A Retrospective Chart Review of Hospital Based Wound Discharge Planning and 30-Day Readmission Rates

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Abstract

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Background: Healthcare institutions are examining ways to reduce costs and to improve the quality of care through both discharge planning and follow-up appointments which aim to avoid unnecessary readmission. Based on a recent thesis (Kyles, 2011), 83 patients with both a wound related complication and same-cause diagnosis consisted of 5% of the 1,781 readmitted patients. Patients with wounds comprise the largest population discharged from HMC, but wound care in particular requires adequate supplies and equipment which underserved patients likely cannot afford. Therefore, more attention given to the development of thorough and efficient discharge

planning for patients discharged with wounds will likely help lessen the financial burden on public institutions.

Purpose: The research was focused on finding gaps in discharge planning by describing the current discharge information for patients who are discharged with wounds, evaluating differences between discharge plans for clinic follow-up and actual clinic follow-up, comparing patient characteristics between patients readmitted at 30 days for a wound-related problem to those who were not readmitted, and identifying patient characteristics or post discharge care related to 30-day readmission for a wound problem.

Design: A retrospective cohort study of a total of 82 subjects was obtained from an electronic surveillance system. Convenience sampling was used to identify patients with wounds diagnosed based on ICD-9 code. This study included patients who had been discharged with acute or chronic open wound issues and collected data on their post discharge care, and information on readmission (or non-readmission). Data were collected using a structured data collection form to identify patient characteristics, demographics, wound discharge planning, phone call management, clinic follow-up, and 30-day readmission outcomes.

Results: A comparison of patient characteristics between patients readmitted within 30 days and those not readmitted, showed readmitted patients were older age, had shorter length of stay, more medications prescribed at time of discharge, and more ED visits after discharge from the hospital. Both groups were found to have a mean BMI over 30.0 (obesity). An interesting, and possibly clinically important, finding was that among the 13 patients discharged to a home with services (visiting nurses), none were readmitted to HMC. Less than half of sampled patients' discharge summary included PCP information, and 20 out of 82 wound care plans were not addressed in the discharge summary. Only half of the total sample had received the wound care instructions in

the discharge instruction. A lack of wound care instruction was one possible factor that might have increased the likelihood of readmission between the readmitted patients and the non-readmitted.

Conclusion: The process of open acute or chronic wound to healing is a continuous process and often not complete at the time of discharge. Discharge plans, discharge summaries, discharge instructions, and patient education are crucial for a patient with an open wound. Lack of wound care instruction, post discharge care and some patient characteristics are factors identified in this study that might increase likelihood of readmissions. However, further exploration of the factors and their relationship to readmissions is needed to better understand how to improve care and reduce the need for readmission.

Dedication

To my family – Chien-Chih Chen 陳健治, Hsui-Kuei Cheng 鄭秀貴,

Lee-Lu Chen 陳俐如, and Ming-Ching Lu 呂敏菁

To my dog – Small 小小

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Chapter I: Introduction

The process of discharging patients from a hospital is challenging today primarily because of the growing complexity of the medical system. For example, discharges from acute care hospitals do not represent a completed recovery from wound care, surgery, or other medical treatment due to today's shortened recovery stays. Therefore, today's discharge plans must follow the patient home, or wherever they go for continued recovery, with specific, individualized care instructions based first and foremost on the type of wound and its assessment at the time of discharge.

The objective of discharge planning is to develop an individualized discharge plan before the patient leaves the hospital. If a positive long-term outcome is to be achieved, a post-hospital plan-of-care must also take into account the patient's socioeconomic status, cognitive abilities, living arrangement, and education level. Moreover, it is crucial that it also includes the all-important, pre-planned follow-up appointment, usually scheduled at a clinic where the patient's wound-recovery status will be carefully monitored.

A study done in Hong Kong found that half of readmissions could have been avoided (Yam et al., 2010). A Cochrane review reported eleven trials that showed some elderly patients with heart failure who received discharge planning could avoid unnecessary readmission. One study which recruited a mix of patients who received discharge planning reported a significant reduction of readmission rates (Shepperd et al., 2010). As a result, healthcare institutions are examining ways to reduce costs and to improve the quality of care through both discharge planning and follow-up appointments which aim to avoid unnecessary readmission.

The Washington State Hospital Association patient satisfaction survey results from those who had overnight hospital stays from October 2010-September 2011 reported that Harborview

Medical Center (HMC) “provided discharge instructions” 84% of the time. For hospitals in Washington State, the highest rate reported was 91% and the lowest rate was 66% ("Washington State Hospital Association: Quality indicators," 2012). It indicated that HMC might have room to improve in providing discharge instruction while patients were discharging from HMC. This study further investigated the proportion of patients to actually receive wound care instructions in patient discharge instructions from HMC.

The HMC mission statement (2010) states its primary mission is to “provide and teach exemplary patient care and to provide health care for those patients King County is obligated to serve” ("Harborview Medical Center," 2012). Because of HMC’s unique mission statement, it has very diverse patient populations, including persons incarcerated in the King County Jail, mentally ill patients (particularly those treated involuntarily), persons with sexually transmitted diseases, substance abusers, indigents without third-party coverage, non-English speaking poor, trauma and burn victims, persons requiring specialized emergency care, victims of domestic violence, and victims of sexual assault ("Harborview Medical Center," 2012). In fact, as it turns out, patient populations which are underserved “will be given priority for care within the resources available as determined by the Board of Trustees” ("Harborview Medical Center," 2012). Hospitals rely on insurance company reimbursements and government financial support to cover resultant hospital expenditures, but these sources may not bring in enough revenue to serve all of the aforementioned patients.

Patient treatment unsupported by insurance coverage is at least part of what has increased hospital expenditures. In a recent thesis (Kyles, 2011), 83 patients with both a wound related complication and same-cause diagnosis consisted of 5% of the 1,781 readmitted patients. Patients with wounds comprise the largest population discharged from HMC, but wound care in

particular requires adequate supplies and equipment which underserved patients likely cannot afford. Therefore, more attention given to the development of thorough and efficient discharge planning for patients discharged with wounds will likely help lessen the financial burden on public institutions such as HMC. In turn this will allow them to truly carry out their mission to fully care for all of their targeted patients.

Each institution's and hospital's discharge planning system typically has its own special features; therefore, by recognizing the operation systems of an institution's or hospital's discharge procedures, analyzing the institution's mission, and evaluating the patient population, institutions and hospitals may develop an appropriate discharge plan (Euster, 1991). Meetings with the wound care team at HMC indicated interest in finding the current discharge planning gaps for patients with wounds that may be associated with increased 30-day readmission rates. The research was focused on finding gaps in discharge planning by describing the current discharge information for patients who were discharged with wounds, evaluating differences between discharge plans for clinic follow-up and actual clinic follow-up, comparing patient characteristics between patients readmitted at 30 days for a wound-related problem to those who were not readmitted, and identifying patient characteristics or post discharge care related to 30-day readmission for a wound problem. By reporting the results, HMC might be able to improve wound-related discharge planning/summary, documentation, patient education, and patient discharge instruction, as well as improve the quality of wound care. Furthermore, decreased hospital health care costs and prevention of unnecessary readmission might be possible through information gained in this study.

Preventing unnecessary readmissions can tremendously impact the financial status of healthcare systems. Appropriate after-discharge care at follow-up outpatient visits can also

enhance patients' well-being and quality of life, as well as promote the process of wound healing. Practices for improving wound-healings, ranging from prevention, assessment, and diagnosis to intervention, monitoring, evaluation, and follow-up care, are important elements of the discharge plan. Further investigation and recognition regarding the current practices at HMC for wound discharge planning, follow up, and outcomes would help us to explain:

(1) What was the current discharge information for patients who were discharged with wounds from HMC?

(2) What were the differences between discharge plans for clinic follow-up and actual clinic follow-up?

(3) Did any gap in healthcare providers' communication exist between time of discharge, outpatient follow up and subsequent readmission?

(4) What were the differences in patient characteristics and post discharge care between patients readmitted at 30 days to those who were not readmitted?

(5) What were the different factors between the readmitted patients and the non-readmitted?

Effective discharge planning and transitional care can greatly improve patient outcomes and minimize readmission rates ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009; Mohta et al., 2012), as well as ensure quality transitions. Currently, there is limited specific literature, studies, or guidelines to address how to improve transitions in care for patients with acute and chronic open wounds. Moreover, the patient characteristics, and post discharge care related to 30-day readmission for a wound problem have not yet been described.

Purpose

The purpose of this study was to investigate the relationship between three factors: (1) discharge planning, (2) phone call management and ambulatory care clinic follow-up, and (3) wound-associated 30-day readmission to HMC. Data was gathered through HMC web-based electronic medical records. This study pursued the following aims:

1. To describe the current discharge information for patients who were discharged with wounds from HMC.
2. To evaluate differences between discharge plans for clinic follow-up and actual clinic follow-up.
3. To compare patient characteristics (i.e. age, weight, height, body mass index (BMI), length of stay (LOS), and number of medications the patient was prescribed at discharge) between patients readmitted at 30 days to those not readmitted.
4. To compare post discharge care (i.e. How many days after discharging was the first clinic follow-up visit? What was the number of ED visits after first discharge from HMC within 30 days? What was the number of clinic visits after first discharge from HMC within 30 days?) between patients readmitted at 30 days to those not readmitted.

Chapter II: Background and Significance

Patients with wounds suffer numerous physical, psychological and social challenges. Understanding the appropriate skills required to care for wounds to enhance the wound healing process may not be an easy task for each patient and family. The causes for readmission are often multifactorial. Wound complication is one of the postoperative occurrences leading to increased risk of readmission. Postoperative wound infections cause an approximate 3½ -fold increase in readmission rates (Kassin et al., 2012). To achieve continuity of care planning and to avoid readmission, healthcare professionals and discharge planners need to understand and implement well-developed discharge planning procedures, documentation, and protocols that include wound-related information, wound care instruction, resources, care, and follow-up information for patients and caregivers.

Literature Review

Acute Care Discharge Planning

Medicare defines discharge planning as: "A process used to decide what a patient needs for a smooth move from one level of care to another ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009)". In 1991, the philosophy of discharge planning was discussed as "continuity of care planning" (Euster, 1991). The simplest way to describe discharge planning is that it is the process of moving someone out of the hospital (Euster, 1991).

Discharge planning is a routine feature of health systems in many countries (Shepperd et al., 2010). The goal of developing an individualized discharge plan for the patient prior to their leaving the hospital is to contain costs and to improve care outcomes (Shepperd et al., 2010). Implementation of discharge plans may be affected by a variety of factors that include type of services, patient-related factors, living arrangements, marital status, support groups, and

socioeconomic status (Auslander, Soskolne, Stanger, Ben-Shahar, & Kaplan, 2008). Therefore, knowing which patient populations are high-risk for discharge planning problems may help to reduce length of stay (Euster, 1991). In a Cochrane review entitled "Discharge planning from hospital to home (Review)," Shepperd et al. (2010) reported that patients allocated to discharge planning had significantly decreased hospital length of stay and readmission rates. Therefore, an individualized discharge plan/summary, patient discharge instruction, and patient education are very important to not only reduce hospital length of stay, but also to decrease patient readmission rate.

