nursing, social service, therapy, and pharmacy. Using simulation learning, pre/post-tests and post satisfaction surveys found improvement in team efficacy and satisfaction. They also recommended additional research in real settings with outcome measurements of performance to improve generalization. This work was grounded in SCT and used an interprofessional framework.

Simulation training fits within the schema of SCT as it is essentially modeling preferred behaviors. Simulations were case studies based on competencies from the

Interprofessional Education Collaborative (IPEC), along with TeamSTEPPS triggers, to increase engagement. The simulation training used modeling and ultimately, practice improved teamwork for cancer care. Although this was not specific to chronic wounds, it is logical to posit that it is applicable to the concept of teaming for wound management as well.

Simulation training can facilitate team engagement at an emotional level for positive outcomes with complex conditions. Simulation training can empower and improve communication as a foundational step to achieving positive team behavior. Rotgans et al. (2017) found that incorporating team-training simulations for undergraduate students increased their cognitive engagement. Gellis et al. (2018) explored simulation training for palliative teams with the person-centered approach. The teams collaborated to address multiple chronic disease conditions, psychosocial aspects, and overall physical functioning of those in palliative care.

The teaming simulations have resulted in an improvement in creating person-centered plans to improve quality of life, a significant departure for the traditional medical model. A similar finding by Liaw et al. (2017) occurred with medical and nursing students were team trained with simulations based on a declining-patient scenario. Again, the researchers included TeamSTEPPS constructs such as the SBAR, Callback, Debrief, and Reflection to simulate and practice leveled team communication. The results further bolster support for simulation team training for complex medical conditions, including improved teamwork, team satisfaction, and team clinical confidence (Liaw et al., 2017).

Liaw et al., (2017) used TeamSTEPPS framework to teach core inter-professional teamwork constructs, such as teamwork, roles and responsibilities, communication, learning/reflecting, patient focus, and ethics. This work was grounded in Kolb's experiential theory that describes how simulation training can provide the constructs of concrete learning. Alternately, the TeamSTEPPS debrief added to the construct of reflective observation and resulted in a mental model called abstract conceptualization which may be applicable in actual clinical practice. This is well suited for simulation training and may be combined or aligned with the social cognitive theory in applying my wound-simulation training with using photos for team training.

Shared Language

Establishing a shared language for wound management in nursing homes across the team unifies the team and creates the possibility for one plan of care for the patient/resident, rather than multiple, and often competing and mismatched plans by each discipline. First, a shared language means team wound literacy around basic wound types, chronicity, as well as intrinsic and extrinsic factors that can cause a wound or prevent healing. Further, it requires an understanding of possible outcomes that extend beyond healing, such as maintenance and comfort or palliative wound related goals. This can be achieved with basic education and handouts.

The first step in defining a wound team type is to understand the different terms used in literature to represent team types. Many groups of clinicians self-define themselves as a team, but the definition of team varies greatly Sheehan et al. (2007) distinguished team types as interprofessional, multidisciplinary, and transdisciplinary.

The characteristics of an interprofessional team include a shared language, goal, and collaborative approach between disciplines. A multidisciplinary approach differs in those different disciplines are engaged for the best outcome of the patient/resident, but work independently, in siloes, likely with discipline specific goals. This team type is common in a medical centric approach. A transdisciplinary team is described as multiple disciplines that work collaboratively with the same language and goal, but also learn from each other and in some cases are cross-trained (Batorowicz B, & Shepherd TA, 2008). Although this is an attractive model that may work in countries not bound by strict practice acts, this could present an issue for some disciplines in the United States where the guardrails for practice are well defined and a widening of practice margins could risk licensure.

Wound teams in nursing homes require a common language to engage across discipline barriers, a shared patient-centered goal, and collaboration to collectively achieve the optimal outcome. Therefore, this model represents an integration and collaboration of inter-professionals.

Core Values

Stadick (2020) determined to understand the constructs of an effective health professional team amongst providers, nurses, physical therapist, speech therapists, radiologists, and spiritual workers. Stadick acknowledged that lack of teamwork was associated with poor staff satisfaction and retention as well as increased medical errors and poor patient outcomes. Findings from this work demonstrates that constructs of a successful team are not inherent in individuals, within policy, or within a profession, but

rather stem from core values with communication skills and role knowledge, which can be taught at a professional level, within practice settings. Stadick determined that collaboration requires integration of certain principles such as trust, respect, validation, and valued relationships. Adding to this conversation, Kim and Ko (2014) sought to evaluate a teamwork values and found that attitudes of the team members effects success. Therefore, evaluating team members' core values, attitude and developing a curriculum intended to improve mutual respect and buy-in of the team, may be an essential component of success.

Adding to this conversation, Rotgans et al. (2017) found that values, such as a growth mindset, humility, respect, and curiosity, could improve team dynamics, patient outcomes, and team satisfaction. These values can be identified, established, and practiced by the team through relationship building activities.

These core values established as expected behaviors that are both modeled by leaders and required by the team. Holding team members accountable for core value behavior builds trust and harmony within the team (Rotgans et al., 2017). Sheehan et al found that communication styles and specific language used are markers of the type of team, or lack thereof, in health care. Further, shared languages are a hallmark of a developing team and role modeling of such shared language is a recommended strategy in team development. Additionally, understanding ‘roles’ was important, but not as important as being able to feel comfortable in expressing oneself and feeling that

opinions are valued. The IOM (2012) found that teams that value curiosity, discipline, creativity, and humility function at higher levels.

