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Wound Nurse Specialists' Pressure Injury Knowledge and Specialty Support Surface Preferences

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by
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Abstract

Low-level foam specialty support surfaces are negatively affecting the number of hospital-acquired pressure injuries that occur each year and overall skin health of acute care patients. Lack of knowledge by wound care specialists on different types of therapy could lead to patients not receiving the best possible specialty surfaces available. An online anonymous survey of 19 certified wound care nurses was conducted. The survey examined the nurses' knowledge of pressure injuries using the Pieper Zulkowski Pressure Ulcer Knowledge test (PZPUKT) and choice of specialty support surface for prevention of pressure injuries. One hundred percent of nurses scored 80% and higher on the knowledge portion of the survey. Eighty-eight percent of nurses chose the support surface which represents the most current evidence-based research. The preparation, certification and recertification for certified wound care nurses is sufficient to maintain a "good" and "very good" rating on the PZPUKT. Self-driven upkeep of education through literature and lecture by certified wound care nurses leads to choosing most current products with regards to research related findings.

Keywords: pressure injury, wound nurse specialists, certified wound care nurse, specialty support surface, hospital acquired pressure injuries, wound nurse pressure injury knowledge, nurse pressure injury knowledge, Pieper Zulkowski Pressure Ulcer Knowledge Test, PZPUKT.

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Table of Contents

Chapter I: Introduction

Hospital Acquired Pressure Injuries are preventable medical errors. Prevention relies on use of evidence-based knowledge to ensure supportive actions take place. Wound nurse specialists are at the forefront of this endeavor. However, given the extraordinary number of pressure injuries that occur each year, wound specialists may not be as prepared as we hope to make decisions that protect patients from developing pressure injuries. Wound specialists may lack the knowledge to manage pressure injuries once they occur or may not have the evidence-based knowledge to choose the most up to date therapy when assessing new patient products.

Low-level foam specialty support surfaces (chair cushions and bed overlays) are thought to negatively affect the number of hospital-acquired pressure injuries that occur each year and overall skin health of acute care patients. Lack of knowledge by wound care specialists on different types of therapy may have led to patients not receiving the best possible specialty surfaces available. This study used the Pieper Zulkowski Pressure Ulcer Knowledge test (PZPUKT) to score wound nurse specialists' knowledge on pressure injury (PI) identification, prevention and management. The study also surveyed the same group of nurses on their choice between three specialty support surfaces with varying levels of therapy.

Significance

Medical Errors

Individuals seeking medical care in an acute care setting typically have a specific reason for the visit, such as a stroke, heart attack, or surgery. Most consumers of healthcare expect the hospital environment to be safe when they seek treatment.

Unfortunately, mistakes do happen in healthcare settings. While the Institute of Medicine's (IOM) publication "To Err is Human: Building a Safer Health System" is over twenty years old, it is still widely accepted as a highly relevant and important publication (Kohn, Corrigan, & Donaldson, 2000). The IOM report highlighted the prevalence of mistakes, injuries and deaths occurring in United States (U.S.) healthcare each year and brought awareness to the serious issue of medical errors.

As staggering as the reported data was, many feel the actual severity of the problem was underestimated. Some healthcare workers shared they do not always report an incident for fear of losing a job or receiving serious reprimand (Rogers, Griffin, Carnie, Melucci, & Weber, 2017). An example of a medical error is the development of a hospital acquired pressure injury (HAPI). It is thought that more than 60,000 people die each year due to complications of pressure injuries (PI) in the U.S. (Petrone & Mathis, 2017). If the IOM is correct, then deaths due to unintentional PI development are underestimated as well.

Pressure Injuries

Of the potential medical errors that occur in healthcare settings, one specific unintended error is the development of a PI. Pressure injury is the current medical term for a wound that developed as a result of prolonged pressure on or near a boney prominence, sometimes in the presence of friction or shear (Bryant and Nix, 2012). Past terms used to describe this type of medical injury include decubitus, pressure ulcers, and bed sore. It is estimated that 2.5 million people [Agency for Healthcare Research and Quality (AHRQ), 2014] develop PIs each year. The cost of treatment for PIs in the United States is $11.5 million per year [Washington State Hospital Association (WSHA),

2020]. Patients seeking acute care for specific situations like heart attack or stroke do not anticipate that they may develop a secondary diagnosis as a result of being admitted to the hospital.

PIs are described based on level of severity called stages. The seriousness of the effects of PIs may not be understood by someone (i.e. patient, family member, caregiver, etc) who has never experienced a PI or perhaps experienced only a lower stage PI. Table 2: PI Stages details descriptions of the six stages of PIs including photographs to aid in visualization. PI stages range from intact skin with discoloration (Stage 1) all the way to the most severe category (Stage 4) in which bone, ligament, tendon or muscle may be exposed [National PI Advisory Panel (NPIUP), 2016]. Treatment for PIs vary. Less severe PIs may be resolved with use of ointments, while more severe PIs may require surgery to debride non-viable tissue interfering with wound healing. Some PIs may even require surgery to have a diverting colostomy to avoid stool from getting into wounds located near the rectum or perhaps weeks of intravenous antibiotic therapy.

PIs are a prime example of a shocking injury that can occur while a person is in the hospital being treated for their primary complaints. They are also a prime reason a malpractice suit may occur against an organization, with settlements ranging between $250,000 to $312 million per case (Petrone & Mathis, 2017). That is likely due to two reasons: 1) PIs can look so unbelievably horrific and 2) PIs are considered preventable in most situations. Prevention of PIs is important for all patients, but especially for those who have lost some or all ability to care for themselves since healing is even more difficult and resource intensive. PI prevention strategies are multi-faceted (AHRQ, 2014). There is not one single activity a healthcare provider can do to prevent a PI. To

help focus attention on the areas of risk that are most likely to lead to development of a PI, a variety of evidence-based tools have been created for assessing risk for skin breakdown. Examples include the Braden Scale for adults, Braden-Q Scale for infants and children, Norton Scale, and Waterlow Scale (AHRQ, 2012).

Assessing Skin Breakdown Risk

The most commonly used PI risk assessment tool utilized in acute care settings is the Braden PI Risk Assessment Tool (AHRQ, 2012). The Braden Scale for Predicting Pressure Sore Risk shows the in-depth manner in which the tool identifies areas of weakness. A score of 1-4 is available for the sub-scale areas of activity, sensory perception, mobility, friction & shear, nutrition, and moisture. The tool describes a narrative for each score value. The sub-scale scores are added up for a cumulative score (Bryant and Nix, 2012). Frequently it is the role of the nurse (RN) to calculate a patient's Braden score. This risk is typically assessed on admission, at least weekly and when changes from a patient's baseline occur (McNichol, Watts, Mackey, Beitz, & Gray, 2015).

A total Braden score of 18 or less indicates the patient is at risk for skin breakdown. As the total score decreases, the risk of PIs increases (Bryant and Nix, 2012). A Braden score of 15-18 is considered at risk, but low. A score of 13-14 is considered moderate risk, 10-12 is high risk, and a score below 9 is considered very high risk for PI development. As the Braden score gets lower, more aggressive prevention interventions are indicated. It is suggested that looking at each sub-scale score can aid in individualizing a patient's care plan (McNichol et al, 2015). Any sub-scale score that is

rated 1 or 2 indicates the patient is particularly at risk in those areas and interventions should be specific to those areas.

Skin Breakdown Prevention Interventions

Once the Braden score is calculated, the multidisciplinary team will create a prevention plan of care, specifying what skin breakdown interventions are initiated for the patient and on what schedule. Examples of category specific interventions include, but are not limited to:

Sensory perception → Elevate the heels off the bed to relieve pressure.

Mobility → Ensure an advanced support surface is in use.

Activity → Assist patient up to the chair or in ambulation.

Nutrition → Record food and drink intake; Respond to low intake.

Moisture → Use skin protectant to skin at risk for breakdown from incontinence.

Friction & Shear → Position head of bed below 30 degrees (if not contraindicated).

In addition to reasons already discussed, the occurrence of PIs are concerning to all stakeholders because they are painful, scary, can lead to longer hospitalization, complications or even death. They are expensive to treat, may require surgery, may lead to withheld reimbursement from insurance companies, and suggest the quality of care being provided is insufficient (Center for Medicare Services, 2106). Patients and family members expect healthcare providers to provide high quality, safe and effective care to entirely avoid prolonged pressure, friction and shear aggravation, and moisture damage to skin. If a PI develops, it is generally accepted that the care plan was flawed or was not

implemented correctly. Skin breakdown prevention interventions should be standard nursing care for all patients, regardless of provider orders.

Support Surfaces

A variety of PI prevention strategies exists. One specific strategy to relieve pressure and prevent PIs is through the choice of support surfaces. A specialized support surface should be utilized in particular when the mobility or activity score is 1 or 2 (McNichol et al, 2017). A support surface is a "specialized device for pressure redistribution designed to address management of tissue loads, micro-climate, and/or other therapeutic functions. Support surfaces include but are not limited to mattresses, integrated bed systems, mattress replacements or overlays, seat cushions and seat cushion overlays (NPIAP, 2019, Pg 4).