Best practice of discharge planning. Effective discharge planning and transitional care can highly improve patient outcomes and minimize readmission rates ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009; Mohta et al., 2012). Discharge planning should include identifying and assessing the required services, coordinating the multidisciplinary health care teams' discharge plans and activities, preparing and searching for resources for post-hospital care, providing patients and caregivers health care education and discharge assistance for selecting services, and follow up that occurs after acute hospitalization (Auslander et al., 2008; Karliner et al., 2012).

Effective discharge planning to establish the successful transition from hospital to home involves (1) effectiveness of communication between hospitals and communities (Mohta et al., 2012), (2) interactive communication between patients and health care providers, (3) discharge documentation that involves the patient's conditions, care, treatments, medications, and anticipated changes, (4) providing verbal and written communication tools, and (5) eliminating the gaps and barriers between agencies ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009; Smith & Alexander, 2012). Miscommunication or lack of

communication may cause decreasing follow-up rates and misunderstandings about disease conditions and care plans (Smith & Alexander, 2012). Therefore, bridges need to be built between acute hospital care facilities and follow-up clinics for more effective communication. The gaps in patient health information need to be connected in order to help provide for wound patients. In short, interprofessional collaborative practice and communication are needed.

Discharge planning takes a team approach. The health care system is complex and involves many cooperative partnerships and relationships. In order to provide heath care services, collaboration is needed between several different systems including the hierarchies, the bureaucracy, professional disciplines, and nonprofessional and administrative staffs that interact and overlap with each other (Euster, 1991). For example, homeless patients may not have any community systems support; therefore, the hospital might need to reach out to the community to find and set up available needed resources from the community system (i.e., home care, wound care, and temporary rehabilitation). Successful discharge planning takes a team approach that involves coordination with patients, families, social workers, nurses, case managers, physicians, and discharge planners ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009; "Hospital-to-Home discharge guide," 2010; Smith & Alexander, 2012). Social workers are skilled health care team members for patients and their families in the discharge transition from acute care settings to other care settings (Auslander et al., 2008; Euster, 1991). Providing individualized discharge planning can assist patients to utilize community resources (such as visiting nurses), or wound care services and have a smooth transition to the scheduled discharging dispositions.

Risks of poor discharge planning and summary. According to a Cochrane Review reported by Shepperd et al. (2010), a structured discharge plan could bring small reductions in

hospital length of stay and readmission rates for older patients with a medical condition, but the impact of discharge planning on mortality, health outcomes and cost remains uncertain. The effect of discharge planning on hospital care costs compared to usual care is compelling. Patients receiving discharge planning have significantly lower costs compared with readmission costs at 2 weeks follow up and at 2-6 weeks follow up (Naylor et al., 1994; Shepperd et al., 2010).

Ineffectual discharge planning often causes patients and families stress, decreasing the well-being of patients and caregivers ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009). Discharge summaries often do not provide important healthcare-related information including diagnostic test results, test results pending at discharge, treatment or hospital course, discharge medications, follow-up plans, and patient or family counseling (Mohta et al., 2012) (p. 1-6). In fact, 90-92% of discharge summaries failed to include patient or family counseling (Mohta et al., 2012). Incomplete discharge summaries, referrals, or medication lists may cause miscommunication that could lead to increased health care system expenses (Smith & Alexander, 2012). An effectual discharging plan/summary could not only decrease patients' and their families' stress after discharging from an acute care hospital, but could also decrease hospital care cost and increases the patients' well-being.

Discharge planning related resources for healthcare providers. The discharge process is an influential part of integrating patient and family caregivers into the care plan. Healthcare providers should provide counseling and clear guidance to patient and family caregivers and assist them throughout the discharge process ("For providers: Hospital discharge planning - First steps with family caregivers," 2011).

Most State Departments of Health recommend that patient and family rights include (1) to know the expected date of discharge, (2) to have an explanation of staff recommendations for

after-discharge care, (3) to be given a list of providers for after-discharge care, (4) to appeal what they feel is an unsafe discharge or an inadequate discharge plan ("For providers: Hospital discharge planning - First steps with family caregivers," 2011).

The website "Next Step In Care: Family Caregiver and Health Care Professionals Working Together" by United Hospital Fund (2012) has recommended a list of elements to address when discharging from hospitals to other care settings (for example, hospital to home or rehab facility, or the start or end of home care agency services). It includes summary of care, estimated date of ending services, all diagnoses, medication management, medical equipment (who to call for supplies and servicing), exercises and physical and occupational therapy follow-up, community services, foods and diet, activity restrictions, medical test results still pending, appointments, name and number to call with medical questions, and caregiver's questions answered.

To assess the patient population and plan for transition, discharge planners should be able to answer the following questions: (1) Do you have an elderly population? (2) What percentage is on Medicare? (3) What percentage of your patient populations is on Medicaid? (4) What is the breakdown of services in your institution? (5) What is the major access point for your institution (Euster, 1991)? Family Caregiver Alliance (2009) has listed some basic questions for caregivers to ask (Appendix A) which can be included in discharge planning for health care providers or discharge planners.

Discharge planning related resources for patients and caregivers. Discharge planning has long-term impacts on patients and families (Auslander et al., 2008). Hospital discharge planning needs to include discussions with patients and caregivers that (1) explain the patients' diagnoses and condition, (2) discuss their needs, (3) identify preferences for discharge location,

(4) discuss the pros and cons of present options based on patient and caregiver needs, and (5) discuss financial implications of discharge options ("For providers: Hospital discharge planning - First steps with family caregivers," 2011).

Centers for Medicare and Medicaid Services (CMS) have created a discharge planning checklist for patients and caregivers. United Hospital Fund (2008) has developed a going home handbook for patients and caregivers. “Going Home: What you need to know” (2008) includes information on admission, discharge, services and supplies (medical equipment and home care services), follow up (special foods and diet and medical tests), follow-up appointments, and family caregiver notes.

According to “Your discharge planning checklist: For patients and their caregivers preparing to leave a hospital, nursing home, or other care setting” (2012), the patient action items include asking where you will get care after discharge, asking the staff to show you and your caregiver any other tasks that require special skills, and asking for written discharge instructions and a summary of your current health status. Patients are advised to bring their discharge instructions, summary of health status, and a completed medication list to follow-up appointments.

Discharge planning protocol at the Harborview Medical Center (HMC). A 30-day readmission retrospective review study at HMC was done by Kyles (2011) entitled “Utilizing an electronic surveillance system to track factors associated with hospital readmissions: A retrospective review.” It found that “of the 1,781 readmitted patients, 83 patients readmitted within 30 days of discharge with a same-cause diagnosis and a wound related complication consisted of 5% of all readmitted patients” (p. 21). At the time of discharge from HMC, 91.6% of patients had a wound plan, but HMC’s 30-day readmission rate was still high (Kyles, 2011).

However, in Kyles' (2011) study, she did not define wound care plan/discharging summary or collect more detailed information about what was included in the wound plan/discharging summary.

After confirming the discharge planning process with HMC's Nursing Research Committee, it was discovered there was neither a formal policy nor protocols to demonstrate the discharge plan, nor a formal policy around wound discharge planning. Currently, while discharging patients with wounds, healthcare providers follow the Online Record of Clinical Activity (ORCA) electric discharge planning formats to document the discharge planning information (Appendix B). There are wound care consult notes as well as heath care provider notes that are recorded in the ORCA.

Wound Healing

Wound healing problems can be a threat to the health and well being of many patients (Reinke & Sorg, 2012). Eleven million people are affected by acute wounds annually and approximately 300,000 people are hospitalized in the United States with wounds (Demidova-Rice, Hamblin, & Herman, 2012). In hip fracture management, the rehabilitation post-discharge care includes rehabilitation services, primary care clinicians and a surgical team, as well as primary care (Hung, Egol, Zuckerman, & Siu, 2012). Currently the evidence base for discharge planning for patients with wounds is limited, and further research in this area is necessary for patients and healthcare professionals alike.

Pathophysiology of wound healing. The wound healing process includes cell migration, proliferation, differentiation, apoptosis, and the synthesis and remodeling of the extra cellular matrix (ECM) (Rolfe & Grobbelaar, 2012). Wound healing is divided into three distinct phases: (1) the vascular response: hemostasis and coagulation; and the cellular response: inflammation

[immediately upon injury through days 4 to 6], (2) proliferative phase and repair: epithelization, angiogenesis, and provisional matrix formation [day 4 through 14], and (3) maturation and remodeling [day 8 through 1 year] (Broughton, Janis, & Attinger, 2006; Demidova-Rice et al., 2012; Reinke & Sorg, 2012). The wound healing phases overlap in time and space (Reinke & Sorg, 2012). After the initial injury, the skin's healing process might last for years (Reinke & Sorg, 2012).

Regeneration or repair is recognized as the closure of a skin wound (Reinke & Sorg, 2012). Many factors are associated with the various stages of tissue repair such as cell-cell interactions, cell-matrix interactions, numbers of different cell types, growth factors, and cytokines (Rolfe & Grobbelaar, 2012). Therefore, discharge planning (summary) needs to address wound care supplies, equipment, dressing change method, and education that can influence wound-healing status and prevent healing delay.

Cost of acute/chronic wound treatment. Wound care is costly, representing a significant expenditure for a hospital. Studies have shown the cost of chronic wound treatment increased markedly with ulcer severity (Harding, Posnett, & Vowden, 2012). Gunter and Machens (2012) emphasize that chronic wounds are also called civilizational diseases due to their relationship with the elderly population. The treatment of chronic wounds is an immense and rapidly growing expenditure for the health care system. Chronic wounds amongst the elderly population could lead to higher cost of wound care.

One study demonstrated that hip fractures' rehabilitative (post-operative management) cost was about 530 million Euros in 2005 (Piscitelli et al., 2012). An interesting study conducted by Walter et al. (2012) found that there is no evidence to show that leaving a wound uncovered

could increase rates of surgical-site infections in comparison with dressing a surgical wound. However, there were limited studies which addressed the cost of acute wound treatments.

In managing both acute and chronic wounds, the direct wound cost includes costs of supplies, dressings, cleansing agents, topical applications, surgical interventions, medications, related investigations, inpatient care, formal and informal care-giver time, travel by care-giver or patient and disposal of wound-care material. This can be difficult for patients with wounds to afford. The indirect wound costs includes assistance with activities of daily living and the effects of days lost from work (O'Meara, Cullum, Majid, & Sheldon, 2000).

A systematic review and meta-analysis by Walter et al. (2012) reported that dressing costs vary based on the individual dressing products used. The dressing types can be summarized as follows: (1) basic wound contact dressings: low-adherence dressings, wound contact materials, and absorbent dressings, (2) advanced wound dressings: alginate dressings, hydrogel dressings, films-permeable film and membrane dressings, soft polymer dressings, hydrocolloid dressings, fibrous hydrocolloid dressing, foam dressings, capillary-action dressings, and odor-absorbent dressings, (3) antimicrobial dressings: iodine-impregnated dressings and silver-impregnated dressings, (4) specialist dressings: protease-modulating matrix dressings (Walter, Dumville, Sharp, & Page, 2012). Numerous dressing types can be confusing and the costs vary widely. For underserved patients without income or resources, purchasing dressings could be very challenging, making it difficult to take care of their wounds and to further promote wound healing.