Discipline Roles

Chronic wound prevention and care require multiple skillsets from multiple disciplines for the best outcomes. The wound team has multiple disciplines addressing areas within their own expertise. Providers, physicians, advanced practice nurses, and physician assistants, serve the wound team in addressing co-morbid conditions, circulation, wound type diagnosis and prognosis (Somayaji et al., 2017; Ogrin et al., 2015). However, Lindsay et al (2017) point out the lack of wound care education in medical curriculums for providers. Sen (2019) provided more detail in research that surveyed 55 medical schools, only 7 offered a wound healing elective. On average, typical wound education does not exceed 9.2 hours leaving providers with limited knowledge in wound management and unlikely knowledge of the roles of the wound team

Nursing has a role in the assessment of risk, skin, and wound as well as providing treatments and interventions. Moya-Suarez et al (2018) endeavored to understand the lack of nursing adherence to common expected pressure ulcer prevention strategies in an observational study in a high achieving hospital in Spain. Nurses from all units completed a questionnaire. Although this work is not generalizable to other settings or to lower performing hospitals, their findings corroborate current research in guideline adherence. There is no relationship to number of years as a nurse, education/degree, or sex in terms

of pressure ulcer protocol adherence. The relationship to adherence or lack thereof was with the setting in which the nurse worked, typically, those that work on higher risk units, like critical care are more adherent. Secondly, the primary areas that were lacking included re-evaluations of risk and use of specialty surfaces.

A team approach includes leadership, as well as other disciplines, to collaborate. The nursing assistant is the only caregiver in a nursing home that works directly with residents and families every day. De Meyer et al. (2019) stated training of the nursing assist can improve knowledge of PI prevention but most training remains geared toward nursing.

The role of the therapist may include mobility, positioning, adaptive equipment, swallowing, debridement, and modalities. There are numerous examples of the contribution of the therapist. For example, Darimela and Killi (2018) evaluated 160 patients with type 2 diabetes in an outpatient clinic. The researchers compared four cohorts, those that served as a control, those that performed yoga, those that performed strength training, and those that performed a walking program, all under the direction of a physical therapist. The results found that all activity, from yoga to strength training and walking had an impact on lowering blood sugars and blood pressure, however, the strength training was the most significant. Although this outpatient population does not represent the nursing home population, this aligns with historical studies finding the benefits of exercise on blood sugar management and blood pressure. Electrical stimulation and exercise are both performed by a therapist to promote healing. Almansi et al. (2021) completed a randomized controlled study evaluating those with diabetes and

arterial insufficiency. In this study of two groups receiving traditional therapy, one of the groups also received electromagnetic therapy while the other also received high intensity training. Both groups improved their endothelial function and blood flow, however, the group receiving electromagnetic improved at a significantly significant level. This is important as blood flow and endothelial function are primers of wound healing, and a lacking is often a cause for chronicity.

A team approach requires that all disciplines are engaged and have voice in determining what is possible for patient centered wound prevention and management.

Patient-Centered Care

Patient-centered care is at the heart of aspirational health care delivery design, required by Medicare, and expected by consumers. However, patient-centered care requires an approach in which the patient and when appropriate, their family, is engaged as a team member, actively directing in their own care. Therefore, patient-centered care is a team approach. For a patient to be a decision maker, they have to be aware of their options, and that requires a team beyond the patient and one practitioner in most cases. Chronic disease management requires an inter-professional team approach. Cox et al., (2016) evaluated interprofessional education intended to improve patient-centered care and team approach, and ultimately outcomes. A major gap recognized by Cox et al (2016) was a lack in measurement and therefore outcomes specific to patient and family satisfaction. This is an important finding is important as patient satisfaction is a key determinant in effective patient centric care.

Smallwood et al. (2019) evaluated a new integrated patient-centered team approach for palliative care to determine if this model of delivery improved patient and staff satisfaction. This work found improved patient and staff outcomes with an integrated approach. This palliative model is team based and patient centric. The patient is an active participant of the team and drives all care options. In some cases, the patient and family may opt for a primary goal of comfort over aggressive treatments. Those with chronic wounds may also opt for comfort rather than aggressive care, especially if the treatments may severely impair quality of life and/or life expectancy may not align with treatment trajectory. This study supports the concept of a successful patient-centered team collaborative model that renders improved patient outcomes, even if the outcome wasn't specifically, healing the disease.

Hung et al (2019) researched person-centered care in 16 LTC centers in Taiwan. They used a used a hierarchical multiple regression analysis to evaluate responses from a survey of 366 caregivers using the Person-Centered Care Questionnaire. Their interest was the effect of person-centered care on productivity, job satisfaction, and organizational commitment. They reiterated the WHO 2016 commitment to person-centered care as the preferred humanistic approach to care. Further, they described person-centered goal as a shift away from a biomedical model and toward a framework in which the patient is informed and the locus of control in establishing goals and a plan of care. This research supported the idea that long-term care centers that use this framework have an improved level of job satisfaction, organizational commitment, and productivity. This is directly applicable to a wound model in long-term care. The current 'medical

model' assumes that wound healing is always the goal, at all costs, regardless of what that may take to get to healing. For older adults in long-term care, quality of life may be their goal, and certain wound-healing pathways may not align with that. Person-centered care means ensuring the patient/resident and their family understand the pathway to healing, what that means to their day-to-day quality of life, and an estimated time it will take as total anticipated life span should also be factored in when deciding on lengthy treatments in which anticipate healing may be estimated to be longer than lifespan.