Support surfaces are frequently misunderstood by care providers due to the use of multiple model names chosen by companies to describe their products, therapy types, and education. Many healthcare providers focus on support surfaces for beds and mattresses and often forget that chair cushions are also a type of support surface. While ensuring support surfaces included in a patient's care plan is a critical first step, the features of specific surfaces matter as well. Support surfaces are produced with a wide range of materials (i.e. air bladders, foam, gel) each offering various methods of pressure redistribution. The outside cover material is also important in determining the level of injury prevention. This cover can be foam, plastic, or polyurethane among other materials.

Knowledge of the support surface options is a challenge for experts and novices alike. It is not uncommon for even wound care specialists to struggle with identifying the

type of therapy inside a support surface. The therapy is 1) frequently hidden inside a cover and 2) the support surface is usually called by a manufacturer's model name (i.e. Hill-Rom's Clinitron) instead of the category of therapy. A non-specialist nurse or certified nursing assistant (CNA) may potentially struggle even more with the types of therapy available. Many institutions create support surface algorithms for staff, but human error is common in their use. Facilities may also use multiple types of specialty mattresses due to negotiated vendor contracts, cost, age, and availability.

Wound Nurse Specialists

Behind the avoidance or occurrence of medical errors in healthcare is knowledge or lack thereof. For two decades the general public has ranked nursing as the most trusted profession (Nurse.org, 2021). Communities trust us to: Do no harm (maleficence), do good (benevolence), remain ethical, advocate for patients' rights and safety, and much more (Nurse.org, 2021). A nurse cannot succeed without knowledge growth. We receive knowledge multi-directionally such as in nursing school and new job orientation. We learn from continuing education units required yearly to maintain our licensure. It is worth mentioning that there has been doubt for decades on whether required education is enough to fulfill the amount of growth necessary for nurses to remain current and safe in their practice (Cooper, 1980). Many go back to school for advanced degrees. Scientific research gathers evidence-based knowledge, accessible in professional journals. Conferences and professional meetings allow for networking and learning. Finally, nurses learn from their mistakes, although knowledge growth can help to decrease such things.

Since the nursing professions' induction, nurses have cared for patients in all areas of specialties. As these generalists oversaw areas of expanding specialties, the need for

individuals to focus their attention in specific areas of nursing became evident. Wound care nursing was one such specialty. Wound care specialists came about through a relatively unrelated area. In 1961, enterostomal nurse training began through the efforts of Dr. Rupert Turnbill, a Cleveland Clinic colorectal surgeon, and his former patient Norma Gill (Corbett, 2012). The specialty grew to incorporate wound and continence care specialties. Everything came together in a mere 7 years to form the Wound Ostomy Continence Nurse (WOCN) Society in 1968, the largest, oldest and most prestigious organization of its kind (Corbett, 2012).

The WOCN Certification Board (WOCN-CB), via the WOCN Society, is considered the "gold standard" for certifying wound specialists. Achievement of any certification available through the WOCN–CB is defined by completion of:

- An approved curriculum
- Clinical hours with approved preceptors
- Extensive & challenging board exams
- Rigorous process for re-certifying every 5 years (Corbett, 2012)

Certification "gives consumers and payers some assurance that the designee has attained an expert level and agrees to engage in lifelong learning, with implied allegiance to best practice, leadership, safety, and achievement of superior patient outcomes" (Corbett, 2012, pg 190). Wound nurse specialists outperform their generalist nurse counterparts in specialty related topics (Aydin, 2019). Topical wound care (choosing dressings) is the tip of the iceberg. All systems of the body affect skin health and wound healing. Wound specialists are trained at varying levels to understand the association of pathophysiology and skin health [Wound, Ostomy, Continence Nurse (WOCN) Society, 2021].

Specialty certification has been known to improve all the following:

- Cost
- “Patient satisfaction
- Nurse Staffing
- Retention rates
- Workplace empowerment
- Patient outcomes
- Patient Mortality
- Patient safety” (Corbett, 2012, pg 190)

WOCN Society and WOCN-CB are accredited through the Accreditation Board for Specialty Nursing Certification and National Commission for Certifying Agencies. Accreditation indicates the program has had validity and reliability testing conducted by the certifying organization to support the credentials earned by participants (Corbett, 2012). As of 2012, even physicians were yet to have an official wound specialty certification process, leaving only self-proclamation as assurance.

The WOCN-CB tests for competency in multiple areas including:

- Anatomy and Physiology of skin and other tissue
- Factors leading to skin breakdown and wounds
- Policy creation and regulatory issues
- Wound healing and related barriers
- Assessments and documentation
- Wound management
- Topical therapy

- Responding to non-healing wounds
- Lower leg ulcer management (WOCN Society, 2018)

Certified Wound Treatment Associate. The WOCN Society developed the Wound Treatment Associate (WTA) program to respond to the increasing demand for wound knowledgeable nurses. WTAs provide optimal care under the care of a Certified Wound Care Nurse (CWCN) or Licensed Independent Practitioner (LIP) in the areas of skin health, acute and chronic wounds, as well as PI prevention program, and much more (WOCN Society, 2021). Requirements to sit for the WOCN-CB exam for WTA includes

1) Obtain Licensed Vocational Nurse (12-15 month program) or Associate Degree Nurse license (2 years).
2) Prepare for the certification exam via one of two preparatory courses or collecting 100 hours shadowing a certified wound care nurse.
3) For those who took a preparatory course, shadow with wound specialist for 16 hours
4) Pass the WOCN-CB certification exam to become a Certified WTA (WOCN Society, 2020)

Certified Wound Care Nurses. The full scope CWCN obtains certification via the WOCN-CB examination process by:

1) Obtaining a BSN degree (4 year college degree) or higher
2) Have 1 year nursing experience, and current clinical experience within the past 5 years
3) Prepare for the certification exam by attending one five preparatory programs accredited by the WOCN Society

4) Shadow with wound specialist for 40-120 hours depending on program.
5) Pass the WOCN-CB certification exam

Advanced Practice Certified Wound Care Nurse (AP-CWCN). An AP-CWCN is required to go through similar steps for certification but must have a masters or doctorate degree first. (WOCN Society, 2021)

The public's trust is motivation to stay current on literature, certifications, and knowledge. However, non-mandated education is entirely up to the individual. Given all states require a certain amount of knowledge growth in the form of continuing education credits to recertify their specialty nursing license (Cooper, 1980), one could assume elective education may have a history of being shunned. Specialists such as WTAs, CWCNs, and AP-CWCNs will need to participate in ongoing learning in their area of expertise. Specialists are frequently required to renew their certification on varying schedules, typically every five years [Wound Ostomy Continence Certification Board, (WOCN-CB), n.d.]. The main focus of this renewal is to ensure base knowledge is present. This could leave a large gap in specialists' knowledge if they are not motivated to pursue non-mandated education on current and upcoming topics.

Study Purpose

Ideally all beds in a research facility would have low air loss, alternating pressure surfaces. However, a specialized hospital bed costs upwards of $13,000 without considering additional features that can be requested (Sizewise, 2021). This is too steep a cost to initiate all at once for what can be hundreds and hundreds of beds in one facility. Meanwhile, it is thought that patient injuries are occurring and temporary action is needed. Additionally, all patients with an at-risk Braden score of less than 19 should

have a specialized chair cushion (McNichol et al, 2015) and thus a product must be chosen.

Many CWCNs have participated in research, including testing those non-specialists on their knowledge. Drs Pieper and Kowalski designed a reliable and validated test entitled the Pieper-Kowalski Pressure Ulcer Knowledge test (PZPUKT) to test PI knowledge among non-specialists **(**Pieper & Zulkowski, 2014). Scores were found in multiple studies to be unacceptable (Pieper & Zulkowski, 2014). With scores like these, mistakes are to be expected. However, how would wound specialists themselves score on this same test?

The purpose of this MSN thesis was to survey wound specialists on their choice of chair cushions and bed overlays for mattresses that lack microclimate control and alternating air therapy. Additionally, baseline knowledge by wound specialists on pressure injuries and prevention was surveyed using the PZPUKT. This baseline knowledge may allow researchers to comment on whether wound specialists are as prepared to make recommendations and suggestions for products related to PI reduction.

Theoretical Framework

Florence Nightingale, our revered mother of nursing, is considered the first modern theorist. During the Crimean war in the 1850's, she eschewed wealth and marriage to travel to the battlefront. There she found filth, starvation, and death. It was through persistent letters to her commander and a firm belief that the patient's immediate environment must be optimal for healing that she became infamous as a successful healthcare provider (Hektor and Dunphy, 2015).

She ensured the "556 handcarts and large baskets of rubbish…24 dead animals

including two dead horses" poisoning the water supply channel were removed and safely discarded (Hektor and Dunphy, 2015, pg 42). Soldiers were fed hearty broth and fruit instead of nothing, which was what the military physicians prescribed in response to dysentery. The barracks and hospital were scrubbed clean and lime washed while the patients were scrubbed until the rinse water ran clear. It was said she quietly but resolutely stood nearby to monitor, and if needed she would ask for the task to be repeated. The mortality rate of soldiers decreased unimaginably for their time, by 427 per 100 to 22 per 100 (Hektor and Dunphy, 2015).