Acute wound care without any complications could cost less than chronic wound care because of the fewer days of treatments. However, the cost of wound care depends on the

product chosen and the healing progress of the individual. Delayed healing increases the cost of wound care.

Post-Discharge Follow-Up Interventions

A retrospective cohort study found that discharge follow-up by telephone is an effective way to reduce short-term hospital readmission and further decrease the health care costs of patients and hospital inpatients with chronic diseases such as diabetes, coronary artery disease, chronic kidney disease etc. (Harrison, Hara, Pope, Young, & Rula, 2011). Family Caregiver Alliance (2009) suggested that a telephone follow-up call within two days after discharge can help anticipate problems and improve care at home. HMC has been using a telephone call follow-up program for one year which has been implemented hospital wide. The primary healthcare provider (usually registered nurse) contacts patients based on patients' discharge planning information. Patients can decide to be contacted by telephone call, text message, or voice message. Patients can also decide not to be contacted by HMC. In a quality improvement study, researchers used a "Discharge 'Time Out' Checklist" that included eleven questions to evaluate the quality of discharge summaries (Appendix C). They suggested that refined interventions could improve the narrative flow of discharge summaries (Mohta et al., 2012). This study's data abstraction form has adopted a few questions from the "Discharge 'Time Out' Checklist," including (1) Who is this patient? (2) How is the patient at the time of discharge? (3) What is the discharge plan? (4) What is the follow-up plan? and (5) Has there been any contingency planning?

The "National Prevention Strategy" (2011), published by National Prevention, Health Promotion and Public Health Council, reported that one of the responsibilities of federal government is to encourage sending reminders to patients for preventive and follow-up care, and

to provide patients with timely access to their health information (e.g. lab results, discharge instructions) by certified electronic health record technology. Telephone follow-up calls and mailed reminders to patients are two methods to provide patients a ways to address any concerns and issues they may have after discharge from acute hospital, thereby decreasing readmission rates.

Hospital Readmission

Readmission is defined as returning within 30 days of discharge from an inpatient hospitalization (Kogon et al., 2012). Hospital readmission rates are indicative of the quality of patient care and transitions of care (Askren-Gonzalez & Frater, 2012; Axon & Williams, 2011; Nagata, Tomura, & Murashima, 2012; Podulka, Barrett, Jiang, & Steiner, 2012). Reducing preventable readmission rates will improve health care quality and decrease costs (Podulka et al., 2012).

Postoperative complications related to readmission. Kassin et al (2012) found that a 4-fold increase in risk of readmission was related to postoperative complications and an individual's comorbidity. In addition, patients with sepsis or UTI were 5 times more likely to be readmitted, and postoperative wound infection and postoperative pulmonary complications caused an approximate 3½–fold increase in readmission rates (Kassin et al., 2012). Postoperative infection (16.9 %) was the most common reason for readmission (Kassin et al., 2012). Postoperative abdominal wound infection is a common cause of morbidity which occurs in approximately 5 % of patients (Kravitz, 1996). Longer stays and complex cases are also considered triggers for readmissions in the adequate follow-up care (Harrison et al., 2011).

Costs of readmission. According to Kassin et al. (2012), between 2003 and 2004, patients who were discharged from a hospital and then readmitted within 30 days were 19.5%

Medicare beneficiaries, and readmission costs totaled about $17.4 billion. Centers for Medicare and Medicaid Services (CMS) have been publishing 30-day readmission data for selected medical diseases since June 2009 (Kassin et al., 2012). The Center for Medicare & Medicaid Services' readmissions reduction program states, "Section 3025 of the Affordable Care Act added section 1886(q) to the Social Security Act establishing the Hospital Readmissions Reduction Program, which requires CMS to reduce payments to IPPS hospitals with excess readmissions, effective for discharges beginning on October 1, 2012" ("Readmissions reduction program," 2012). Section 3025 started the focus on readmissions for selected medical diseases including Acute Myocardial Infarction (AMI), Heart Failure (HF), and Pneumonia (PN). In addition, CMS plans to extend the readmission policy to surgical procedures in fiscal year 2015 (Kassin et al., 2012).

Many readmissions are being viewed by payers and insurance agencies as preventable complications of the original surgery or hospitalization; furthermore, both government and private insurance companies have put forth proposals to deny coverage for any additional expenses incurred by hospital readmission (Kassin et al., 2012).

In 2008, one in eight patients who were readmitted within 30 days, across all payer and age groups, were surgical hospitalization patients (Podulka et al., 2012). The 30-day readmission rates for privately-insured adults were lower than for adults covered by Medicaid, regardless of age group (Podulka et al., 2012). Hospitals might not receive any coverage, or may deny coverage by payers or insurance agencies, for patients who are readmitted within 30 days with preventable complications. The cost of readmission is significant.

Summary of Background and Significance

Many readmissions can be avoided by timely discharge follow-up (Harrison et al., 2011). The effectiveness of discharge planning is related to greater satisfaction of clients and fewer readmissions (Nagata et al., 2012). Since the mid-1980s, length of stay has been shortened for patients with open wounds, discharging them from acute care institutions to home care settings where wound care is delivered by patients, caregivers, and home health care providers (Kravitz, 1996). Therefore, well-developed wound care discharge planning is crucial for improving quality of wound care.

Chapter III: Methodology

Design

This was a retrospective chart review cohort study to describe discharge planning and follow up of patients with acute or chronic open wounds at Harborview Medical Center (HMC), a level-one trauma center/safety net hospital. A retrospective design allowed the PI to analyze antecedent factors associated with subsequent post discharge care follow-up (i.e. phone call management and ambulatory care follow-up) and readmissions. Patient information was obtained from an electronic surveillance system maintained by a Clinical Data Analyst.

This study included patients who had been discharged with acute or chronic open wound issues and collected data on their post discharge care, including information on readmission (or non-readmission). This study described the current discharge information for patients who were discharged with wounds (e.g., gender, race, living status prior/post hospitalization), evaluated differences between discharge plans for clinic follow-up and actual clinic follow-up, compared patient characteristics (i.e. demographic factors, discharge planning, and post discharge care follow-up) between patients readmitted within 30-days for a wound-related problem to those who were not readmitted. This study also evaluated differences between discharge plans and actual follow-up phone call management and HMC clinic/ambulatory care follow-up outcomes.

Data were collected using a structured data collection form (Appendix D: Data Abstraction Form) to identify patient characteristics, demographics, wound discharge planning, phone call management, clinic follow-up, and 30-day readmission outcomes.

Independent variables included age, gender, marital status, ethnicity/race, primary language(s) other than English, living status prior to hospitalization, priority payer status, nicotine use, alcohol use, non-intravenous (non-IV) substance use, intravenous (IV) substance

use, body weight (BW), height, body mass index (BMI), Primary Care Doctor (PCP) prior to hospital admittance, discharge day of the week, length of hospital stay (LOS), discharging medical service, wound location, type of open wound, occurrence of the follow-up phone call management, readmission admitting diagnosis, readmission admitting diagnosis related to a wound, and route of patient readmission (e.g., emergency department, clinic). Appendix E describes study variables includes study discharge variables.

Description of Study Sample

This study described characteristics of patients with acute and chronic open wounds who discharged at HMC, a Level I trauma center. HMC is a 413 bed, Level I adult and pediatric trauma and burn center serving Washington, Alaska, Montana, and Idaho. Sample size was based on the anticipated number of patients' discharged with acute or chronic open wounds from July 1st, 2011 through June 30th, 2012 who either had a 30-day readmission or did not. The accessible patient population was all patients with acute or chronic open wounds who discharged from HMC.

Inclusion and Exclusion Criteria

The study population was composed of eligible male and female patients who were 18 years of age or greater, of any race, socioeconomic status, ethnicity, or gender, who were discharged with acute or chronic open wounds from HMC and were or were not followed up by HMC clinics, respite care, or readmitted to HMC inpatient hospital (Appendix F: Current UW Medicine EpicCare Clinics by Facility) within 30 days post-discharge with an acute or chronic open wound-related problem.

Patients were excluded if they were discharged with a closed wound, were younger than 18 years of age, or were deceased at discharge of the index hospitalization. Convenience

sampling was used to identify patients with wounds diagnosed based on ICD-9 code using a database maintained by a Clinical Data Analyst. Eligible subjects were identified using the electronic surveillance system database that was maintained by the Clinical Data Analyst. The Clinical Data Analyst generated an automated report using identifiable patient information obtained from the EMR through the HMC's network servers.

Eighty-five subjects were identified; three were excluded due to death during hospitalization, age being under 18 years, and/or date of hospitalization falling outside the IRB approved study period. The PI performed a retrospective cohort study of a total of 82 subjects.

Human Subjects

The PI obtained approval from the thesis chair and committee members. Upon approval of the proposal, planned statistical analysis, and tool by the chair and committee, the PI obtained a letter of approval from the HMC Nursing Research Committee. Before submitting the proposal to IRB, the Department of Biobehavioral Nursing and Health Systems within the University of Washington School of Nursing reviewed and approved the study proposal. After obtaining the School of Nursing's approval, the PI submitted the proposed study to the University of Washington's Institutional Review Board (IRB). The PI completed Health Insurance Portability and Accountability Act (HIPAA) training, submitted documentation of confidentiality training and Corporate Compliance education and Collaborative Institutional Training Initiative (CITI) training prior to the study. Human subjects approval for the study was obtained on May 7, 2013.

Measures and Procedures

Data abstraction form. The PI used a structured data collection tool (Appendix D). Variables included information pertaining to discharge (e.g., was patient education about wound care documented prior to discharge?), wound discharge planning summary (e.g., did the wound

discharge planning summary include PCP's information?), phone call management and clinical record (e.g., follow-up phone call management and ambulatory care follow-up), and patient with 30-day readmission (e.g., was the readmission admitting diagnosis related to a wound?). One certified wound nurse and one Clinical Data Analyst examined the data abstraction form to evaluate the relevance of each of the proposed items related to discharge planning, post discharge care, and 30-day readmission. Relevant items reflected subject characteristics and risk factors identified in the literature and described characteristics related to patients discharged with acute or chronic open wounds. Study data were extracted by a Clinical Data Analyst and kept on a password protected secure drive in the Clinical Education Department of HMC. The PI and thesis chair met with the Clinical Data Analyst to discuss statistical analysis of the study.

Training. While IRB approval was pending, the PI underwent training to become proficient in searching records in the (1) ORCA (in-patient) and (2) Epic (outpatient) clinical electronic database systems. A critical care CNS and training officer scheduled the training on October 26th (ORCA training) and October 30th (Epic training), 2012.