The World Union of Wound Healing Society (WUWHS) collaborated with the Lindsay Leg Club Foundation to publish a call to action for a patient-centered approach in wound management (Lindsay et al., 2017). Although a patient-centered team collaborative approach is endorsed for patient care in general, this document helps to unravel the issues related directly to the wounded patient that often prevent this type of approach. One of the most pressing is that wound management, in general, is not perceived to require a team approach by the team members expected to collaborate. Further, in alignment with patient-centered care in general, the team needs to communicate with the person and team effectively, with compassion, empathy, and ensure dignity of the patient/person (Lindsey et al., 2017). It is also important that the wounded person, and family when appropriate, be actively involved as team members. This requires clarity on wound type, prognosis, estimated time for treatments or interventions, associated risks of treatments and interventions, and what to expect from wound care.

Instruments to Evaluate Patient-Centered Teaming

Cox et al. (2016) synthesized research from 2011-2014, including a meta-analysis of systematic reviews and found that most Inter professional Education (IPE) and actual teamwork was not measured by validated scales but rather by chart reviews. Some IPE programs had been evaluated using the Kirkpatrick typology or the expanded Kirkpatrick typology. Reeves et al. (2015) commented on the saturation of program evaluations based on self-reported changes or satisfaction of a program, however, similar to Cox et al (2016), felt that evaluations based on observation of behavior would increase strength of findings.

The Team Performance Observation Tool is designed for teaming observations and was adapted for use for the patient-centered wound team program. The TPOT is an instrument developed by Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS). TeamSTEPPS is a publically available program that was developed by the Department of Defense and the Agency for Healthcare Research and Quality (AHRQ). The TPOT is posted on the AHRQ for public use and modification are allowable to meet program needs (AHRQ.org). TPOT is a tool that uses a 5-point Likert scale to rate the quality of generic team skills. Observing specific behaviors reduces subjectivity, improving the reliability and validity of evaluation measures (Rosen et al., 2008). The TPOT continues to be used in teaming research, for example, Shortridge et al. (2019), used the TPOT to evaluate an interprofessional collaboration training of NP, PT, OT students. In this example, the TPOT was modified to meet specific competencies of the training and participants self-rated, rather than observed scoring. Sixty-Eight

participants completed the instrument. The TPOT was found to have good internal reliability with Cronbach's alpha of .91. In another example, Zhang et al. (2015) evaluated the psychometric properties of the TPOT using scenario simulations and determine satisfactory validity and reliability as well as test-retest reliability (Kappa= 0.707 $p<0.001$). The researchers found that when using the behavior triggers during a simulation, the TPOT had decreased subjectivity, was valid and reliable. The TPOT has been adapted for wound teaming by the program trainers and is currently used and collected pre/post by the program trainers as a coaching tool.

Summary and Conclusion

Chronic wounds are a complex issue that disproportionately affect older adults and are increasing as population's age. In addition to advanced aging, chronic wounds disproportionately affect those with chronic diseases and lead to nutritional impairment and impaired mobility. They have high prevalence and incidence among nursing home populations. Management of these wounds requires a multidisciplinary approach as not one discipline is sufficient for this complex condition. Furthermore, the medical-centric approach to care continues to persist in nursing homes, contributing to dysfunctional teamwork and poor outcomes. This literature review included current evidence involving healthcare, discipline roles in wound management, and specific regulations. Team collaboration in healthcare improves outcomes; however, team collaboration for wound management in nursing homes has yet to be measured in nursing homes. Lack of clarity of provider roles prevents effective teamwork. Core values of teams such as mutual respect are essential for team success and need to be embedded into a wound team-

training program. Nursing home regulations should incorporate and require wound team training as well. Major reasons for lack of following evidence-based guidelines for wound management include lack of process, policy, and leadership.

One nursing home organization has implemented a novel patient-centered wound team program in its nursing homes across the U.S. This program is unique in that it addresses gaps in literature by structuring teams using the UWM. Further, the SCT was used to implement and sustain this program through specific delivery methods such as simulations and role modeling. Finally, the triadic reciprocal relationship between cognition, the environment, and behavior change was addressed along with policies, leadership, and hiring of certified wound skin health team leaders.

I evaluated effects of a novel program focused on wound team behavior and PI rates using secondary data from the TeamSTEPPS Wound TPOT, a valid and reliable instrument and PI rates. As patients and residents and nursing homes continue to struggle with increasing chronic wounds, this study may serve as a series of instructions for a patient-centered wound teaming. Further, this may be used to inform policy changes regarding wound management for all nursing homes in the U.S.

Chapter 3 includes the methodology of this study, the research design, sampling procedures, privacy, secondary data, and statistical analyses.

Chapter 3: Research Method

The purpose of this quasi-experimental pre/posttest quantitative study was to evaluate outcomes of a novel patient-centered wound team program in a group of nursing homes. This chapter includes the research design, variable selection, sampling, data collection procedures, and ethical considerations. I conclude with an explanation of data collection and analysis processes.

Research Design and Rationale

Variables

The novel patient centered wound program is the independent variable of this study. There are two dependent variables, which are team behavior change and facility-acquired PIs. Both of these variables were evaluated using pretests and posttests in participating nursing homes within this national organization. Further, the relationship between team behavior and PI rates was analyzed.