While current day patient and caregivers are not at war, you could say that there is a battle for the best environment and tools possible to avoid developing PIs. Especially given these injuries are considered avoidable and could end a person's life. Environmental factors, including support surfaces, must be to a certain level of standard for patient health. The best tools possible can also offset what may be delayed or insufficient care related to nursing shortages and high RN to patient ratios. One of the most important tools is caregiver knowledge and level of expertise.

Problem statement

Low-level foam specialty support surfaces are negatively affecting the number of hospital-acquired pressure injuries that occur each year and overall skin health of acute care patients. Lack of knowledge by wound care specialists on different types of therapy could lead to patients not receiving the best possible specialty surfaces available.

Research question

Hypothesis #1

95% of participating wound care specialists will score a "good" or "very good"

rating (80% or higher) on the PZPUKT (revised 2020).

Hypothesis #2

Participating wound care specialists will choose non-powered, reactive air with immersion feature overlay (Figure 1) for both chair and bed support surfaces over other options. (See figures 1-3 for survey specific question, details and instructions for participants).

Definition of Terms

Common pressure redistribution therapies for support surface mattresses are outlined below along with other pertinent terminology. All are available in mattress form, but it is noted if the therapy is unavailable as a chair cushion.

Overlays

A specialty support surface that is laid over a traditional hospital mattress for the purpose of improving pressure redistribution and/or microclimate control.

Static Reactive

Static surfaces do not have a power source for adjusting the pressure redistribution. The cushion is frequently made of foam or gel. These surfaces are non-permeable, meaning there is no passage of air through the material. Foam resists "deformation, returning to its original shape after the stress (external force) that made it deform is removed" (NPIAP, 2019, pg 2). Gel surfaces are a "a semisolid system consisting of a network of solid aggregates, colloidal dispersions or polymers which may exhibit elastic properties. Gels can range from hard to soft. (NPIAP, 2019, pg 2). This therapy is available as a mattress overlay and chair cushion.

Static, Reactive Air

Connected air bladders allow air to move via resistance out from under an area of high pressure, such as that created by a boney prominence pressing into the surface, into a neighboring area to alleviate the high-pressure (NPIAP, 2019). In return, less pressure damage occurs to the tissue around those boney areas. This therapy is available as a mattress overlay and chair cushion.

Powered, Non-reactive Air

Powered, non-reactive air surfaces, also called Alternating Pressure (AP) therapy, cycle air in and out of cells on a schedule. The cells are typically alternated into two groups. Group "A" cells inflate, while group "B" cells deflate. They hold positions for a brief time before switching roles with group "A" cells deflating and group "B" cells inflating. This occurs regardless of the amount of pressure in any one area, but also keeps any one area from experiencing prolonged pressure for more than a short time (NPIAP, 2019). This therapy is available as a mattress, but not as a chair cushion.

Powered, Reactive Air

Similar to AP therapy, pumps move air out from one cell under or near the patient's boney prominences to another cell. In this case the air movement is due to the advanced technology of the surface which can detect the increased pressure from the patient's body weight. In response, the mattress pump moves air away from that high pressure spot to another in order to alleviate pressure (NPIAP, 2019). This therapy is available as a mattress, but not as a chair cushion.

Low Air Loss

Low Air Loss is a feature that addresses management of microclimate. Microclimate by definition is "The temperature and humidity in a specified location. For purposes of support surfaces, microclimate refers to temperature and humidity at the support surface/body interface" (NPIAP, 2019, Pg 4). Due to mobility, airflow over our body cools and wicks moisture away. In the case of bedbound patients, the parts of our body that do not receive airflow warm and sweat, leading to skin damage and negative effects on wound healing. This microclimate can be salvaged via low air loss, which releases air at the surface to cool and wick away body heat and moisture. This feature should only be used as appropriate. Some patients may not be appropriate to have moisture wicked away as in the case of a dehydrated patient [Wound Treatment Associate (WTA), 2016]. The benefits to countering dehydration must outweigh the risk of a PI. This therapy is available as a mattress, but not as a chair cushion.

Air Fluidized

Air-fluidized is a uses a fluid like medium made up of millions of tiny silicone or polymer beads that have air forced through it at high rates and pressure. Advantages of this feature are immersion and envelopment of the patient in the surface, experiencing lower pressure areas when in contact with body tissue (Fleck, Rappl, Simman, Titterington…& Lawrence (2010). Only one bed surface is available on the current market that may claim to be truly "air fluidized". It is this highest level of therapy (Fleck et al, 2010) and is a standard of care for advancing stage 3 and stage 4 PIs and for the 21 days following a myocutaneous flap surgery (Wound Source, n.d.). This therapy is available as a mattress, but not as a chair cushion.

Immersion Feature

Immersion is the sinking in of the patient's body into the specialty surface, leading to envelopment of the boy in the surface. It is a major feature of air fluidized surfaces. (Fleck et al, 2010). This therapy is available as a mattress, mattress overlay and chair cushion.

Group 1 Therapies

Reactive, static products as defined above.

Group 2 Therapies

Reactive static air surfaces such as those with communicating air bladders, and powered reactive and non-reactive surfaces such as alternating pressure and low air loss surfaces (Fontaine, Risley, and Castellino, 1998)

Group 3 Therapies

Air Fluidized surfaces as defined above.

Pressure Injury

An injury that occurs on or near a boney prominence from prolonged pressure with also potentially friction and shear (NPUAP, 2020).

Chapter II: Literature Review

A literature review was conducted on non-specialist nurses' knowledge of PI identification, prevention and management. Similarly, literature on wound nurse specialists' knowledge of the same topics was collected. Specialty support surfaces were researched in order to ascertain in which order the available therapies ranked with regards to preventing pressure injuries. Finally, literature was gathered on Florence Nightingale's Environmental Theory, which aided in creation of a Conceptual-Theoretical-Empirical (CTE) system model to guide this study (See Figure 4). Sources for the literature search included Public/Publisher MEDLINE (PubMED) and Cumulaive Index for Nursing and Allied Health Literature (CINAHL) via the Gardner Webb University library services, the WOCN Society Journal, and Google online search engine.

Keywords: Wound nurse, wound specialists, nurse specialist, Wound Treatment Associate, WTA, Certified Wound Care Nurse, CWCN, Advanced Practice Certified Wound Care Nurse, AP-CWOCN, support surfaces, specialty surfaces, PZPUKT, Pieper Zulkowski, pressure injury knowledge,

The Advantages of Wound Specialists

A quality improvement project was conducted at John Hopkins to determine hospitalists' familiarity with PI and neuropathic ulcer complexities. The results showed a majority of providers had no official wound care training and rated themselves as "lacking confidence" in PI and diabetic foot ulcers knowledge and management (Walker, Rahman, Gipson-Jones, and Harris, 2019). Barriers included: lacking knowledge, lacking resources, obesity as a conflicting comorbidity, provider education, information technology, organizational system factors, and interprofessional engagement. The

majority of providers welcomed more discussion and problem resolution. CWCNs and other wound specialists supplement the knowledge of LIPs and provide knowledge growth to their audiences (Walker et al, 2019).

In another study, 153 WTA course participants and 48 WTA Course Coordinators were surveyed. It was found that wound care knowledge and treatment skills improved after taking the WTA certification preparatory course. Course Coordinators saw PI incidents go down in their own facilities. Home health nurses were able to decrease their number of Visits per Episode (VPE) and also noted a decrease in supplies required. The organization's PI prevention programs was positively impacted as well (Ramundo, Coverston, Crumbley, Geiger, Jankowski…and Sutton, 2020).

In an attempt to expand the reach of the Certified Wound Care Team across 17 counties, "Field nurses" were trained via the WOCN Society as WTAs. The flow of work was managed using a new referral process so WTAs were not seeing patients before a CWCN delegated it. If a WTA did see a patient first, a meeting was conducted to review the case and approve the care plan, which may involve the CWCN seeing the patient as well. Ongoing education & development was led through a "shared governance WTA Practice Committee" held quarterly. Patients were served quicker, staff satisfaction increased and advancement occurred along the clinical ladder (Fisher, Kratovil, and Germansky, 2019).

PI staging is frequently very inconsistent, and this leads to obvious issues of tracking wound improvement or deterioration, reimbursement issues, and poor-quality plans of care. 59 nurses became graduates of the WOCN' Society's WTA program, and only these WTAs and CWCNs staged pressure injuries. This extended the reach of the

CWCN team's limited business hours from Monday through Friday to 24/7 as the WTA nurses worked all shifts. PI staging accuracy improved, earlier initiation of plans of care due to improved accuracy, and HAPIs decreased (Whaley, 2019).