Data collection. After IRB approval was obtained, the PI completed the HMC approval process to have remote access to data for retrieval and data files. Data on hospital index, phone call management and from clinic records were pulled electronically from the EMR by the HMC data analyst. All other data was extracted from the EMR by the PI and entered into a Microsoft Excel 2011 data extraction tool developed by the Clinical Data Analyst. The data extraction spreadsheet included only study code numbers and de-identified data. The data extraction tool was used to capture the proposed study variables in the patient information. It was in the form of a spreadsheet and contained numeric variables and some text notes. The links between the medical record number and study code number were kept separate and secure and used as needed

to confirm the accuracy of the data. Once the accuracy of the data is confirmed the links will be destroyed (no later than April 1st, 2014). After codes linking de-identified data to subjects have been destroyed, the thesis chair and a Clinical Data Analyst will have access to the de-identified data collection spreadsheet on the HMC server.

During the data collection phase, the PI accessed chart data from each subject by using password protected internet/Wi-Fi and a personal laptop. The PI protected subject information at all times. When the PI stepped away from the computer, she was logged off. The PI recorded only de-identified data on an encrypted thumb drive.

This study was meant to investigate the relationship between three factors: (1) discharge planning, (2) phone call management, clinic follow-up, and post discharge care documentation, and (3) wound-related 30-day readmission to HMC. Thirty-day readmission was defined as a repeat admission to HMC occurring within 30 days of discharge.

Data Analysis

The PI described the current discharge information for patients who discharged with wounds from HMC. Data was automatically populated and imported into a Microsoft Excel spreadsheet. Data analyses were conducted to include all population descriptive statistics, continuous variables, categorical variables, and comparative analyses.

Nominal variables (e.g., gender, marital status, ethnicity/race, primary language, living status prior to hospitalization [Appendix E]), were reported using frequency distributions including number and percent of total.

Interval level (e.g., age) variables were summarized using descriptive statistics and measures of central tendency. Comparison of patient characteristics (i.e., discharge plan, and post discharge care follow-up) between patients readmitted within 30 days for a wound-related

problem to those who were not readmitted were compared using cross tabulations and Chi-square test.

Significance tests were two-tailed with an alpha level established a priori at 0.05.

Risks and Benefits

The PI accessed subjects' records using the Clinical Data Analyst database. Since this was a retrospective review with minimal risk to subjects, consent was waived as part of the IRB approval. Data are confidential until the study is completed (no later than April 1st, 2014). At that point, study code linking subjects with their data will be destroyed and data cannot be linked to individuals.

Loss of privacy due to the review of medical records was a possible risk, but safeguards were in place to protect privacy. Individual subjects did not directly benefit from this study.

Data gathered during this review described discharge planning documentation and discharge follow-up associated with patient readmission and wound care outcomes. Knowledge of documented discharge planning information may help health care providers identify areas where there is need for improved planning or more specific wound care information included in discharge plans. In addition, the study may also help to identify any areas that could be improved to help prevent readmission for patients with wounds.

Chapter IV: Findings

Sample Summary Statistics

For the entire cohort (n = 82 patients), there was a male predominance (69.5% vs. 30.5%). Most of the patients were single (33, 40.2%), Caucasian (55, 67.1%), and English was their primary language (77, 93.9%). Sixty (73.2%) patients were living at home without services prior to hospitalization, and most patients were discharged to either a skilled nursing facility (28, 34.1%) or a home without services (21, 25.6%). Twenty-three (28%) patients were discharged on a Friday. The most frequent primary discharge diagnosis was Diabetes with other specified manifestations, type II or unspecified type, not stated as uncontrolled (ICD-9-CM diagnosis code 250.80 – DM2/NOS w Manif NEC NSU) (8, 9.8%) and the most frequent secondary discharge diagnosis was Unspecified septicemia (ICD-9-CM diagnosis code 038.9 – Septicemia NOS) (7, 8.5%). Demographics are presented in Table 1 (Appendix G).

Over half of the patients' payer status was Medicare (30, 36.6%) or Medicaid (28, 34.1%). Forty-three (52.4%) out of 82 patients did not have a PCP prior to hospital admittance, and 15 (34.9%) of the 43 patients had a Primary Care Provider assigned prior to discharge. There were 36 (43.9%) patients who reported using alcohol, 20 (24.4%) patients used nicotine, 19 (23.2%) patients used non-intravenous (non-IV) substances, and 5 (6.1%) patients used intravenous substances (Table 1, Appendix G).

Eighty-two (100%) patients' wound care plan had been documented either in the nursing note or wound care team consultation note during hospitalization. There were 62 (75.6%) patients' with wound care plan/instruction addressed in the discharge summary that was written by a physician or Nurse Practitioner (NP). Patient discharge instruction was given when patients were discharged, and for half of the patients (41, 50%) wound care instructions were included in

the discharge instructions. In the EMR, patient education was documented in the discharge readiness/wound care team consult/patient education record/patient discharge checklist, and 71 (86.6%) patients received education about wound care that was documented prior to discharge. Fifty-six percent of patient discharge instructions or patient discharge checklists included a 24/7-callback number to patient (Table 2, Appendix G).

Thirty-eight (46.3%) patients discharged from HMC with pressure ulcers, and 40 (48.8%) patients' wounds were located in the lower extremities (Table 3, Appendix G). During hospitalization, 75 (91.5%) patients received consultation from the wound care team, 74 (90.2%) patients had a social worker consulted, and 70 (85.4%) received nutrition consults.

The HMC discharging medical services included Medicine, General Surgery Trauma, Medicine ICU and CCU, Medicine Hospitalist, Urology, Orthopaedics, Plastic Surgery, Oral Surgery, Thoracic-Vascular Surgery, Neurosurgery, Neurology S, Otolaryngology, Burn Surgery, and Rehab Medicine; 12 (14.6%) patients were discharged by the Medicine Hospitalist 2. About half of the discharging plan summaries included patient PCP's information (40, 48.8%), and 64 (78%) patients' discharging plan summary had a follow-up appointment made to address the wound (Table 4, Appendix G).

Most of the patients needed wound care supplies after discharging (69, 84.1%). In the discharging plan summary, 78 (64%) patients had no prescriptions for wound supplies, 75 (91.5%) patients had no wound care supplies ordered, and for 70.7%, topical agents for wound care were not recommended in the discharge documentation (Table 4, Appendix G).

The PI determined if (1) a patient was cognitively independent or not and (2) a patient was able to take care of him/her-self at the time of discharge based on the documentation of the discharge summary. Seventy-four (90.2%) patients were cognitively independent, and 52

(63.4%) patients were not able to take care of him/her-self at the time of discharge (Table 4 and Table 5, Appendix G). Forty-nine (59.8%) patients had no caregiver during hospitalization, 56 (68.3%) had a family member or other caregivers after discharging, and the primary learner for patient education was the patient (40, 48.8%) (Table 5, Appendix G).

A total of 69 (84.1%) out of 82 patients had some type of clinical follow-up, such as HMC high-risk foot clinic, adult medicine, general surgery, rehab clinic, infectious disease clinic, palliative care clinic, stroke clinic, or plastic surgery. In forty-seven (68.1%) out of 69 the wound closure was documented at first follow-up clinic visit, and in 48 (69.6%) out of 69 the wound status was described in the clinic note within 30 days after discharging.

After discharge, patients received follow-up phone call management from HMC staff. Fifty-five (67.1%) out of 82 patients received/were successfully contacted through the follow-up phone call. When patients received the follow-up phone call, 2 (4%) out of 55 patients were asked, “Is your dressing dry and intact?” and “Did all your supplies and equipment arrive?”; Six (11.0%) patients were asked, “Do you have any questions related to your visit or treatment plan?”; Thirty (54.5%) patients were asked, “Can you tell me what things or changes would prompt you to call your doctor?”; Twenty-six (47.3%) patients were asked, “Were you able to schedule your follow-up appointment?”; and 4 (7.3%) patients were asked, “Do you have transportation arranged for your follow-up appointment?”

There were 20 (24.4%) readmissions in 82 patients with acute/chronic open wounds. Two patients’ readmission admitting diagnosis was gangrene and 2 patients had heel and mid-foot ulcers. The remaining 16 patients had various readmission admitting diagnoses, such as foot cellulitis, acute respiratory failure trauma/surgery, and acute deep vein thrombosis (DVT) involving the leg. Fourteen of the readmission-admitting diagnoses were related to a wound. Half

of patients who were readmitted did so through the Emergency Department (ED) (Table 6, Appendix G).

The Discharge Plans for Clinic Follow-Up and Actual Clinic Follow-Up Summary Statistics

In the discharge summary, there were 64 (78%) patients with a documented follow-up appointment made to address the wound (Table 4, Appendix G). After discharging, a total of 69 (84.1%) patients received various types of clinic follow-up.

Comparing the differences between the group of readmitted and the group of non-readmitted, there were no differences between groups regarding documentation of follow-up appointments in the discharge summary, or whether or not they had some type of clinical follow-up. In other words, there was no difference between groups in the discharge plans for clinic follow-up and actual clinic follow-up (Table 7, Appendix G).

Patient Characteristics and Post Discharge Care Between Patients Readmitted Within 30-Days and Those Not Readmitted

There were 20 (24.4%) patients who were readmitted within 30 days and 62 (75.6%) patients who did not. Patient characteristics (age, weight, height, BMI, length of stay [LOS], and number of medications during discharging) were compared between groups.

In the group readmitted within 30 days, the mean age was 62.5 (SD[1] = 17.34) years old vs. 51.7 (SD = 15.97) years old ($p = 0.012$[2]), the mean weight was 92.5 (SD = 36.55) kg vs. 89.8 (SD = 29.99) kg, the mean height was 173.7 (SD = 12.41) cm vs. 173.5 (SD = 10.32) cm, the mean BMI was 36.42 (SD = 13.73) vs. 34.91 (SD = 20.74), and the mean LOS was 21 (SD = 27.1) days vs. 36.6 (SD = 60.92) days. The group of readmitted patients had more individual medications prescribed at discharge (mean 16. 5 (SD = 6.92) vs. 13.9 (SD = 8.64)). Both groups

[1] SD: Std. Deviation.
[2] $p < 0.05$ – statistically difference between two groups.

had similar mean height and BMI. Only age was statistically significant between groups; weight, height, BMI, LOS, and number of medications were not statistically significant.

Post-discharge care (Number of days after discharging before the first clinic follow-up visit? Number of ED visits within 30 days of first discharge from HMC? Number of clinic visits within 30 days of first discharge from HMC?) was compared between the two groups. The readmitted group had more ED visits (mean 0.7 (SD = 1.59) vs. 0.26 (SD = 0.89) within 30 days after first discharge from HMC. The average number of days before the first clinic follow-up visit was similar in both groups, as well as the number of all clinic visits within 30 days after first discharge from HMC. The average number of days up to the first clinic follow-up in the readmitted group was 19.63 (SD = 19.35) days vs. 18.94 (SD = 20.79) days compared to those not readmitted. The average number of time for clinical visits within 30 days in the readmission group was 2.05 (SD = 2.86) vs. 2.37 (SD = 2.72) to those non-readmitted. In conclusion, none of these comparisons were statistically significant.