Design

The nursing home organization that has implemented this patient-centered integrated wound team is a national corporation. All nursing homes within the organization were presented with the new model based on the UWM, provided a new team checklists and guidelines, education, wa wound leader job descriptions, and a budget for a wound specialist team leader and team wound training. All nursing homes were directed to initiate this program starting January 1, 2022. However, given the nursing home staffing crisis and COVID infection rates, most nursing homes have been unable to focus on this new initiative, hire any staff, or provide training time to staff

overwhelmed by COVID infections. Therefore, only those centers that implemented the program were used in this analysis. Although those not initiating the program may seem to be a logical control to compare, the staffing crisis and high infection rates are both external and internal risk factors for PI development, potentially confounding results. Therefore, a preliminary pretest/posttest design was selected for analysis within only those nursing homes that implemented the program to measure only the effect of the program itself on outcomes and teaming without the influence of staffing or COVID.

Program Details

A nursing home organization implemented this novel integrated wound team program in 2022 with the intent to improve care and reduce PIs throughout the organization. The program framework was based on the constructs of the UWM including hiring a designated wound leader, establishing team roles, using a single medical record for the team, new metrics for PIs and a policy. The training and sustainability of the program utilized Bandura's SCT for behavior change that included specific education approaches to achieve team efficacy, including modeling and wound case studies as well as leadership support to influence the environment. Further, a validated tool, the Wound TPOT was used to observe teaming behavior, to provide team feedback, and to allow teams to goal set for continuous improvement. Daily communication meetings, weekly team wound rounds, and electronic medical records with a new photo application were used to help bridge all disciplines. Team cohesion was addressed through virtual and live team training modules, live virtual team wound discussions with a wound specialist coach, and use of the new photo wound application.

Remuneration is a method to reward staff and centers for teamwork and performance. This includes performance bonuses provided to all nurses and nursing assistants every month. Finally, companywide presentations to leaders, recorded videos, and a new website with resources were provided to all nursing home leaders and new skin health team leads. Lastly, skin health team leads completed a residency program consisting of four live interactive webinars, weekly coaching calls, and an advanced wound training workshop to lead the wound team. Overall, this program presented a paradigm shift away from a medical-centric band-aid approach to a patient-centered interdisciplinary integrated wound team approach

Bandura's SCT was the theory used for implementation and sustainability of the patient centered wound team. Bandura (2004) posited that behavior change does not occur purely due to education or information; but through a reciprocal relationship between education, cognition or choice in change, and an environment to support that change. Therefore, implementation of this program included simulation videos involving teamwork during wound management, checklists and practice guidelines, a new photo wound app embedded within electronic medical records for team discussion, at, a skin health team lead residency, and weekly team coaching calls to set goals and receive feedback. Further, the TPOT scale was administered as part of the training program and after full program implementation to observe team behaviors, to provide feedback, and to allow teams to self-set goals to achieve efficacy.

Population, Sampling, and Sampling Procedures

The target population of interest was the actual wound teams in each nursing home. This team may consist of a physician or advanced practice nurse or physician assistant, skin health team leader, registered nurse, licensed practical nurse, physical therapist, nursing assistant and registered dietitian. In some cases, families and residents/patients may also be key team members I used a convenience sample of all nursing homes within the corporation who implemented patient-centered wound team programs.

Data Collection

The timeframe for data collection was April 1 to December 31, 2022. A convenience sample of 20 nursing homes was selected for evaluation, after approval from the Walden Institutional Review Board (IRB). Although the entire organization is implementing this new program, certain factors such as COVID-19 and lack of staffing prevented full or timely implementation. Only those centers that fully implemented the program by April 2022 were included in this analysis. One center lost their skin leader and was removed from data analysis. Therefore, data from 19 centers were used in this analysis. This included publicly reported PI rates both before and after program implementation, as well as internally reported team behavior scores. PI rates and team behavior scores did not include any patient or staff names or personal information. PIs were reported as part of required documentation in each nursing home within electronic medical records and automatically uploaded into a data warehouse and reported publicly by Medicare. Team behavior scores were used as part of program training and collected

internally by program coaches using the Wound TPOT tool. The scores were stored on Google Drive according to center name only. The nursing home organization provided support and approval for the study based on Walden IRB approval (# 06-27-22-0723927).

I measured and analyzed both PI rates and team behavior observation scores, both secondary data. PI rate tracking is a Medicare requirement in all United States nursing homes. Residents/patients who develop PIs are evaluated at bedside and the PI characteristics, such as stage, are entered into the electronic medical record. This information is automatically generated into a national report of all PI in-house acquired rates, by stage. These reports do not contain any patient/resident information. These PI rates are determined by resident months to compare nursing homes of various sizes. This monthly rate will be evaluated for the sample, comparing the pre-test rate and the post rate.

The second variable, team behavior change, is a score that is generated during and after the program initiation. The training program consists of team training activities, observations of simulations, role modeling, and feedback loops, as per the social cognitive theory. A training component is use of the validated tool by TeamSTEPPS, the TPOT that had been adapted to focus on wound teams (Appendix B). The TPOT is an instrument developed by Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS). TeamSTEPPS is an available program that was developed by the Department of Defense and the Agency for Healthcare Research and Quality (AHRQ). The TPOT is posted on the AHRQ for public use and modification allowable to meet program needs (AHRQ). TPOT is a tool that uses a 5-point Likert scale to rate the quality

of generic team skills. Observing for specific behaviors reduces subjectivity, improving the reliability and validity of evaluation measures

The instructors use the TPOT routinely to coach the team, to modify their own behaviors in role modeling communication, and to provide for teaming communication. This tool is completed during the initiation of the team to determine the base score and to provide feedback for the team to goal set. Upon completion of the training and implementation of the team, the team is observed post-program by the instructor using the tool, to provide feedback and evaluate improvement. This tool is completed in google survey and the scoring will be provided for this study.