Interdisciplinary teamwork is imperative to success in patient care. One study led by a CWCN sought to address the issue of missing links to traditional wound care nurse teams in the form of personnel and knowledge. 80 professionals became graduates of the WOCN' Society's WTA program. These professionals included "Skin team" nurses & nurses in all environments, Physical/Occupational Therapists (PT/OT), Case Managers, Physicians, and even needle exchange van & addition treatment clinic professionals.

The result was the reach of the CWCN team increased with addition of WTA nurses, and the efforts created a broad interdisciplinary wound treatment community (Walker, 2019). Hospitalists were inspired to identify gaps in their internal medicine practice. One ambulatory nurse expanded her practice in a head and neck clinic, while PTs became more involved in wound plan of cares, PI prevention and foot care. "Just in time" protocols were put in place for highly vulnerable people at discharge (i.e. homeless, addicts, etc.) to improve exposure to evidence-based medicine. Without the knowledge and influence of a CWCN to initiate this process improvement project, the "Circle of Safe Wound Care" in their community would not have been closed (Walker, 2019).

Support Surface Considerations and Rankings

While not the most represented topic in research literature, support surface comparison has come to show multiple themes with regards to which surfaces are superior over others. One study by Fontaine, Risley, and Castellino (1998) compared three types of group 2 surfaces with regard to shear force pressure readings. The authors

found that among group 2 surfaces, powered air mattresses are better than powered air-filled overlays which are in turn better than non-powered fluid filled overlays with regards to the negative effects of shear.

A very large study was conducted by McNichol et al (2015) entitled “Identifying the right surface for the right patient at the right time” that created what was thought to be the first support surface algorithm in literature at the time of publication. This study confirmed that high density specialized foam used in support surfaces marketed as specialized are better than a foam hospital mattress. The age of a product can significantly affect how well it will perform and once the item has “aged out” it should be discarded. There is no evidence for comparable effectiveness among group 1 surfaces (McNichol et al, 2015).

The same study concluded that alternating pressure (AP) surfaces were superior to standard hospital mattresses, and that both overlays and mattresses with AP therapy were comparable (McNichol et al, 2015). Patients with mobility and activity sub-scale scores of 1 or 2 when using the Braden Score for Predicting PI Risk calls for a specialty support surface. If a patient requires a specialty mattress, they will also require a specialty chair cushion (McNichol et al, 2015). When choosing such a surface, take into consideration if the patient’s plan of care includes facilitating mobility. Some beds and products are a hindrance to exiting the bed and working with physical therapy. For the purpose of preventing pressure injuries from forming, a reactive static surface is as effective as a powered mattress with alternating pressure. Finally, for the treatment of current PIs, not enough evidence is available to make a consensus statement on whether surfaces have comparable effectiveness or not (McNichol et al, 2015).

A study specifically on chair cushion compared a hospital recliner with no cushion, a specialize foam cushion, a non-adjustable air cushion. a non-adjustable air/foam hybrid cushion, and an adjustable air cushion (Slayton, Morris and Brinkley, 2017). The air cushions outperformed the foam, and all cushions were better than no cushion with regards to pressure alleviation. Other factors that affected the outcomes of this study were weight of the patient and their interaction with the surface. They also ruled out that the position of the chair, reclining versus sitting upright, affected the study outcomes (Slayton et al, 2017).

Whittemore (1998) conducted a literature review of the support surface research from the previous ten years. Of the 16 studies, several supported themes were noted. Alternating pressure, low air loss and static air mattress could all be considered comparable to each other for the purpose of preventing skin breakdown and were the superior choice of surface over specialized foam overlays. Four inch foam overlays were better than 2" foam and all aforementioned surfaces were superior over a standard hospital mattress except in one case. If the standard hospital mattress was quite new, it was found it may be comparable to either thickness foam overlay that was not as new. The definition of age in this case was a subjective one (Whittemore, 1998).

With regards to PI prevention, Beekman and Serraes (2019) utilized a static air heel lift cushion, as well as a static bed overlay and static air cushion. The newer product used has a unique configuration and is marketed as mimicking immersion therapy. Immersion therapy is a major feature of an air fluidized bed. The Repose product is "a combination of 2 urethane membranes. The inner membrane is inflated and provides static pressure redistribution throughout tubular cells that are oriented along the length of

the overlay. The second membrane is formed from a multidirectional stretch, vapor-permeable material. The combination of the 2 membranes provides pressure redistribution. The static air support surfaces come packed inside a pump, which enables it to be inflated and ready for use within seconds and ensures that the product is inflated to the correct pressure" [Beekman and Serraes, 2019, pg 1].

Common issues with human error and support surfaces that require addition of air for use is overinflation, and therefore creating a firmer surface than intended. The Repose has a safeguard against this concept. Another benefit of this particular product is the packaging, which is much smaller overall than most other brands. Storage is a very large concern when considering which products to choose. It can be the deciding factor, despite the negative affect choosing an inferior product may have on patients. This product will be included in the choice of support surfaces in this study's methodology in an attempt to test this study's hypotheses. The product is newer to the United States (Beeckman et al, 2019), and many specialists have likely not been exposed to it as much as other products.

Support Surface Standardization

Conducting research to compare quality indicators like PI incidence rate can allow clinicians to compare different products for support surfaces. This is time and resource intensive. The Support Surface Standards Initiative (S3I) was developed to provide methods in which to compare products (Stone, Brienza, Call, Fontaine, Goldberg, Hong,…and Sylvia, 2015). This set of systems is not for the purpose of passing or failing a product, but to quantify the "life" of a specialized support surface . The five tests that make up the S3I initiative are: Immersion, heat and moisture dissipation using body

analog, heat and moisture dissipation using grounded hot plate, measurement of horizontal sliding, and efficiency of envelopment. The final two were still in reliability and validity testing at time of print (Stone et al, 2015). Such a system would allow practitioners a quick manner in which to grade the effective life of their current and potential future products.

Knowledge of Healthcare Providers

The logical assumption is RNs should acquire pertinent knowledge to care for a patient safely and holistically. PI prevention and management is one area in which most RNs will encounter a need. Despite this, several studies have shown surprising deficits in non-specialists' PI knowledge. One study conducted in Turkey across five types of units in three hospitals surveyed 243 RNs and found that the mean score of the survey was 48.85 $\pm$ 11.99 out of 100 (Aydin and Karadağ, 2010). Fulbrook, Lawrence and Miles (2019) concluded a similar result in Australia when RNs at a very large tertiary care center had a mean score of 65% on the PZPUKT. Anything under 70% was deemed overall unsatisfactory. Another study surveyed 347 RNs attending the 2013 and 2015 Wound Management Congresses in Turkey using a modified PZPUKT with 35 items. The mean score was 57.37 $\pm$ 14.26 out of 100 (Aydın, Karadağ, Gül, Avşar, and Baykara, 2019). Both studies by Aydin (2010, 2019) listed the following as positively affecting the survey outcomes:

- Years of experience
- Level of education, particularly bachelor's or post-graduate level
- RNs who have received specific education in PI prevention and management

- RNs working in the Intensive Care Unit or wound clinics
- RNs who care for a higher number of patients with PIs each week,

Thirty-two critical care nurses were provided with the same PZPUKT in a 237 bed Veterans hospital in Mid-West United States (Miller, Neelon, Kish-Smith, Whitney, and Burant, 2017). The nurses had undergone a two-year education initiative and the PZPUKT was provided to measure current knowledge. The average score was 72%, with less experienced nurses (5-10 years' experience) scoring higher than experienced nurses of 20 or more years (Miller et al, 2017). The PZPUKT has three themes: prevention, staging and wound management. Staging scores were higher than prevention scores. Also, staging scores were higher in newer or younger nurses or for nurses working in the medical ICU (Miller et al, 2017).

Wound care specialists are expected to have a certain level of knowledge in their area of expertise. The creators of the PZPUKT found that nurses with a wound care certification scored a mean score of 89% while the mean score for nurses without a wound specialty certification was 76.5% (Pieper et al, 2014). The study also found incidentally that medical residents scored 69% on the PZPUKT, concluding that PI education should be included in their training (Pieper and Zulkowski, 2014). There is limited research on the use of the PZPUKT with wound specialist populations. Hypothesis #1 is focused on how wound specialists will score on the PZPUKT.

Theory of Environment

Florence Nightingale's Theory of Environment focuses on the client in the center of the model, and environmental factors surrounding the patient. If one concept surrounding the client is out of balance, the remaining concepts and the patient are

thrown off kilter as well (Zborowksy, 2014). Among these concepts are the environment, products being utilized, and knowledge of caregivers surrounding patients.

Nightingale made many changes to the barracks and other surroundings during the Crimean war. In her notes on nursing, she comments on the buildings architects' failure to create a healing environment. The walls were made of absorbent material (Zborowsky, 2014). One can only imagine what they absorbed. The bathrooms were defective. The great expanse of room that occurred between each window denied patients healing light and fresh air. The furniture was poorly made. The kitchens and laundries could not keep up with the demands of war (Zborowsky, 2014), or in fact even the smallest of demands. These were all altered whenever possible per Nightingale's instructions.