The Different Factors Between the Readmitted Patients and the Non-Readmitted Patients

Several different factors were examined between the readmitted patients and the non-readmitted patients. In evaluating differences in demographic factors between readmitted and non-readmitted patients, readmitted patients were most frequently married (7, 35%) and discharged on Thursday (8, 40%); the most frequent marital status category for non-readmitted patients was being single (27, 43.5%) and discharged on Friday (17, 27.4%). There were no significant demographic differences between patients who were or were not readmitted based on gender, ethnicity, primary language(s), living status prior to hospitalization, discharge disposition, payer status, PCP prior to hospital admittance, and substance (nicotine, alcohol, non-IV/IV substance) use.

Missing wound care instructions in the patient discharge instructions was found to be associated with increased likelihood of readmission ($p = 0.040$). More than half of readmitted patients did not receive wound care instructions in the patient discharge instructions (14, 70%); thirty-five out of 62 (56.5%) non-readmitted patients had received wound care instructions. The patient discharge instructions or patient discharge checklist included a 24/7-callback number to the majority non-readmitted patients (37, 60%), but over half of readmitted patients (11, 55%) did not have the patient discharge instructions or patient discharge checklist that included a 24/7-callback number (Table 8, Appendix G). In the discharge summary, the majority of readmitted patients (12, 60%) included PCP's information; in contrast, the majority of non-readmitted patients (34, 54.8%) did not (Table 9, Appendix G).

There were no statistically significant differences regarding wound locations or types of open wound (Table 10, Appendix G), consultation during hospitalization (Table 11, Appendix G), patient education and caregiver information (Table 12, Appendix G), and documentation of the ambulatory care follow-up between readmitted/not readmitted patients (Table 13, Appendix G). There were also no significant differences between groups for follow-up phone call management. Both groups received the follow-up phone call management, but there were still close to half of the readmitted patients who did not receive the follow-up phone call management (Table 14, Appendix G).

Chapter V: Discussion

This study demonstrates a number of interesting and potentially important findings. First of all, comparing characteristics between patients readmitted within 30 days to those who did not readmit, readmitted patients were: older age (mean 62.5 +/-[3] 17.34 years old vs. 51.7 +/- 15.97 years old; p = 0.012), shorter length of stay (21 +/- 27.1 days vs. 36.6 +/- 60.9 days), more medications prescribed at time of discharge (16.5 +/- 6.92 vs. 13.97 +/- 8.64), and more ED visits after discharge from the hospital (0.7 +/- 1.59 vs. 0.26 +/- 0.89) may be factors, or possible "red flags," to predict patients with a higher risk of readmission.

Length of stay has been shortened since the mid-1980s for patients with wounds (Kravitz, 1996). This study found that shortened length of stay might increase the chance of readmission. A shorter length of stay may be associated with incomplete assessment or evaluation before patients are discharged from the hospital. A shorter length of stay might educe an increased readmission rate.

According to the Centers for Disease Control and Prevention ("Healthy weight - it's not a diet, it's a lifestyle!," 2013), BMI below 18.5 indicates underweight, BMI 18.5-24.9 indicates normal, BMI 25.0-29.9 indicates overweight, and BMI 30.0 and above indicates obesity. In the group of readmitted patients, the mean BMI was 36.42 (SD = 13.73) vs. the group of non-readmitted patients mean BMI of 34.91 (SD = 20.74). Both groups were found to have a mean BMI over 30.0 (obesity). While obesity is a potential health issue, and a factor in wound complications, it was not a differentiating factor between the readmission and non-readmission groups.

Patient discharge disposition arrangement is important to consider. Comparing pre and post hospitalization living status, for all 82 patients, 60 patients were living at home without

[3] +/-: Std. Deviation (SD)

services and 5 patients were homeless prior to hospitalization. After discharging, 21 patients went back home without any services and 1 patient was homeless. More than half of the patients were discharged to other healthcare facilities and/or provided arrangements with other healthcare service such as home services (visiting nurses), assisted living facilities, long-term acute care, respite, rehabilitation facilities, SNF (Table 1, Appendix G) This demonstrates the variability in patient disposition and complexity of the discharge process for HMC patients.

When patients receive discharge planning, readmission rates significantly decrease (Shepperd et al., 2010). HMC assisted patients by utilizing community resources and searching for appropriate discharge placement. In addition, an interesting, and possibly clinically important, finding was that among the 13 patients who discharged to a home with services (visiting nurses), none were readmitted to HMC.

There were gaps identified in healthcare providers' communication between time of discharge and post-discharge care. The PCP is important in post-discharge care. When patients are admitted to a hospital, determining PCP status is the beginning of planning for post discharge care. Identifying if the patient has a PCP is an important step towards better understanding the patient's health status and resources and providing continuous health care service. This study found that 43 (52.4 %) out of 82 patients did not have a PCP prior to hospital admittance, and a new PCP was assigned to only 15 of the 43 patients prior to discharge. Overall, less than half of the total sample had a discharge summary that included PCP's information (40, 48.8%).

Also, this study found that 20 (24.4%) out of 82 wound care plans were not addressed in the discharge summary. This discharge summary is a documentation tool for summarizing a patient's hospital course and planning for continuous care after discharging It is also a communication tool between acute hospitalization and post-discharge care, e.g. SNFs, clinic

follow-up, and respite. Incomplete wound care plan/instruction documentation in the discharge summary might contribute to miscommunication between different health care systems/agencies involved in patient follow-up or disposition (Smith & Alexander, 2012). Therefore, adding a standardized documentation format that includes PCP information in the electronic admission form and discharge summary, as well as includes wound care plans in the discharge summary, might improve documentation completeness and enforce the communication between the acute hospital health care team and follow-up clinic/agency health care providers.

This study found that a lack of wound care instruction was one possible factor that might increase likelihood of readmission between the readmitted patients and the non-readmitted. Only half of the total patients (41, 50%) had received wound care instructions in the discharge instructions. Comparing the readmitted group to the non- readmitted, less than half of the patients in the readmitted group had received wound care instructions (6 out of 20 patients); the non-readmitted group had a higher rate of patients who received wound care instructions (35 out of 62 patients) ($p = 0.040$) (Table 8, Appendix G). While wound care instruction was not documented in the discharge instruction; it was unclear whether patients had actually received wound care instruction or not. It may have been done, but not documented.

Wound care can be complicated due to the use of different wound care supplies, medications or topical agents. Patients often have open acute or chronic wounds at the time of discharge. Individualized patient discharge instructions and patient education are important factors in reducing patient readmission rate ("Fact Sheet: Hospital Discharge Planning: A Guide for Families and Caregivers," 2009; Shepperd et al., 2010; Smith & Alexander, 2012). Therefore, providing discharge instructions that include a complete wound care plan/instructions would help patients, caregivers, or family members to take care of their wounds. Discharge instruction is one

of the most important components provided to patients because it includes an important post-discharge care information. Giving wound care instruction could also reduce patient and caregiver stress while discharging from an acute hospital. Therefore, when discharging patients with wounds from an acute hospital, healthcare teams need to fully assess and evaluate patient conditions and provide adequate patient education and instruction before discharging patients.

Recognizing red flags for readmitted patient populations and providing a smooth discharge deposition arrangement is crucial. Ensuring health care providers acknowledge the importance of providing effective and complete wound care instruction in the discharge instruction could be the key for improving discharge instruction documentation. Building in a standardized format in the electronic admission form and discharge summary might improve documentation completion and enforce communication between the acute hospital health care team and post-discharge care.

Finally, development of a formal policy or protocol to demonstrate the discharge plan, as well as a formal policy around wound discharge planning, might be considered for improving the discharge process and reducing readmission rates for patients with wounds.

Limitations and Recommendations

The results presented here should be considered in light of limitations. The data were collected from patients within a single Medical Center with unique population characteristics (e.g., serving homeless safety net hospital); therefore, that might not generalize to populations of other acute care hospitals.

The study sample did not exclude patients who did not live in Washington State. Patients living outside of Washington State may have had their clinic follow-up visit or other post discharge care in other acute hospitals in their home state or town. This was discussed with the

data analyst and, due to system difficulty of determining this from the EMR, we included all patients who discharged with wounds.

Comorbidities could be factors that cause readmission. Patients with sepsis, UTI, and postoperative wound infections are reported to be more likely to be readmitted and cause individual's comorbidity (Kassin et al., 2012; Kravitz, 1996). However, comorbidities may be another limitation in this study because each patient had different comorbidities. For future study, consideration of comorbidities should be included and may help in understanding if this factor relates to readmission.

Patient's height and BMI may not be accurate in the EMR. After discussion with a wound care nurse at HMC, it was learned that height is rarely measured and most patients self-report their height. Therefore, this might also affect BMI accuracy as height is used to calculate BMI.

The PI found that most patients who discharged to a SNF did not receive discharge instructions or a patient discharge checklist. For patients who discharged to a SNF, the PI assumed that HMC staff would not give the discharge instructions to patients because the patients were moving to other healthcare facilities. It may also be that these patients were sicker, and/or unable to participate in discharge instruction. However, some readmissions were from SNFs (3, 15%). There may be a need for better communication between acute hospital facilities and other post discharge care settings, particularly SNFs.

It was not feasible to collect the documentation for patient's understanding of patient wound care education because not every healthcare provider had documented patient's understanding in wound care education. The PI found that, even for patients who were documented to have received education, healthcare providers did not document patient's understanding in the chart. However, documenting patient understanding of education is

important for clinicians to provide continuous care. The information could help healthcare providers follow-up on the patients' ability to take care of their wounds. In more complicated wounds or ostomy care, patients may need additional time to learn. Most patients in the hospital were in the acute disease stage and they might not be able to learn wound care at the first time of teaching; therefore, documenting the patient's understating can track learning status and identify areas for post discharge reinforcement. One approach to over come this is for healthcare providers to use teach-back skills while providing patient education, and document the results of the teach-back. This would allow other healthcare providers to evaluate a patient's learning status and provide additional teaching and patient education.

There were also limitations in determining patient cognitive status and their ability to take care of themselves at the time of discharge because discharge summaries lacked documentation about patient cognitive status and their ability to take care of themselves. This was also the case for the documentation of topical agent and recommendations for wound care, wound care supplies ordered, and prescriptions for wound supplies.

Lack of communication or documentation might cause misunderstandings about disease condition and care plan; therefore, the discharge summary should be individualized and include the patient's health state and condition while discharging from the hospital, including cognitive status, ability to take care themselves or not, need for wound care supplies prescriptions, if supplies are ordered and any topical wound care agent recommendations. The PI discussed the lack of documentation of topical agent recommendations for wound care, wound care supplies ordered, and prescriptions for wound supplies in the discharge summary with wound care nurses. In the hospital, most healthcare providers do not typically include wound care supplies order and prescription information in the discharge summary. However, the discharge summary is the

summation of a patient's hospital course and the health care they received. This discharge summary is also one of the communication tools between two facilities; therefore, providing a complete and continuous wound care plan in the discharge summary, including supplies ordered and prescriptions, could enhance patient's post-discharge follow-up care.