Organization Approval

This study was presented to this organization's leadership for approval. Approval to proceed in collecting the secondary data of both the pre-post PI rates and the Wound-TPOT scores were received by this organization.

Privacy of Center/Patient Data

Nursing home demographics, such as size, population age, state, staffing mix will be provided for this study by the corporations IT group. The corporations IT/outcomes group will provide the PI rates. The Wound-TPOT instruments are collected by program trainers and put into a google survey and will be emailed using a protected server. However, the Wound-TPOT and the PI rate data are both secondary, collected regardless of this study, and do not have any staff member names or patient/resident names. The nursing center name was provided with each PI rate and Wound-TPOT score in order to

analyze the pre-post data accordingly but was coded for privacy of the nursing home with a unique number to ensure the pre/post surveys align for analysis.

The collection of the PI rates is secondary data that is routinely collected by the nursing home and reported internally and publicly by all nursing homes and contains no patient level data. Therefore, consents were not applicable but permission to obtain and analysis the PI data directly from the nursing homes was required and received. Refer to Table 1 for sample PI rate data collection.

The second source of analysis is the pre and post behavior scores, also secondary data. The scores are generated from the Wound-TPOT, a validated instrument used routinely by the program trainers to both evaluate team and to provide team feedback. This tool is used routinely with program implementation and evaluation internally by the corporation and does not contain any staff member or patient/resident personal information. The tool contains the center name that was given a unique identifier and blinded for this analysis for the privacy of the nursing home center and the staff. The tool data is secondary data used for the analysis and consents are not applicable as the instrument used is routine regardless of this study. The researcher has access only to results and has no ability to identify participant or patient/resident information. There was no remuneration for participation in the team observation by the instructors as it is a standard routine requirement of the program.

Statistical Analysis

A convenience sample nursing homes that have adopted this patient-centered wound team program structured with the UWM and SCT was evaluated from one

national nursing home organization. Statistical analyses included Means with standard deviations (SD), reported for continuous outcome variables. Difference in means were assessed using a two-tailed t-test. Mean difference in pre- and post-test measures were evaluated with paired t-tests. Pearson correlation coefficient was used to assess linear relationships between continuous outcome variables. All analyses were tested for statistical significance at the alpha=0.05 level. Statistical analyses were performed using IBM SPSS Statistics (Version 28).

Threats to Validity

This study is observational in nature and can be used to assess associations, but not causal relationships. The use of a convenience sample may not provide results that are generalizable to a broader sample of nursing homes. It is expected that the implementation of the program improves a care team's ability to identify and treat PIs. Prior to implementation of the program, historical PI rates may be underestimated due to poor team behavior, which may impact the ability to evaluate the pre- and post-program change in PI rates.

Summary

The purpose of this quantitative study was to evaluate effects of a novel patient-centered interprofessional wound team that was structured using the UWM and delivered using Bandura's SCT. The design is a quasi-experimental pre/posttest with analysis of secondary data including standard and routinely collected team scores from the Wound-TPOT as well as publicly reported PI rates. Statistical analyses were used to evaluate the

effect of this program on PI rates as well as team behaviors. Further, I analyzed the relationship between team behavior scores and PI rates.

Chapter 4 includes nursing home demographics and processes for data collection of secondary data involving PI rates and team behaviors. Further, this chapter includes data analysis methods, results of statistical analysis, and a final summary.

Chapter 4: Results

Chapter 4 includes descriptions of data and findings. Descriptive analysis includes SDs and means of pre and post PI rates and team behavior scores. This chapter includes data analysis methods, results of statistical analysis, and a final summary.

Baseline Descriptive Statistics and Demographics

Nursing homes selected for this analysis were early adopters of a novel patient-centered integrated wound team program. Although all nursing homes within this organization are in the process of adopting this program, factors such as infection rates and lack of staffing delay timely or full adoption. Those same factors may also contribute to PI rates, centers who failed to adopt this program as a comparable control. Therefore, only those centers who had fully adopted the program were evaluated in this quasi-experimental research. The final sample size of 19 nursing homes was within the previously estimated sample of 15 to 20. Selected nursing homes were geographically diverse, located in 13 states and represented the typical bed count of the average nursing home (Statistica, 2023).

The entire organization has attempted to implement all aspects of this novel program; however, several factors prevented early or full adoption. First, the COVID-19 outbreaks prevented system changes, as the organization was focused on infection management and control of individual nursing homes. Second, staffing continues to be an issue in nursing homes. Hiring for new positions, or any position, continues to be challenging. Lastly, there was a learning curve for adopting a wound photo application that varied by center and held full adoption of the program in some cases. Finally,

success of skin health team leads continues to depend on level of acceptance and support within the center as well as leadership skills needed to help the center adjust to new concepts and roles. Despite these challenges, there were no adverse events related to the program. Ultimately, 19 centers were used in data analysis (see Table 2).

Table 2

Descriptive Statistics of 19 Nursing Homes

Nursing Home	State	Beds	Pre- PI Rate April, 2022	Post- PI Rate Dec, 2022	Pre-Wound TPOT Score	Post-Wound TPOT Score
A	DE	136	4.13	2.67	10	25
B	VT	142	0.81	0	18	20
C	RI	164	1.44	4.45	20	24
D	ME	90	7.23	4.58	10	19
E	WV	62	1.67	0	17	18
F	NM	45	0	0	20	25
G	PA	138	3.73	6.69	8	23
H	WV	115	0	0	20	24
I	WV	66	0	0	10	20
J	WV	124	0	0	10	20
K	MA	120	0.87	0	17	21
L	RI	130	4.63	2.78	14	20
M	AL	183	5.13	0	10	21
N	CO	146	0	1.19	10	18
O	KY	98	1.09	3.54	20	23
P	PA	130	5.60	0.81	16	19
Q	RI	138	3.57	2.62	5	18
R	AZ	157	0	0	0	20
S	NH	99	5.56	1.26	0	25

Assumptions

The estimated sample size was between 15 and 20 nursing homes. Nineteen nursing homes were included in the study, which was appropriate.