The products being provided as part of the environment are also part of the theoretical model. As a supporter of holistic medicine, Nightingale observed the physical care of patients, but also scrutinized things such as beneficial colors in the healing environment. She incorporated music into healing (Riegel, Crossetti, Martini, Goncalves Nes, 2021). Exercise seems like a modern convenience, with gym memberships and the running of marathons. However, Nightingale was already on top of this concept 200 years ago. She even used pets, lighting and flowers in healing (Reigel et al, 2021). Safe drinking water, so easily obtained by first world countries in the modern world, was known to be questionable in the 1800's. It was especially inaccessible for the soldiers of the Crimean war. This vital product, safe drinking water, was a large focus for Nightingale in her efforts to improve the environment (Hektor and Dunphy, 2015).

Nightingale would not have become so notorious if not for her knowledge. There is a natural critical thinking ability to her talents. However, she also sought official education. In 1851 she obtained training in Germany at the Institution for the Training of Deaconesses (Hektor and Dunphy, 2015). It was for those women who sought to become nurses, and for a wealthy individual, was quite sparse in comfort. Also due to her family's wealth, touring other countries was a common occasion. Nightingale used this time to tour hospitals and took notes on the happenings within (Hektor and Dunphy, 2015). All this collected knowledge was used to better train the nurses she was provided with during the Crimean War (Hektor and Dunphy, 2015). Her educational model was based on anticipation of patients' needs and in turn nurses performing related care (Riegle et al, 2021).

In conclusion, wound specialists are deemed extraordinarily important to the healthcare field, especially in guiding advancement of non-specialist nurses in the areas of skin health and wound healing. Wound specialist nurses scored higher than both non-specialists and medical residents on the PZPUKT, with an average score of 89% or "good". With regards to support surfaces, air fluidized surfaces with immersion feature are better than alternating air surfaces which are in turn better than specialized foam surfaces in the prevention of pressure injuries. This study's hypothesis sought to test similarly that wound nurse specialists would rate "good" or "very good" on the PZUKT, as well as choose the highest level therapy for a chair cushion and bed overlay. Of the three options, that is the Repose immersion cushion. Florence Nightingale's Theory of Environment emphasizes the importance of nursing knowledge, quality of products, and application or thus.

Methodology

The aforementioned studies included in the literature review have shown that non-wound care specialist nurses frequently score well below 70% on the PZPUKT, which is unacceptable. While we expect wound specialists to understand their area of expertise very well, we also could say the same for a non-specializing nurse to know this pertinent information as PI prevention is extremely important to all nursing.

On this point, wound specialists' influence in choosing products to aid in the prevention of pressure injuries is discussed. If specialists scored low, we hypothesized that they may not be prepared to choose PI prevention products that are aligned with the latest evidence based research. If specialists score well, we expected in the absence of cost comparison, they would choose the best product based on current literature.

Study Design, Setting & Participants

NC State wound specialists were invited to take an anonymous survey. The audience of wound specialists were members of the North Carolina Wound Ostomy Continence Nurse (NC WOCN) Group. Upon permission by the group's President Elect, invitation for the group members to participate was provided through the group's email list which included 122 people. Members of the NC WOCN Group are mostly CWCN, although other wound specialists were represented. The survey requested this information for clarification.

The survey used the PZPUKT (revised 2020). The PZPUKT was tested for reliability and validity (Fulbrook et al (2019). This study used a quantitative descriptive design. Participants were asked to complete the online survey administered via Qualtrics, which allowed for development of the actual survey and

collection of the answers in a succinct spreadsheet. The survey had three components: demographic questions, the PZPUKT, and a preference choice on type of chair cushion and bed overlay that are advertised as specialty support surfaces. Permission to use the PZPUKT was granted by one of the original creators and authors, Dr. Karen Zulkowski. The PZPUKT is a 72-item tool that has been tested repeatedly for reliability and validity through scientific research. Cronbach's α for the entire test and then each sub-scale (Pieper and Zulkowski, 2014) were as follows:

Full 72-item PZPUKT	0.80
Staging sub-scale	0.67
Wound description sub-scale:	0.64
Prevention/risk sub-scale	0.56

The PZPUKT questions are answered similarly: true, false or not sure. The test focused on PI identification, prevention and treatment. The PZPUKT authors have set the following ratings for test scores (Pieper et al, 2014):

- < 70% Unacceptable
- 70-79.9% Satisfactory
- 80-89.9% Good
- > 89.9% Very good

Data Analysis

Data was collected via Qualtrics and exported into a spreadsheet. Each nurse's test was manually graded and provided with a percentage grade out of 100%. The demographic information is further presented in graph form (see Figures 5-9).

Protection of Human Subjects

The audience of the survey were protected from any harm via use of an anonymous survey. Anyone contacted with a request to take the survey had every right to decline participation by simply not proceeding with no knowledge to the researchers. Permission to pursue the study was provided by the Gardner-Webb University Institutional Review Board.

Chapter IV: Results

A convenience sample of North Carolina CWCNs and AP-CWCNs were surveyed using the PZPUKT. In addition, they were asked to choose between three brands of chair cushions and bed overlays. The results strongly supported both hypotheses. Hypothesis #1 is "95% of participating wound care specialists will score a "good" or "very good" rating (80% or higher) on the PZPUKT (revised 2020)" while hypothesis #2 is "participating wound care specialists will choose non-powered, reactive air with immersion feature overlay (Figure 1) for both chair and bed support surfaces over other options. (See figures 1-3 for survey specific question, details and instructions for participants)".

Sample Characteristics

The North Carolina Wound Ostomy Continence Nurse (NC WOCN) group list serve contains 122 email addresses. Of the 122 individuals who were sent an email, twenty-one members (17%) responded to the anonymous survey. However, three responses were not included in data analysis due to incomplete test results (Table 1: Collected Data). Of the complete responses, 18 (94.7%) were female. Fourteen nurses (73.7%) work in acute care, one in home health (5.3%), one private practice (5.3%), one in an out-patient wound clinic (5.3%), one in the sales industry (5.3%), and one in a rehab facility (5.3%) (See Figure 5). One nurse (5.3%) is within the 20-30 years age group, four (21.1%) in the 31-40, two (10.5%) in the 41-50, six (31.6%) in the 51-60, five (26.3%) in the 61-70 years, and one (5.3%) in the greater than 70 years age group (See Figure 6).

Of the nurses surveyed, thirteen nurses (68.4%) have CWCNs, four (21.2%) have

AP-CWCNs, and two (10.5%) did not specify (See Figure 7). The majority of respondents (N=9, 47.3%) have 20 or more years' experience as a specialist, three (15.7%) have 15-20 years, three (15.7%) have 10-15 years, one (5.3 %) has 5-10 years, and three (15.7%) respondents have one to five years' experience (See Figure 8). The majority of respondents are educated at the baccalaureate degree level (N = 12, 63.1%) with 7 (36.8%) being educated at Master's degree level (See Figure 9). The four AP-CWCNs scored above 90% (very good range), and seven of nine nurses with 20+ years of experience scored above 90%. The three lowest scores of 83%, 83% and 85% were obtained by nurses with 20+ years, 15-19 years, and 20+ years-experience respectively.

Major Findings

The lowest PZPUKT score was 83% while the highest score was 94%. Average score, mean and mode are all 90%. Nurses with 20 or more years' experience had a test average of 90.5% (N=9), 15-20 years was 88% (N=3), 10-15 years was 89.3% (N=3), five to ten years was 83% (N=1), and one to five years' experience was 92% (N=3) (See Figure 10). Baccalaureate prepared nurses (N=12) had an average test score of 89.2% while Master's prepared nurses (N=7) had an average test score of 92.14%.

Fourteen nurses (74%) chose the Repose cushions in Figure 1 while two (10.5%) chose the EHOB brand in Figure 2. Three (15.8%) selected none of the options and zero nurses chose the 4" foam Geomatt in Figure 3. Eight baccalaureate prepared nurses (66.7%) chose Repose, one chose EHOB (8.3%), and three chose none (25%). Six Master's prepared nurses (85.7%) chose Repose while one nurse (14.2%) chose EHOB.

Seven nurses (77.7%) with 20 or more years' experience as wound specialists chose the Repose cushion, while two (22.3%) chose none of the three options. Two

nurses (66.7%) with 15-20 years' experience chose Repose, while one nurse (33.3%) chose none. All three nurses (100%) with 10-15 years' experience chose Repose brand. All nurses (N=1) with five to ten years experience chose Repose brand. One nurse (33.3%) with one to five years' experience chose Repose brand while two (66.7%) chose EHOB brand (See Figure 11).

In regard to continuing education on pressure injuries (PIs), only one respondent reported the length of time since hearing a PI lecture as being greater than one year but less than two. The remaining respondents (N=18) reported hearing a PI lecture in the past year. All 19 people surveyed have read a book or other literature on PIs in the past year.

Chapter V: Discussion

The catalyst for this thesis was an identified problem that lack of knowledge by wound care specialists on different types of therapy may lead to patients not receiving the best possible specialty surfaces available. Both hypotheses

- #1: 95% of participating wound care specialists will score a "good" or "very good" rating (80% or higher) on the PZPUKT (revised 2020) and
- #2: Participating wound care specialists will choose non-powered, reactive air with immersion feature overlay (Figure 1) for both chair and bed support surfaces over other options

were strongly supported in this study.