The phone call management was in the EMR and was pulled electronically from the EMR by the HMC Clinical Data Analyst. Due to the small readmission sample in this study, the PI did not find that follow-up by telephone was an effective method for reducing short-term hospital readmission. The study found that 55 (67.1%) out of 82 patients received the phone call management, but when patients received the follow-up phone call management from the HMC staff only a few patients were asked wound-related questions. Two (4%) out of 55 patients were asked, "Is your dressing dry and intact?" and "Did all your supplies and equipment arrive?"; 6 (11.0%) patients were asked, "Do you have any questions related to your visit or treatment plan?"; 30 (54.5%) patients were asked, "Can you tell me what things or changes would prompt you to call your doctor?"; 26 (47.3%) patients were asked, "Were you able to schedule your follow-up appointment"; and 4 (7.3%) patients were asked, "Do you have transportation arranged for your follow-up appointment?" The majority of patients were not asked specific questions which related to wound issues. This study found that only a small number of patients were asked questions that related to a wound. According to the HMC Clinical Data Analyst, ideally HMC staff would ask the questions based on the patient's hospital information; however, this information was not provided to the person making the phone call. They did not understand the patient's actual health condition/diseases and they did not know if the patient had any wounds. That resulted in the person calling asking the wrong questions or even not asking any questions that related to wound issues. Having phone call management ask the right questions is

important in determining the need for follow-up. HMC could develop a different list of questions based on disease categories. Those questions could be included for patients who need wound care after discharging, such as “Are you having any unusual pain, symptoms, or problems?”; “Are there any problems with your wound dressing?”; “Is the wound dressing in place? Dry?”; “Did all your supplies and equipment arrive?”; “Do you have any questions related to your visit or treatment plan?” Although this study did not find the significant decreases in readmission by phone call management, the phone call management did provide an opportunity for patients and caregivers to ask questions if they had concerns.

Finally, the number of readmissions was small (n = 20). This may have reduced the ability to detect factors that in a larger sample might be related to readmission. Increasing the sample size is recommended to further confirm the trends identified in the current study.

Conclusions

Thirty-day readmission rates may be related to a number of demographic factors, include older age, shorter LOS on the index admission, more medications at the time of discharge, and increased ED visits post-discharge. Discharge plans and discharge summaries need to provide complete individual health care details when patients are discharged from a hospital. Without PCP information in the discharge summary, opportunities to know about previous health conditions may be missed, as well as the PCP might not know the patient’s hospital course care and post-discharge care strategies. Missing wound care plans/instructions in the discharge summary might cause miscommunication between different health care facilities and providers. Lack of wound care instruction could increase the chance of readmission. Wound care instruction is an important part of patient education. Both having complete documentation in the discharge summary and providing complete wound care instruction are critical.

Understanding patient education learning status could help health care providers provide more specific wound care in terms of discharging planning. Therefore, documenting patient education understanding is another strategy to improve wound care and further decrease the chance of readmission. Also, discharge summaries ideally need to address patient cognitive status, ability to take care themselves after discharging, topical agent recommendations for wound care, and wound care supplies ordered and prescribed in order to have complete information for post discharge care. That information could help to guide the post-discharge follow-up care and provide baseline information on wound status at the time of discharge.

In conclusion, the process of open acute or chronic wound healing is continuous. Discharge plans, discharge summaries, discharge instructions, and patient education are essential for patients with open wounds. Missing any information could contribute to the rate of readmission. Developing a standardized format in the electronic documents might enhance communication amongst healthcare providers throughout healthcare systems and decrease the chance of readmissions. To fully identify and understand factors that are related to readmissions further research is needed.

Appendices

Appendix A: "Some Basic Questions for Care Givers to Ask" Adopted from Family Caregiver Alliance (2009).

Questions about the illness:

- What is it and what can I expect?
- What should I watch out for?
- Will we get home care and will a nurse or therapist come to our home to work with my relative? Who pays for this service?
- How do I get advice about care, danger signs, a phone number for someone to talk to, and follow-up medical appointments?
- Have I been given information either verbally or in writing that I understand and can refer to?
- Do we need special instructions because my relative has Alzheimer's or memory loss?

What kind of care is needed?

- Bathing
- Dressing
- Eating (are there diet restrictions, e.g., soft foods only? Certain foods not allowed?)
- Personal Hygiene
- Grooming
- Toileting
- Transfer (moving from bed to chair)

- Mobility (includes walking)
- Medications Managing symptoms (e.g., pain or nausea)
- Special equipment Coordinating the patient's medical care
- Transportation Household chores Taking care of finances

Questions when my relative is being discharged to the home*

- Is the home clean, comfortable and safe, adequately heated/cooled, with space for any extra equipment?
- Are there stairs?
- Will we need a ramp, handrails, grab bars?
- Are hazards such as area rugs and electric cords out of the way?
- Will we need equipment such as hospital bed, shower chair, commode, oxygen tank? Where do I get this equipment?
- Who pays for these items?
- Will we need supplies such as adult diapers, disposable gloves, skin care items? Where do I get these items?
- Will insurance/Medicare/Medicaid pay for these?
- Do I need to hire additional help?

Questions about training

- Are there special care techniques I need to learn for such things as changing dressings, helping someone swallow a pill, giving injections, using special equipment?
- Have I been trained in transfer skills and preventing falls?

- Do I know how to turn someone in bed so he or she does not get bedsores?
- Who will train me?
- When will they train me?
- Can I begin the training in the hospital?

Questions when discharge is to a rehab facility or nursing home

- How long is my relative expected to remain in the facility?
- Who will select the facility?
- Have I checked online resources such as www.Medicare.gov for ratings?
- Is the facility clean, well kept, quiet, a comfortable temperature?
- Does the facility have experience working with families of my culture/language?
- Does the staff speak our language?
- Is the food culturally appropriate?
- Is the building safe (smoke detectors, sprinkler system, marked exits)? Is the location convenient? Do I have transportation to get there?

For longer stays:

- How many staff are on duty at any given time?
- What is the staff turnover rate?
- Is there a social worker?
- Do residents have safe access to the outdoors?
- Are there special facilities/programs for dementia patients?
- Are there means for families to interact with staff?

- Is the staff welcoming to families?

Questions about medications

- Why is this medicine prescribed? How does it work? How long the will the medicine have to be taken?
- How will we know that the medicine is effective?
- Will this medicine interact with other medications' prescription and nonprescription? or herbal preparations that my relative is taking now?
- Should this medicine be taken with food? Are there any foods or beverages to avoid?
- Can this medicine be chewed, crushed, dissolved, or mixed with other medicines?
- What possible problems might I experience with the medicine? At what point should I report these problems?
- Will the insurance program pay for this medicine? Is there a less expensive alternative?
- Does the pharmacy provide special services such as home delivery, online refills or medication review and counseling?

Questions about follow-up care:

What health professionals will my family member need to see?

- Have these appointments been made? If not, whom should I call to make these appointments?
- Where will the appointment be? In an office, at home, somewhere else?
- What transportation arrangements need to be made?
- How will our regular doctor learn what happened in the hospital or rehab facility?

- Whom can I call with treatment questions? Is someone available 24 hours a day and on weekends?

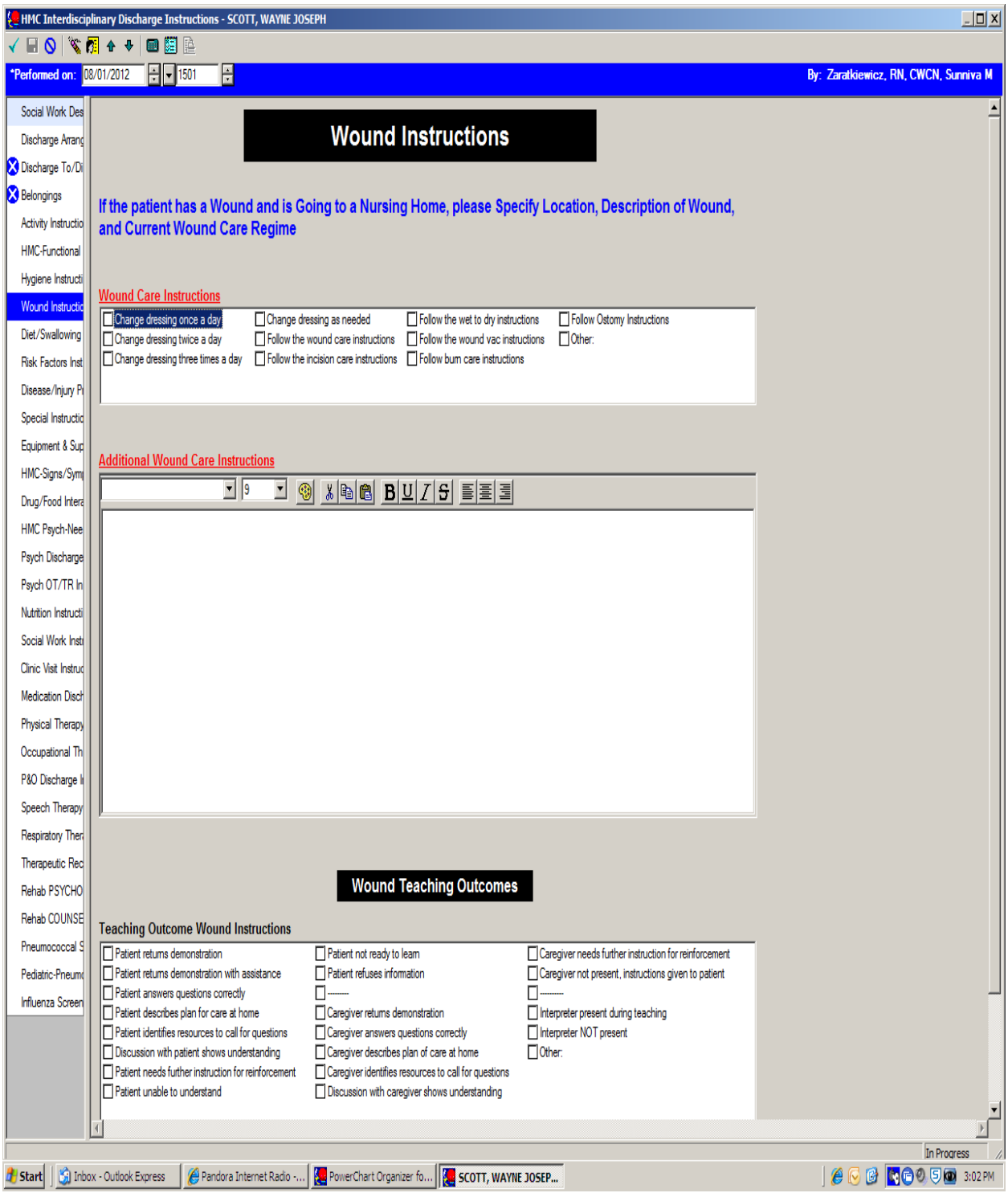
Questions about finding help in the community:

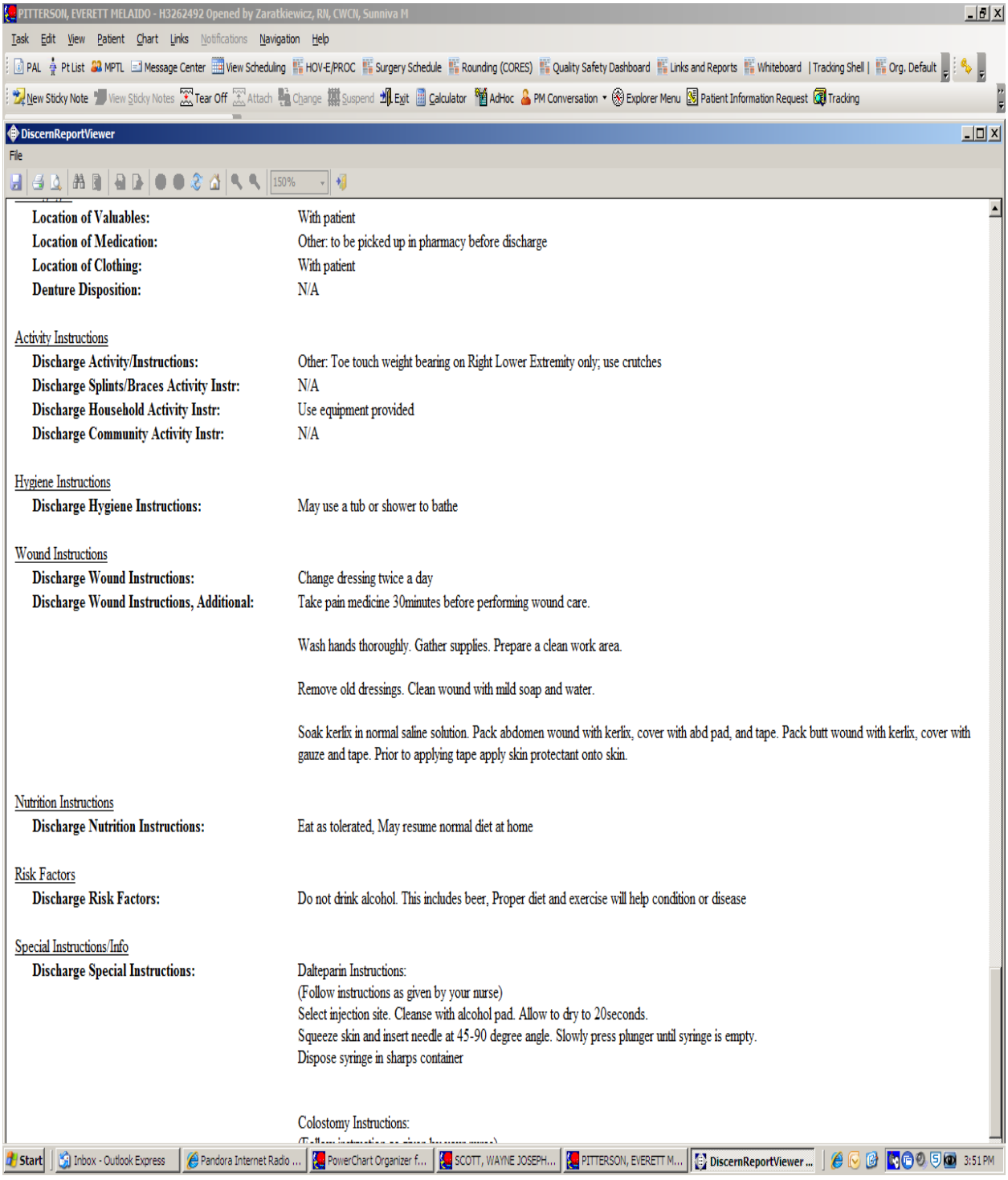
- What agencies are available to help me with transportation or meals?
- What is adult day care and how do I find out about it?
- What public benefits is my relative eligible for, such as In-Home Supportive Services or VA services?
- Where do I start to look for such care?

Questions about my needs as a caregiver:

- Will someone come to my home to do an assessment to see if we need home modifications?
- What services will help me care for myself?
- Does my family member require help at night and if so, how will I get enough sleep?
- Are there things that are scary or uncomfortable for me to do, e.g., changing a diaper?
- What medical conditions and limitations do I have that make providing this care difficult?
- Where can I find counseling and support groups?
- How can I get a leave from my job to provide care?
- How can I get a respite (break) from care responsibilities to take care of my own healthcare and other needs?

Appendix B: Harborview Medical Center Wound Instruction (ORCA)




PITTERSON, EVERETT MELAIDO - H3262492 Opened by Zaratkiewicz, RN, CWCN, Sunniva M
Task Edit View Patient Chart Links Notifications Navigation Help
PAL Pt List MPTL Message Center View Scheduling HOV-E/PROC Surgery Schedule Rounding (CORES) Quality Safety Dashboard Links and Reports Whiteboard | Tracking Shell | Org. Default
New Sticky Note View Sticky Notes Tear Off Attach Change Suspend Exit Calculator AdHoc PM Conversation Explorer Menu Patient Information Request Tracking
DiscernReportViewer
File
150%
Location of Valuables: With patient
Location of Medication: Other: to be picked up in pharmacy before discharge
Location of Clothing: With patient
Denture Disposition: N/A
Activity Instructions
Discharge Activity/Instructions: Other: Toe touch weight bearing on Right Lower Extremity only; use crutches
Discharge Splints/Braces Activity Instr: N/A
Discharge Household Activity Instr: Use equipment provided
Discharge Community Activity Instr: N/A
Hygiene Instructions
Discharge Hygiene Instructions: May use a tub or shower to bathe
Wound Instructions
Discharge Wound Instructions: Change dressing twice a day
Discharge Wound Instructions, Additional: Take pain medicine 30minutes before performing wound care.
Wash hands thoroughly. Gather supplies. Prepare a clean work area.
Remove old dressings. Clean wound with mild soap and water.
Soak kerlix in normal saline solution. Pack abdomen wound with kerlix, cover with abd pad, and tape. Pack butt wound with kerlix, cover with gauze and tape. Prior to applying tape apply skin protectant onto skin.
Nutrition Instructions
Discharge Nutrition Instructions: Eat as tolerated, May resume normal diet at home
Risk Factors
Discharge Risk Factors: Do not drink alcohol. This includes beer, Proper diet and exercise will help condition or disease
Special Instructions/Info
Discharge Special Instructions: Dalteparin Instructions:
(Follow instructions as given by your nurse)
Select injection site. Cleanse with alcohol pad. Allow to dry to 20seconds.
Squeeze skin and insert needle at 45-90 degree angle. Slowly press plunger until syringe is empty.
Dispose syringe in sharps container
Colostomy Instructions:
Start Inbox - Outlook Express Pandora Internet Radio ... PowerChart Organizer f... SCOTT, WAYNE JOSEPH... PITTERSON, EVERETT M... DiscernReportViewer ... 3:51 PM

Appendix C: Discharge "Time Out" Checklist (Mohta et al., 2012)

Discharge "Time Out" Checklist

During rounds, prior to writing/dictating the discharge summary, answer the following questions in 1-2 sentences each:

1. Who is this patient? (age, gender, major comorbidities)
2. How did s/he present? (chief complaint)
3. What were the relevant findings on history, PE, and studies?
4. What was the final diagnosis?
5. How was the patient treated?
6. What was the response to treatment?
7. What else happened to the patient?
    a. Complications or adverse events
    b. Other diagnoses, treatments, and response
8. How is patient at the time of discharge (esp. cognitive, cardiopulmonary, and functional status; include important data such as Cr, INR, weight if relevant)
9. What is the discharge plan?
    a. Destination and rationale if not obvious
    b. Medications: exactly how are they different from prior to admission?
    c. Diet, activity, return to work
    d. Other goals (eg, INR goal, dry weight and diuresis goal, BP goal, course of antibiotics, wound care)
    e. VNA, home PT, other services
10. What is the follow-up plan?
    a. When and with whom?
    b. What are the goals for the follow-up visit(s)?
    c. What tests and studies are pending, who is responsible for them, and what should be done with the results?
11. Contingency planning
    a. For patient: what should you watch for and whom should you call?
    b. For follow-up physicians: what could go wrong, what should they do about it, and whom should they contact with questions?
    c. Code status and healthcare proxy

Appendix D: Data Abstraction Form

A. Hospital Index

a. Study sample information (during discharge)

1. Study code: _____

2. Age: _____(years)

3. Gender

1 Female

2 Male

4. Marital status

1 Single

2 Married

3 Domestic partnership

4 Divorced

5 Widowed

6 Other/Unknown

5. Ethnicity/Race

1 American Indian or Alaska Native

2 Asian

3 Black or African American

4 Hispanic

5 White (Caucasian)

6. Primary language(s) other than English? _____ _____ _____

7. What was patient's living status prior to hospitalization?

1 Home without services

2 Home with services (Visiting Nurses)

3 Home hospice

4 Inpatient hospice

5 Skilled nursing facility (SNF)

6 Rehabilitation facility

7 Other acute care hospital

8 Street/Homeless

9 Shelter

10 Respite

11 Assisted living facility

12 Adult family home

13 Long term acute care (LTAC)

8. What was patient's payer (or insurance agency) status?

1 Medicare

2 Medicaid

3 Private

4 None, self-pay

5 Other

9. Nicotine use?

1 Yes

0 No

10. Alcohol use?

1 Yes

0 No

11. Non-intravenous (non-IV) substance use?

1 Yes

0 No

12. Intravenous (IV) drug (substance) use?

1 Yes

0 No

13. Patient body weight (kilogram; kg) at discharge (1 kg ≒ 2.2 pound (lb)): _____ (kg)

14. Patient height (Centimeters; cm) at discharge: _____ (cm)

15. Patient body mass index (BMI) at discharge: _____

16. Did the patient have a Primary Care Doctor (PCP) prior to admit to hospital?

1 Yes

0 No

17. If the patient did not have PCP, did HMC assign a PCP to the patient prior to discharge?

1 Yes

0 No

18. What was the discharge day of the week?

1 Monday

2 Tuesday

3 Wednesday

4 Thursday

5 Friday

6 Saturday

7 Sunday

19. What was the length of hospital stay (LOS)? _____ (days)
20. What was the primary discharge diagnosis? _____
21. What were the co-morbid diagnoses (comorbidities) (up to three)? _____
22. Was there a wound care plan documented during hospitalization (can be found in nursing note or wound care team consultation note)?

    1 Yes

    0 No
23. Was there a wound care plan/instructions as part of the discharge-planning summary?

    1 Yes

    0 No
24. Were there wound care instructions in the patient discharge instructions?

    1 Yes

    0 No
25. Was patient education about wound care documented prior to discharge (can be found in discharge readiness/wound care team consult/ patient education record/patient discharge check list)?