To perform a paired t-test, the dependent variable must be continuous, and each subject in the sample must be measured twice, resulting in pairs of observations. Each of the 19 nursing homes in the sample were measured twice with regard to PI rates and Wound-TPOT scores, once before the start of the program and once after the program was complete. Assumptions for paired t-tests were met.

To perform a correlation analysis, several assumptions must be met. Each variable must be continuous, each subject must have a pair of values (one for each variable), no outliers, or observations that are ±3.29 SDs from the mean, and there must be a linear relationship between each variable that is measured. Assumptions for conducting a correlation analysis were met.

RQ1

Prior to the study, PIPI rates among nursing homes in the sample ranged from 0 to 7.23 with a mean of 2.39 (SD: 2.41). After the program was implemented, PI rates ranged from zero to 6.69 with mean of 1.61 (SD: 2.03). Pre- and post-PI rates were moderately correlated ($r = 0.423$), but the correlation was not statistically significant ($p = 0.051$).

A total of 52.6% ($n = 10$) nursing homes saw decreased PI rates after the study was implemented, 26.3% ($n = 5$) reported no PIs either before or after the study, and 21.1% ($n = 4$) reported increased PI rates after the study was implemented. To determine whether the program impacted PI rates, mean differences in rates before and after the program were assessed using a paired t-test (see Table 3). The mean difference in PI rates was 0.782 (95% CI: -0.35, 1.91) and was not statistically significant ($p = 0.163$).

Table 3

PI Rates

Mean Difference	95%	T	dF	P-Value
0.782	-0.35, 1.91	1.45	18	0.163

RQ2

Prior to the study, Wound-TPOT scores ranged from 0 to 20 with a mean of 12.4 (SD: 6.4). After the program was implemented, Wound-TPOT scores ranged from 18 to 25 with a mean of 21.2 (SD: 2.51). There was a statistically significant improvement in in the Wound TPOT pre- and post-scores with a p value of < .005. All 19 nursing homes in the study demonstrated improved team behaviors with the program.

Table 4

Wound TPOT Scores Pre/Post T test

Mean	SD	Std Error Mean	CL Lower	CL Upper	T	Df	Two Sided p
8.263	5.352	1.228	10.843	-5.683	-6.729	18	<.001

RQ3

To determine whether changes in nursing home team behaviors were associated with changes in PI rates pre- and post-program implementation, Pearson correlation

coefficient involving changes in TPOT scores and PIs was conducted (r = -0.181; P = 0.458). No significant linear relationship was found between changes in TPOT scores and changes in PI rates

Summary

Chronic wounds in older nursing home residents is a societal issue that can impair quality of life, cause pain, infection, and hospitalization (Efraim et al., 2018). Chronic wound care increases staff burden and requires higher levels of education for a wound team app. Further, nursing homes also have regulations involving prevention and management of chronic wounds and impose significant financial fines as well as lowered quality ratings of centers with high wound rates. Wound care requires expensive treatment and time, further burdening the Medicare system and nursing homes. Given these issues, chronic wounds are a societal issue that is worsening in parallel with the aging population in the U.S. and rise of chronic diseases. A new approach to management is needed to prevent chronic wounds and improve team approaches to better manage chronic wounds.

I evaluated the effect of a novel person-centered integrated wound team that was built using UWM as the framework and Bandura's SCT to inform the techniques for implementation and sustainability. The UWM has been evaluated and recommended by experts in the field but has not been examined in the nursing home setting. One organization is attempting to shift away from the medical-centric approach to this novel person-centered wound team approach in order to improve outcomes. However, given continued COVID-19 infections and staffing crises in nursing homes, only 20 homes

were able to adopt this approach in full. One nursing home was unable to sustain the program during the evaluation period. Ultimately, 19 homes adopted and sustained this program from April to December 2022 and were used as the sample in this study.

Analysis consisted of paired t-tests for both PIs and TPOT behavior scores before and after the program. PI rates did not change in a statistically significant manner, but all nursing homes in the sample did have a reduction of rates, which may indicate a clinically significant value. Teaming behavior scores did improve between pre and post analysis in a statistically significant manner and the SD was reduced, indicating scores were more consistent across facilities. Lastly, associations between team scores and PI rates after the program was measured to evaluate whether higher levels of team behavior had an effect on PI rates. There was no statistically significant relationship between teamwork and lower PI rates in this study, but this could be due to confounding factors, such as inconsistency of PI rate measurement prior to the program due to lower quality teamwork.

Chapter 5 includes interpretation of data, along with social implications. Limitations and potential areas of further exploration and research are discussed.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quasi-experimental pre/posttest quantitative study was to evaluate outcomes of a novel patient-centered wound team in nursing homes. A nursing home organization adopted this program in 2022. A convenience sample included 19 nursing homes that fully adopted this model across 13 states. Person-centered wound teams are expected to provide holistic and integrated team approaches to care in order to address patient-driven goals and demonstrate improved outcomes in other areas of practice and settings (Leena et al., 2020; Miller, 2016; Somayaja et al., 2017). Nursing home PI rates, along with Wound-TPOT behavior scores, were compared before and after this novel program.