Implications and Limitations of Findings

Hypothesis #1 Discussion

In support of hypothesis #1, all 19 (100%) survey participants scored 80% or higher on the PZPUKT, with a range from 83-94%. All scores were within the "Good" and "Very Good" range as categorized by the PZPUKT authors, therefore hypothesis #1 was supported.

Given the various years of experience of the surveyed nurses, including those five respondents who only have one to five years' experience, this would suggest the training and certification exam requirements by the WOCN-CB are sufficient for preparation of a wound specialist with regards to passing the PZPUKT with a score of 80% or higher. Also supported for aiding in passing the PZPUKT is listening to lectures and reading literature on pressure injuries within the past year. However, a study limitation is no ability to identify if reading or listening is the stronger predictor.

The two supportive areas, requirements of certification and time since reading or hearing a lecture, may be non-predictive considering the majority of survey respondents have more than 10 years of experience. It could be postulated that WOCN experience alone improved PZPUKT scores. However, in the literature review it was noted that younger non-specialist nurses were more likely to have slightly higher scores on the PZPUKT than more veteran nurses (Miller et al, 2017). Many rationales could be considered including the possibility of a desire to prove oneself in a new role. Future studies may consider testing the wound specialist population at the same time as testing a non-specialist population. Most literature reviewed on this topic was greater than two years since completion.

With many facilities having a wound specialist, one may expect that benefits would include dissemination of their knowledge. This does not appear to be the case, given the scores of non-specialists on the PZPUKT. Limitations may include the specialist's own skills at sharing knowledge are lacking, the organization's administrators are not supportive in helping spread knowledge, or perhaps the environment itself is not conducive to education. And finally, nurses may not be receptive to attempts at education by wound specialists due to many reasons, one being the intensity and volume of work nurses are required to put forth. From research in the literature review, plenty of support exists for expanding the CWCN team to include WTAs and "skin nurses" to help in education and conducting care themselves in the best manner possible with regards to PI prevention and management.

The population surveyed was located in one state, North Carolina. This one location may have skewed the results for both hypotheses as the number of total wound

nurse specialists in the U.S. are unknown. The survey received 19 respondents, and may also under represent the number of wound nurse specialists in NC as the total number of CWCNs and AP-CWCNs in NC is unknown. A larger pool would be advantageous for future studies, as well as knowing the total number of wound nurse specialists in the U.S. Offering this survey to the entire population of attendees at the Annual WOCN Society Conference would allow a future study a much more diverse population and much higher number of respondents. More encouragement to the less experienced nurses could help in balancing the average years of experience, since more experienced nurses were likely to respond in this study.

Hypothesis #2 Discussion

Hypothesis #2 was supported well, if not as strongly as hypothesis #1. Eighty-eight percent of the 16 participants who chose a support surface from Figures 1, 2, or 3 chose the non-powered, reactive air with immersion feature overlay in Figure 1, while 12% chose EHOB. Immersion therapy is a significant feature of air fluidized beds. Air fluidized beds have shown the greatest healing rates for pressure injuries, demonstrating 2-3 cm decrease in wound size over one week as compared with 0.7 cm using a group 1 (foam/gel) or group 2 surface (alternating air) (Ochs, 2004). However, not all support surfaces with immersion feature are air fluidized and not all surfaces are available as air fluidized (i.e. chair cushions and bed overlays). Products such as Figure 1: Repose chair cushions and bed overlays do boast immersion therapy.

Studies support that use of alternating pressure beds in the case of myocutaneous flap surgeries (very aggressive attempts to repair severe stage 4 pressure injuries) showed consistent results with air fluidized support surface therapy (Fleck et al, 2010). There is a

degree of immersion in alternating pressure surfaces, with some brands having more than others. Given research supporting immersion therapy as such a high-level feature, it is the product in Figure 1 that seemingly matches the most current literature on specialty support surfaces of the three choices provided. Therefore the majority choice of Figure 1 (Repose surfaces) by 88% of the surveyed nurses is supportive of this population of nurses being mostly current with recent evidence based practice.

However, a study using the Repose cushion supports the cushion may not be as effective as advertised. One hundred and forty-four elderly nursing home residents on 32 different units in six facilities participated in the trial (Beeckman et al, 2019). Nine residents developed PIs, the majority being stage 2. Nine residents of 144 is a 5.1% incidence rate. Initial reaction was this rate is higher than acceptable and supports Repose may not be an ideal product.

A limitation of the study was it took place across six nursing homes in the same country, the per facility PI number would have been more indicative of how well the product performed. Also helpful would have been a previous PI rate. The spread-out population does allow for a lot of variance in the care provided by the staff at each facility. Beeckman et al (2019) did find that the time spent in a chair increased the chances of a resident developing a trunk PI. Beekman et al also discussed this study as a success for the product. More research with improving methods are suggested for the use of the Repose chair cushion and bed overlay.

Application to Theoretical/Conceptual Framework

Many suggest that the ideas and innovations of Florence Nightingale were over a hundred years ahead of her own time. Her knowledge of cleanliness for her soldier's

environment was the #1 reason morbidity and mortality decreased. She was intelligent, and had achieved a great deal of education, particularly for a woman. She chose better "products" for her patients, such as clean drinking water over polluted drinking water. Her patients grew to trust that she would ensure the best conditions possible were provided to them during healing.

No patient desires to have an unintended injury as part of seeking medical care. Patients do not want to develop a HAPI, want the most current and highest quality products, and trust nurses with their care (see Figure 4). In current day, it is through knowledge, choice of products and application of these concepts that support much of the Theory of Environment: the trademarks of best environment, superior products, and knowledge. Florence Nightingale's Theory of the Environment continues to apply to the current needs of patients and supportive healing environments thus aligns well with the intent of this study.

Implications for Nursing

Wound specialists are relied upon for dissemination of knowledge to non-specialist nurses, patients, and caregivers. Specialists act as conference speakers, journal and textbook authors, educators, administrators and much more. Direct care is provided by CWCNs and AP-CWCNs. Any void in knowledge will result in a void in education, accurate literature, and patient care. Wound nurse specialist obtain specialty knowledge through focused course work, certification examination, and continuing education. This preparation and lifelong learning leads to acceptable levels of knowledge maintenance and growth sharing as well as leads to choosing most current products in the absence of administrative or financial restrictions.

Recommendations

Wound specialists have many product options when making decisions regarding their use. Increased availability of specialty products may allow not only the exploration but sampling of a variety of products. Wound specialists may also be able to access the knowledge and expertise of sales vendors to answer questions.

This study presented limited details on support services for which the respondents were to choose. The study design of choosing a support surface may have been flawed due to providing limited information about the chair cushion and bed overlay. Additionally, the Repose items are newer on the U.S. market and may be more attractive as "newer and better" can frequently sell a product. A better approach in study design would be to allow each respondent to physically compare products in-person. Conducting a pilot comparison of all three products would also be an advantageous adjustment to study design. An additional question worth asking is whether the surveyed person was familiar with any of the products in their practice prior to making a choice.

Implications for Practice

This study has supported the certification method for wound nurse specialists as sufficient for passing the PZPUKT with a "good" or "very good" rating. In turn, the specialists were prepared in the majority to select the most up to date therapy possible for a chair cushion and bed overlay. What this implies is that wound nurse specialists can be quite relied on to carry out the requirements of their job, providing not only excellent recommendations for products, but also carrying out patient care and sharing their knowledge among non-specialists.

Conclusion

Low-level foam specialty support surfaces are negatively affecting the number of hospital-acquired pressure injuries that occur each year and overall skin health of acute care patients. Lack of knowledge by wound care specialists on different types of therapy could lead to patients not receiving the best possible specialty surfaces available. Additionally, many people are reliant upon wound specialists for knowledge sharing, and we must be certain the specialist's knowledge is being kept up to sufficient levels.

One hundred percent (N=19) of wound specialists surveyed in this study scored "Good" or "Very Good" on the PZPUKT. Increasing years of experience aided in higher scores on the test, as did having a Master's degree over a Bachelor's degree. The majority of respondents (N=14) also chose the highest therapy available in chair cushions and bed overlays based on evidence-based research: Repose brand with immersion feature. Experience and degree level did not have a positive or negative relationship with brand choice.

The preparation, certification and recertification for certified wound care nurses is sufficient to maintain a "good" and "very good" rating on the PZPUKT. Self-driven upkeep of education through literature and lecture by certified wound care nurses leads to choosing most current products with regards to research related findings. Implications for practice include accurate education of non-specialist nurses and providers and choice of most current products for patient care.

Additional research is recommended to further explore the results of a similar study design but from a more expansive audience, such as that of the annual WOCN Society Conference. When requesting nurses choose between different products, allow in

person access to the product so a more thorough analysis of the product is possible.