This study was conducted for five primary reasons. First, chronic wounds are rising in parallel with the rise of chronic disease and aging populations. Second, residents in nursing homes are highly susceptible to effects of chronic wounds due to their payment system and wound regulations. Fourth, nurses, providers, and therapists are not academically prepared for management and treatment of chronic wounds. In the case of chronic wound management, not one discipline has the full skillset to achieve patient-centered results. The final reason for this study is the gap in literature regarding person-centered wound teams in nursing homes.

Interpretation of Findings

Findings of this study showed person-centered wound teams result in a statistically significant improvement for team behavior and a clinically significant effect on prevention of PIs. Findings did not show a correlation between high team behavior

scores and PI rates; however, a larger sample size with repeated measures on a monthly basis may demonstrate this correlation over time. This study only had one pre and one posttest measure for both PI rates and team behaviors, which were measured between April and December 2022.

RQ1

Results of t-tests indicated no significant difference in pre and post PI rates for the 19 nursing homes in the sample. Therefore, for RQ1, it was necessary to accept the null hypothesis and reject the alternative hypothesis. However, it is noteworthy that the posttest PI mean rate did decrease for the majority of nursing homes and had a p value of .065, approaching statistical significance. Therefore, results are clinically significant. In reviewing results, it was noted that during the beginning of this program, an increase in PI rates occurred in most centers. It is possible that the focus on chronic wounds prior to implementation resulted in an increase in reporting of those wounds. It is also possible that despite training for the skin health team lead and wound team, other factors such as staffing crises, high agency use, and COVID-19 outbreaks led to lack of focus on chronic wound care. Skin health team leads reported they were often involved in other roles such as working the medication cart or covering other nursing shifts, and were therefore not able to fully engage as skin leader.

Integrated teamwork improves outcomes for geriatric populations in nursing homes (Hyer et al., 2000). This research contributes to literature by addressing solely practice of integrated wound management.

RQ2

A paired t-test was used to analyze team behaviors for the person-centered wound team. Results were statistically significant. Therefore, the null hypothesis was rejected. Team behaviors improved overall. Team training improves wound outcomes and communication in hospital settings (Lenna et al., 2020; Worsely et al., 2017). Worsely et al. (2017) found team training and role awareness were specific themes that needed to be addressed to improve PI care. Leanna et al. (2020) found improved team communication improved wound outcomes.

RQ3

RQ3 involved evaluating associations between team behavior and PI rates using a Pearson correlation coefficient. This was not statistically significant. However, a larger sample size with repeated measures over a longer period may result in different outcomes and should be evaluated. Additionally, inconsistency in terms of measurement of PI rate due to lower performing teams may have impacted my ability to measure this association.

Limitations of the Study

The first limitation was that the number of nursing homes within the organization that could fully implement the person-centered wound team was limited by other factors, such as outbreaks from COVID-19 and the nursing staffing crisis. The outbreaks created a need to focus on testing, infection rates, infection management with all-hands on deck culture. The result of this is that the Skin Health Team lead had to focus on other areas and not skin or wounds or leading the team. Further, team wound rounds was very difficult to maintain in a crisis mode. Lastly, the nursing staffing crisis increases the

difficulty in hiring for a specialty role of the Skin Health Team Lead, when other primary roles and functions are not yet filled. To that end, a center with primarily agency staffing will not be able to sustain a program built on specialty training that is not currently a core curricula or expectation within academia or practice licensure.

The second limitation was the length of the study and use of solely a pre-posttest, rather than a repeated measure. Through team discussions, the teams felt that initially after the pre-PI rate, the teams noted an uptick of PIs related to ability to recognize and properly diagnose/categorize with the team based photo application in the electronic medical record. This rate was beginning to decrease, as noted with the post-test, and in theory, may continue to decrease. A longer study period with repeated measures is needed to test this hypothesis.

The third limitation in this quasi- experimental design with the convenience sample was the lack of any control group. This was intentional as the non-implementing centers were unable to implement due to infection rates and staffing, therefore discerning the effect of the program would be unlikely as any difference could be explained by the high infection rates and staffing crisis rather than lack of a program.

Recommendations

This study has potential for shifting the paradigm of wound prevention and management to a patient centered team approach for vulnerable people in nursing homes. The team-work behavior improvement was statistically significant. Although the reduction of PI rate was not statistically significant in the paired t-Test, it was approaching statistical significance and clinically significant. It is recommended that

future research include a larger sample size with repeated measures to evaluate the PI rate upon adoption, with the development of the team, and with maturity. Further, a larger sample size is needed to better measure the effect. Finally, a control group, although not possible for this study, would improve validity of the outcomes. A control group using the publicly reported data to compare this organization as a whole to other nursing home groups is possible as COVID-19 outbreaks decrease, increasing the overall sample size and allowing for a time series of repeated measures for the seasonality that may affect the PI rate. Further, evaluating the difference in the outcomes of regulatory required survey outcomes related to PI rates is recommended as a retrospective analysis once this program has been in place for more than one year, allowing each nursing facility the opportunity to have their program scrutinized by a survey team. This is also publicly reported and could be compared across organizations, increasing the sample size. Lastly, given the staffing crisis, evaluating the longevity and satisfaction of the Skin Health Team Lead, as well as the other professionals participating in a team approach, would add value to considering alternative care delivery models within nursing homes.