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Table 1

Collected Data

Respondent	Certification	Sex	Years Experience	Degree	PZPUKT Score	Time Since Last Lecture on PIs	Time Since Last Read on PIs	Cushion Choice
1	CWCN	Female	20 years or more	Baccalaureate	90%	One year or less	One year or less	Repose
2	CWCN	Female	10- <15 years	Baccalaureate	90%	One year or less	One year or less	Repose
3	AP-CWCN	Female	20 years or more	Masters	94%	One year or less	One year or less	Repose
4	CWCN	Female	1-5 years	Baccalaureate	94%	One year or less	One year or less	EHOB
5	CWCN	Female	15-<20 years	Baccalaureate	83%	One year or less	One year or less	Repose
6	CWCN	Female	>5 - >10 years	Baccalaureate	83%	One year or less	One year or less	Repose
7	CWCN	Female	15-<20 years	Baccalaureate	89%	One year or less	One year or less	None
8	AP-CWCN	Female	20 years or more	Masters	90%	One year or less	One year or less	Repose
9	CWCN	Female	10- <15 years	Masters	92%	One year or less	One year or less	Repose
10	CWCN	Female	15-<20 years	Baccalaureate	92%	One year or less	One year or less	Repose
11	CWCN	Female	10- <15 years	Baccalaureate	86%	One year or less	One year or less	Repose
12	AP-CWCN	Female	20 years or more	Masters	93%	One year or less	One year or less	Repose

13	CWCN	Female	20 years or more	Baccalaureate	85%	One year or less	One year or less	None
14	AP-CWCN	Female	20 years or more	Masters	94%	Greater than 1 year but less than 2 years	One year or less	Repose
15	CWCN	Male	1-5 years	Masters	92%	One year or less	One year or less	EHOB
16	CWCN	Female	20 years or more	Baccalaureate	89%	One year or less	One year or less	Repose
17	CWCN	Female	20 years or more	Masters	90%	One year or less	One year or less	Repose
18	CWCN	Female	1-5 years	Baccalaureate	90%	One year or less	One year or less	Repose
19	CWCN	Female	20 years or more	Baccalaureate	90%	One year or less	One year or less	None

Table 2

PI Stages Using NPIAP Classification System

Stage 1	• Epidermis is intact but discolored pink or red • Does not blanch upon touch	Photo removed due to copyright requirements
Stage 2	• Some degree of epidermis is lost. • Red, pink, or possibly white dermis is visible. • No depth, slough or eschar present.	 Author's own photo.
Stage 3	• Some degree of dermis is lost, exposing adipose. • Depth, slough, eschar are all possible. • Tunnels and undermining may be present.	 Author's own photo.
Stage 4	• Muscle, bone, tendon and/or ligament is visible. • Undermining, tunnels, eschar, and slough are all possible	 Author's own photo.
Unstage-able	• The wound bed has slough or eschar present in such an amount that most of the wound bed or a significant boney prominence is obscured.	

	• If muscle, bone, tendon or ligament is visible, the PI is a stage 4.	Author's own photo.
Deep Tissue PI	• Purple, blue or maroon discoloration of the epidermis is present. • The wound may be closed, or open. • The tissue exposed may be dermis or adipose. • If muscle, bone, tendon or ligament is visible, the wound is a stage 4.	 Author's own photo.

Figure 1

Repose Chair Cushion, Bed Overlay, Reusable Cover

- ✓ *Repose brand.*
- ✓ *Static reactive air with immersion feature.*
- ✓ *Low friction, low shear cover*
- ✓ *Permission to print photos provided by Frontier Medical*

Figure 2

EHOB Waffle Bed Overlay and Chair Cushion

- ✓ *EHOB Waffle.*
- ✓ *Static Reactive Air*
- ✓ *No cover*

Photo of EHOB brand chair cushion and bed overlay deleted due to copyright laws.

Figure 3

Geomatt Bed Overlay and Chair Cushion

Photo of Geomatt brand chair cushion and bed overlay deleted due to copyright laws.

- ✓ *Geomatt. 4" foam.*
- ✓ *No cover.*

Figure 4

Conceptual Theoretical Empirical System

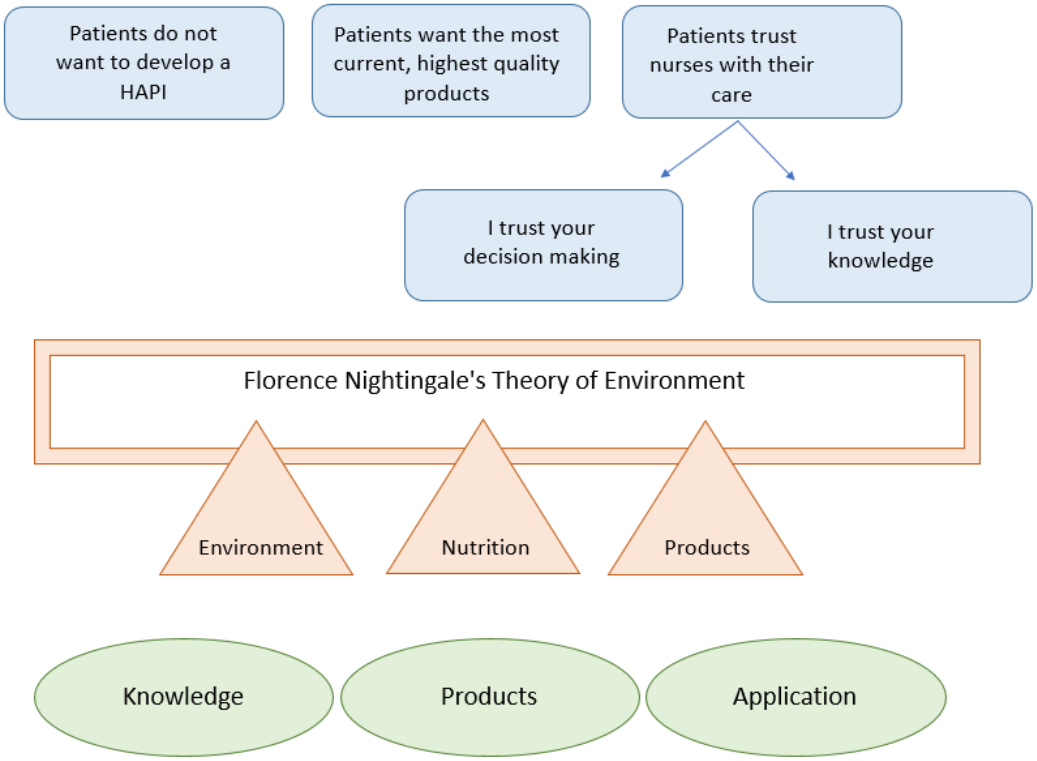

Figure 5

Survey Results Employment Settings

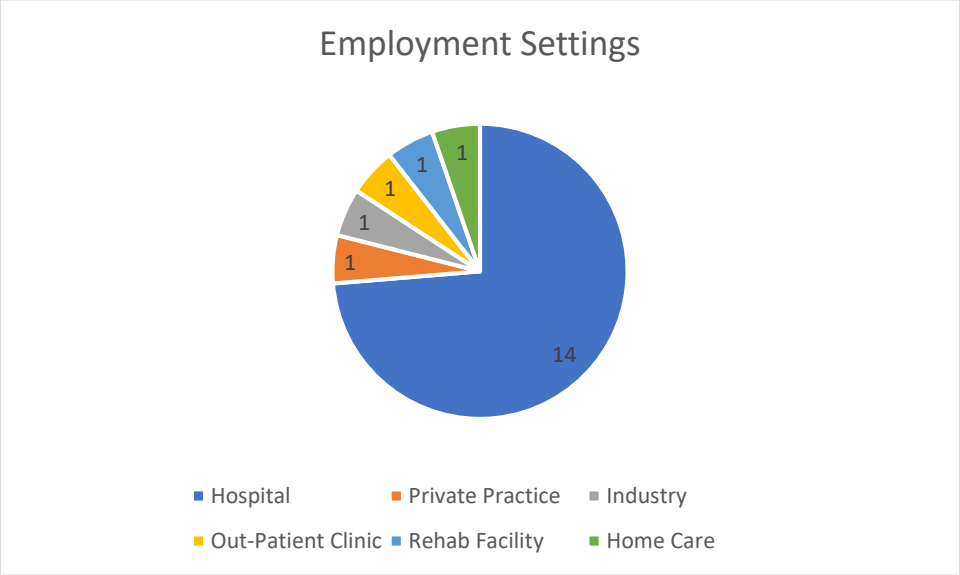

Figure 6

Survey Results Age Groups in Years

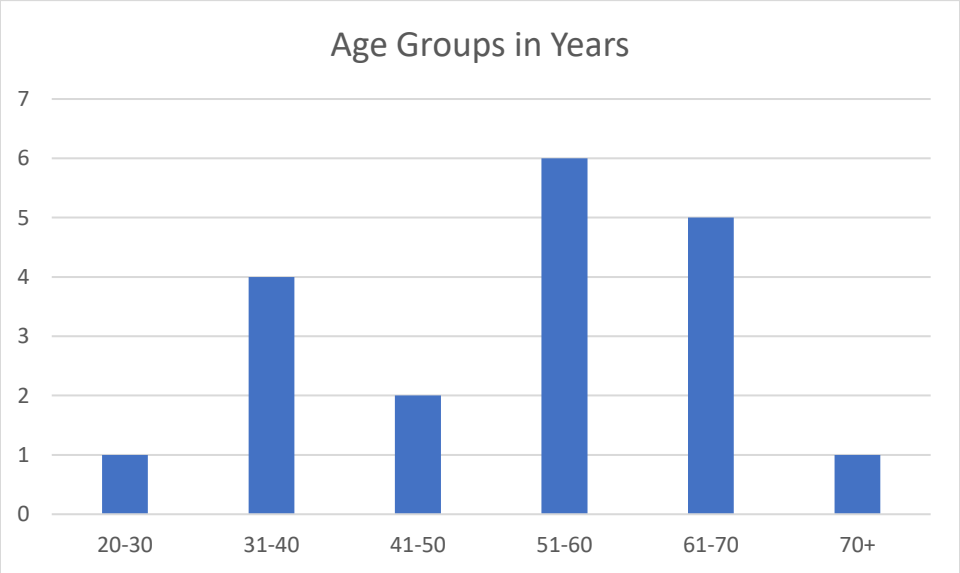

Figure 7

Survey Results Wound Certifications

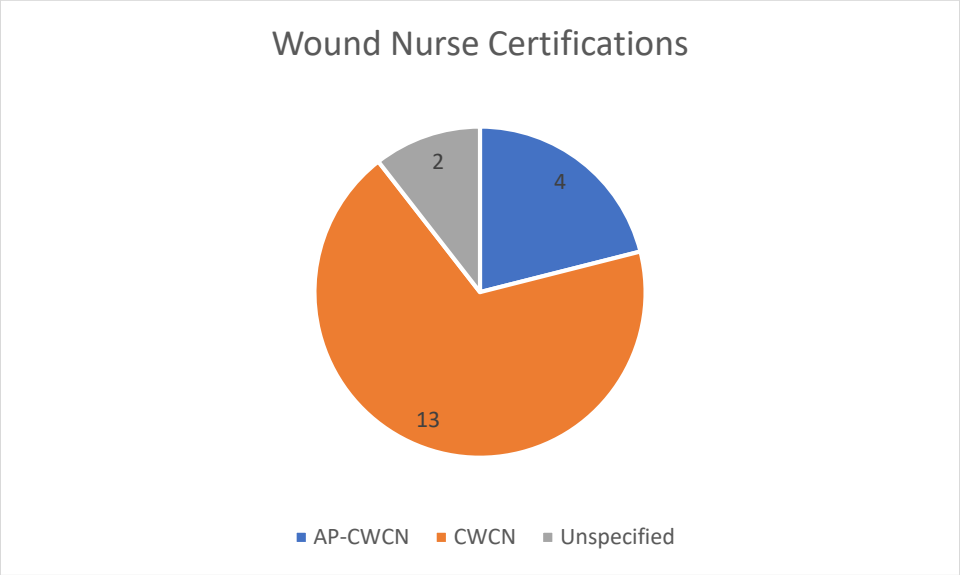

Figure 8

Survey Results Years of Experience as Wound Nurse Specialist

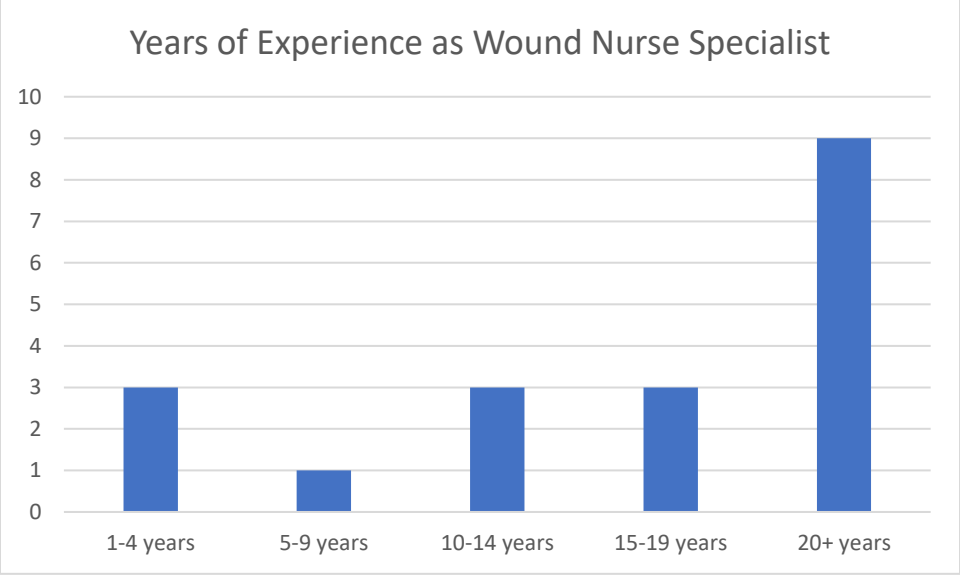

Figure 9

Survey Data Highest Degree Earned

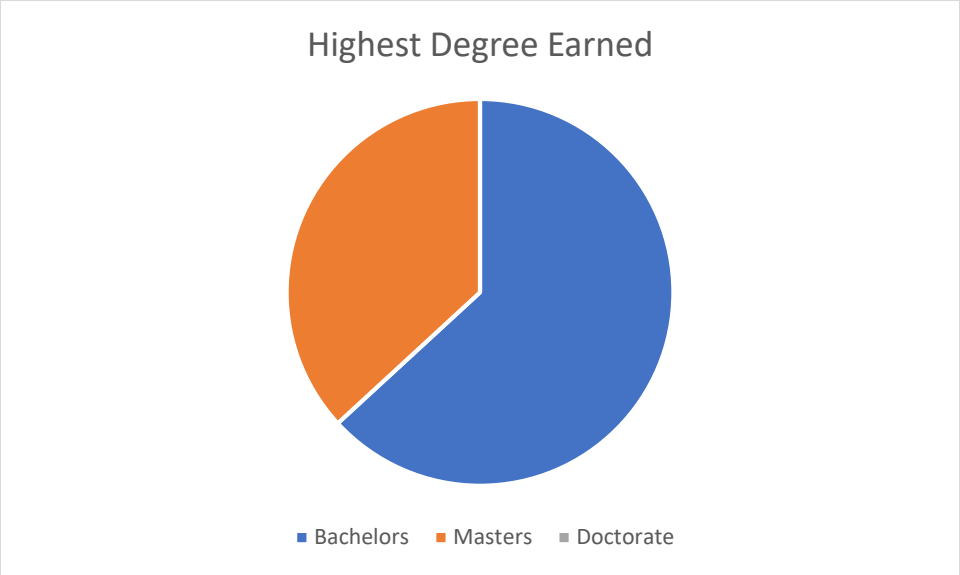

Figure 10

Survey Data: Average Test Score Versus Years' Experience

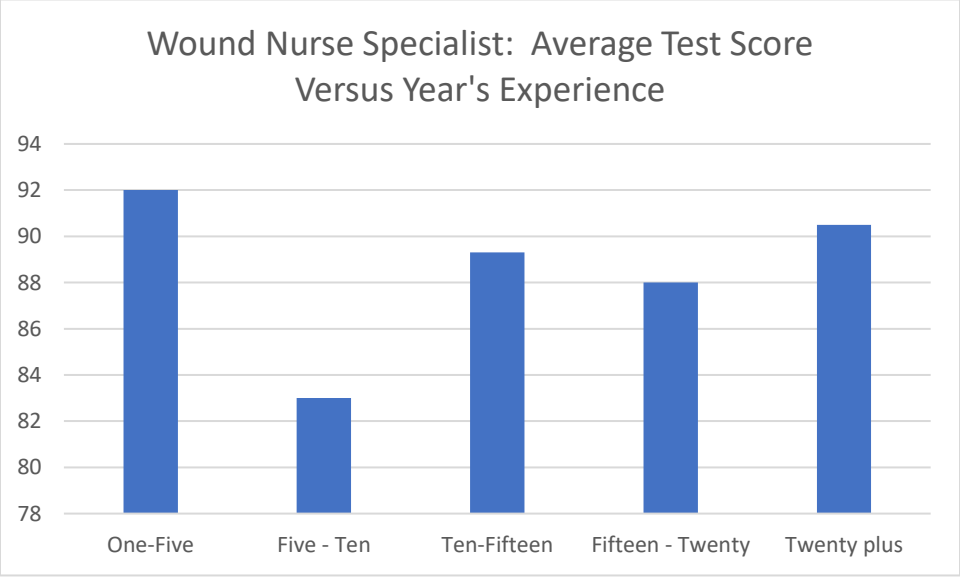

Figure 11

Survey Data: Wound Specialist Choice of Three Brands of Chair Cushions and Bed Overlays Versus Years' Experience