Implications

This study has potential to impact more than 15,000 nursing homes, the vulnerable adults that live in them, and the staff that care for them. First, this study is the first of its kind to evaluate the impact of an evidence-based model for wound management and prevention. The outcome of the PI prevention was clinically significant, and although more research is recommended, the notable PI decrease has a ripple effect on patient quality of life, on nurse burden, and on nursing home expense related to

treatments, survey tags, and litigation. Secondly, regulations require and experts recommend a team approach to wound management, however, this is the first program that offers a roadmap for the implementation using Bandura's SCT for behavior change. Given the statistical significance noted of the team behavior with this program, other nursing homes, and the regulations, should consider adopting or requiring this approach to care. This teamwork approach represents a shift in the paradigm from a siloed band-aid approach in wound management to a collaborating team. The use of the TPOT instrument may also help to evaluate teaming for wound management and can be used for training and on-going monitoring of team behaviors. Lastly, this research is a call to action for academic curriculum changes for providers, nurses, therapists, and others to incorporate an integrated team approach for complex medical conditions, such as chronic wounds.

Conclusion

Chronic wounds have devastating effect to the quality of life of vulnerable adults in nursing homes and are increasing in parallel to population aging due to increased chronic diseases and mobility impairments. Further, chronic wounds are expensive to Medicare and can result in regulatory fines and litigation for the nursing home itself. Finally, chronic wound care represent a nurse burden given the current med-centric band-aid approach that nurses, or any single discipline, are not academically prepared to manage. This is the first research of its kind exploring an evidence based person-centered wound team program in nursing homes. The results in the areas of PIs and teaming are promising as PI reduction was clinically significant. Additional research is recommended over to evaluate over a longer period with repeated measures and with a larger sample

size. The effect on teaming behavior was statistically significant, supporting Bandura's SCT on behavior change of the team. The positive outcomes of this research is an indication that more research should be conducted to explore potentially more significant findings as this work offers a solution to shift the paradigm of care for vulnerable older adults in nursing homes.

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Appendix A: Corporate Letter of Support

Genesis

April 20, 2022

Jeanine Maguire
1140 Virginia Way
Quakertown, Pa 18951

RE: PhD Health Education & Promotion Dissertation

Dear Ms. Maguire

On behalf of the Genesis Healthcare, I am delighted to offer this letter of support for your PhD dissertation research entitled, *Evaluation of Patient-Centered Integrated Wound Team in Nursing Homes.*

We see great value in your work and believe this research is aligned with our philosophy of establishing and maintaing best practices based on evidence. We fully support your plan to evaluate our centers that have implemented patient-centered integrated wound teams to understand the effect on pressure injury prevention and wound management. We look forward to the analysis of the results.

Genesis gives permission to conduct this research within our organization. Julie Britton, Senior Vice President of Clinical Operations, will be your Genesis HealthCare contact person and mentor. This project is approved under the conditions of Walden University IRB approval and may begin once that IRB approval is obtained.

Good luck with your project and please let me know if I can be of further ssistance.

Sincerely,

Julie Britton, DNP, MSN, RN-BC, GCNS-BC, FGNLA

Senior Nursing Officer

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Appendix B: Wound-TPOT

Wound- Team Performance Observation Tool (Wound-TPOT)
Adapted from TeamSTEPPs Team Performance Observation Tool (TPOT)

Center _____ Date: _____
Complete TPOT per/wound. Wound type _____
New/worsening _____ Re-visit _____ Other _____
Time to complete one discussion: 5-10 min____ 11-15 ____ 16-20 _____ > 21____
Team Members (Check off all that apply: Skin Team Lead, Provider, UM, CNA, DON, PT, RD, other)

Rating (select one): 1= Very Poor 2 = Poor 3 = Acceptable 4 = Good 5 = Excellent

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1. Wound Team Structure _____
    a. Skin-Health Team (SHTL) Lead is the facilitator- discusses who will be reviewed and why (new wound, non-healing, issue/declining wound). Provides foundational info.
    b. Each member has clear roles and responsibilities
        i. Provider discusses co-morbid/labs/meds
        ii. PT- mobility/modalities
        iii. RD- nutrition/labs
        iv. Nursing- wound assessment/treatments/pain management
        v. CNA- any patient concerns, interventions
        vi. UM/DON: Resident/family concerns and needs/ wound literacy
        vii. SHTL- holds each member accountable for any follow up
2. Leadership _____
    a. SHLT refers to all applicable Guidelines
    b. Maintains/refers to a follow up log
    c. Delegates as appropriate (as per GL's and Formulary)
    d. Empowers team members to speak freely and ask questions
    e. Determines who is appropriate team member to discuss with family/resident and/or determines if the resident/family should join group discussion
3. Situation Monitoring _____
    a. Discusses resident/patient and family concerns, wound literacy, etc.
    b. Cross monitors fellow team members with compassionate inquiry
    c. Fosters communication to ensure team members have a shared mental model of wound outcome goal
4. Mutual support _____
    a. Provides support as appropriate(ex- cna is unfamiliar with task, or nursing unfamiliar with tx, seeks information/labs, etc.)
    b. Provides respectful and constructive feedback to team members
    c. Models patient advocacy while considering benefits/risks of proposed treatments/interventions and patient goals/wishes- and wound literacy
5. Communication/documentation _____
    a. Ensures wound type and staging accuracy, providing coaching to teammates as applicable
    b. Models team member validation for input and behaviors
    c. Seeks info from all team mates, verifies information that is communicated
    d. Wound Care Plan captures appropriates risks, goals, and interventions
    e. Treatment order is complete and accurate
    f. Team note completed
    g. Skin check and risk assessment completed

Overall Rating: _____