    1 Yes

    0 No
26. Was the wound care team consulted during hospitalization?

    1 Yes

0 No

27. Was a social worker consulted during hospitalization?

1 Yes

0 No

28. Was a nutrition consult done during hospitalization?

1 Yes

0 No

29. What was the discharging medical service (Primary provider service at the time of discharge)?

1 Medicine A

2 Medicine B

3 Medicine C

4 Medicine D

5 Medicine E

6 General Surgery Trauma I

7 General Surgery Trauma II

8 Medicine ICU

9 Medicine CCU

10 Medicine Hospitalist 1

11 Medicine Hospitalist 2

12 Medicine Hospitalist 3

13 Urology

14 Orthopaedics

15 Plastic Surgery

16 Oral Surgery

17 Thoracic-Vascular Surgery

18 Neurosurgery

19 Neurology S

20 Otolaryngology

21 Burn Surgery

22 Rehab Medicine

30. What was the number of medications the patient was prescribed at discharge? _____

b. Wound discharge planning summary

1. Did the wound discharge-planning summary include PCP's information (included patient has PCP or not)?

1 Yes

0 No

2. Where was the patient discharged to?

1 Home without services

2 Home with services (Visiting Nurses)

3 Home hospice

4 Inpatient hospice

5 Skilled nursing facility (SNF)

6 Rehabilitation facility

7 Other acute care hospital

8 Street/Homeless

9 Shelter

10 Respite

11 Assisted living facility

12 Adult family home

13 Long term acute care (LTAC)

3. Did the wound discharge planning note document patient education and understanding?

   1 Yes

   0 No

4. Was the patient cognitively independent?

   1 Yes

   2 No

   3 Unable to determine

5. Was the patient able to take care himself/herself independently at the time of discharge?

   1 Yes

   2 No

   3 Unable to determine

6. Did the patient have caregiver during hospitalization?

   1 Yes

   0 No

7. Did they have a family member or other caregivers (not including the patient him/her-self) after discharging?

1 Yes

0 No

8. Who was the primary learner for patient education?

1 Patient

2 Spouse

3 Children

4 Other relative

5 Other healthcare giver in a rehab facility, respite care or nursing home

9. Wound(s) location?

1 Back

2 Chest/abdomen

3 Head/neck

4 Upper extremities

5 Lower extremities

6 Pelvis/hip

7 More than one wound on multiple sites throughout the body

10. Types of open wound?

1 Pressure ulcers

2 Arterial ulcers

3 Venous ulcers

4 Diabetic ulcers (or Neuropathic wounds)

5 Surgical - Incisional

6 Abrasion

7 Traumatic

11. Did patient need wound care supplies after discharging?

    1 Yes

    0 No

12. Were there prescriptions for wound supplies?

    1 Yes

    0 No

13. Were wound care supplies ordered at the time of discharging?

    1 Yes

    0 No

14. Were dressing and/or topical agents recommendations for wound care included in discharge summary?

    1 Yes

    0 No

15. Was a follow-up appointment made to address the wound?

    1 Yes

    0 No

16. Did the Patient Discharge Instructions or Patient Discharge Check List include a 24/7-callback number to patient?

    1 Yes

    0 No

B. Phone Call Management and Clinical Record

   a. Follow-up phone call management

1. Did the patient receive the follow-up phone call (post-discharge call) management from HMC?

   1 Yes

   0 No

If the patient received the follow-up phone call (post-discharge call) management from HMC, were any of the wound care related questions 2-8 listed below asked by HMC staff?

2. Are you having any unusual pain, symptoms, or problems?

   1 Yes

   2 No

   3 Missing data

3. Is your dressing dry and intact?

   1 Yes

   2 No

   3 Missing data

4. Did all your supplies and equipment arrive?

   1 Yes

   2 No

   3 Missing data

5. Do you have any questions related to your visit or treatment plan?

   1 Yes

   2 No

   3 Missing data

6. Can you tell me what things or changes would prompt you to call your doctor?

1 Yes

2 No

3 Missing data

7. Were you able to schedule your follow-up appointment with your physician(s)?

1 Yes

2 No

3 Missing data

8. Do you have transportation arranged for your follow-up appointment?

1 Yes

2 No

3 Missing data

b. Ambulatory Care Follow-Up

1. Did the patient have **any** clinic follow-up visits?

1 Yes

0 No

2. Name of clinic/respite care (HMC, UWMC, and UW neighborhood clinics): _____

3. How many days was the **first** follow-up clinic visit after discharging? _____

4. Was wound closure documented at **first** follow-up clinic visit?

1 Yes

2 No

3 Missing data

5. Was the wound status described in the clinic note within 30 days after discharging?

1 Yes

2 No

3 Missing data

C. Patients with 30-Day Readmission

1. Readmission admitting diagnosis? _____
2. Was the readmission admitting diagnosis related to a wound?

   1 Yes

   2 No

   3 Missing data
3. How many days since the first discharge was the readmission? _____
4. Where was the patient readmitted through?

   1 ED

   2 Refer from clinic

   3 Non-Facility point of origin

   4 SNF

   5 Transfer

   6 Other

   7 Missing data
5. How many times did the patient readmit within 30 days after first discharge from HMC? _____
6. What was the number of emergency department (ED) visits after first discharge from HMC within 30 days? _____
7. What was the number of clinic visit after first discharge from HMC within 30 days? _

Appendix E: Study Variables

A. Hospital Index: Study Sample Discharge Variables and Wound Discharge Planning Summary Variables

Study Sample Discharge Variables	Wound Discharge Planning Summary Variables
Age	PCP information in wound discharge-planning summary
Gender	
Marital status	Living status after discharging
Ethnicity/Race	Condition at discharge, including functional status and cognitive status if relevant
Primary language	
Living status prior to hospitalization	
Payer (or insurance agency) status	Primary outpatient caregiver
	Family member or other caregiver
Nicotine use	Primary learner for patient education
Alcohol use	
Non-intravenous (non-IV) substance use	Location of open wound (characterize)
Intravenous (IV) use	Type of open wound (specific wound)
Body weight (BW)	Dressing and topical agents recommendation
Height	Discharge supply
Body mass index (BMI)	Prescription for wound supply
Primary care doctors (PCP)	Follow-up appointment
	24/7-callback number
Discharge day of the week	
Length of stay (LOS)	
Discharging diagnosis	
Comorbidities	
Wound care plan	

Wound care instruction Patient education Consult social worker Consult nutrition consult Consult wound care team Discharging medical service Number of medications	

B. Phone Call Management and Clinical Record: Follow-Up Phone Call Management Variables and Ambulatory Care Follow-Up Variables

Follow-Up Phone Call Management Variables	Ambulatory Care Follow-Up Variables
Receive patient phone call management	Clinical follow-up visit
	Name of clinic respite care
Unusual pain, symptoms, or problems	Days after discharging
Dressing dry and intact	
Supplies and equipment arrive	Documentation of would closure status
Questions related to your visit or treatment plan	Documentation of wound status
Things or changes would prompt patient to call doctor	
Schedule follow-up appointment	
Transportation	

C. Patients with 30-Day Readmission Variables

Patient with 30-Day Readmission Variables
Readmission admitting diagnosis
Readmission admitting diagnosis related to a wound
Days since the first discharge
Location patient readmitted through
Times patient readmit
Number of ED visit
Number of clinic visit

Appendix F: Current UW Medicine EpicCare Clinics by Facility

CLINIC	KNOWN RESIDENCY PROGRAM
HARBORVIEW	
Adult Medicine	Internal Medicine
Eye Institute	Ophthalmology
Family Medicine Clinic	Family Medicine
International Medicine Clinic	Internal Medicine
Pediatric Clinic	Pediatrics
Pioneer Square Clinics	Internal Medicine
Women's Clinic	OB/GYN
UNIVERSITY OF WASHINGTON MEDICAL CENTER	
Eastside Specialty Center (ESC)	Cardiology, GI, Gen Surg, Orthopaedics
UWMC Bone & Joint Center	Orthopaedics
UWMC Exercise Training Center	Rehab (mostly Physical Therapists)
UWMC Eye Center	Opthalmology
UWMC GIMC	Internal Medicine
UWMC Orthopaedics, UW Hand Fellowship	Orthopaedics Hand
UWMC Pediatrics	Pediatrics
UWMC Reproductive Health	OB/GYN
UWMC RHC Alderwood (Regional Heart Center)	Cardiology
UWMC Sports & Spine Clinic	Orthopaedics and Sports Medicine
UWMC Women's Clinic	OB/GYN
MS Clinic at NW Hospital	In process of GO LIVE as of July 2012
UNIVERSITY OF WASHINGTON NEIGHBORHOOD CLINICS	
Belltown	
Factoria	
Family Med Center in Northgate (formerly UWMC FMC)	Family Medicine
Federal Way	
Hall Health (formerly with UWMC)	
Issaquah	
Kent/Des Moines	
Shoreline	
Woodinville	

Appendix G: Data Tables

A. Sample Summary

Table 1. Demographic Factors

Factors	Total patients (n = 82) n	%
Demographic Factors		
Gender		
Male	57	69.5
Female	25	30.5
Marital status		
Married	22	26.8
Divorced	18	22.0
Domestic partnership	1	1.2
Single	33	40.2
Windowed	6	7.3
Other/unknown	2	2.4
Ethnicity/Race		
American Indian or Alaska Native	2	2.4
Asian	7	8.5
Black or African American	12	14.6
Hispanic	6	7.3
White (Caucasian)	55	67.1
Primary language(s)		
English	77	93.9
Burmese	1	1.2
Marshallese	2	2.4
Spanish	1	1.2
Unknown	1	1.2
Living status prior to hospitalization		
Adult family home	1	1.2
Assisted living facility	1	1.2
Home with services (Visiting nurses)	1	1.2
Home without services	60	73.2
Other acute care hospital	1	1.2
Rehabilitation facility	2	2.4
Respite	1	1.2
Shelter	3	3.7
Skilled nursing facility	7	8.5
Street/homeless	5	6.1

Discharge disposition		
Adult family home	1	1.2
Assisted living facility	2	2.4
Home with services (Visiting nurses)	13	15.9
Home without services	21	25.6
Long term acute care (LTAC)	1	1.2
Other acute care hospital	1	1.2
Rehabilitation facility	10	12.2
Respite	4	4.9
Skilled nursing facility	28	34.1
Street/homeless	1	1.2
Payer (or insurance agency) status		
Medicaid	28	34.1
Medicare	30	36.6
None-self pay	5	6.1
Private	10	12.2
Other	9	11.0
Primary Care Doctor (PCP) prior to admit to hospital		
Yes	39	47.6
No	43	52.4
(Cont. pervious question) If the patient did not have PCP, HMC assigned a PCP		
Yes	15	34.9
No	28	65.1
Discharge day of the week		
Monday	8	9.8
Tuesday	5	6.1
Wednesday	14	17.1
Thursday	18	22.0
Friday	23	28.0
Saturday	10	12.2
Sunday	4	4.9
Substance Use		
Nicotine use	20	24.4
Alcohol use	36	43.9
Non-intravenous (non-IV) substance use	19	23.2
Intravenous (IV) substance use	5	6.1

Table 2. Wound Care Documentation

Factors	Total patients (n = 82) n	%
Wound Care Documentation		
Wound care plan documented during hospitalization	82	100
Wound care plan/instructions in the discharge summary	62	75.6
Wound care instructions in the patient discharge instructions	41	50.0
Wound care related patient education documented	71	86.6
24/7-callback number to patients	46	56.1

Table 3. Wound-Related Information

Factors	Total patients (n = 82) n	%
Wound-Related Information		
Wound(s) location		
Chest/Abdomen	1	1.2
Head/Neck	7	8.5
Lower extremities	40	48.8
Upper extremities	1	1.2
Pelvis/Hip	24	29.3
More than one wound on multiple sites throughout the body	9	11.0
Types of open wound		
Abrasion	4	4.9
Arterial ulcers	4	4.9
Diabetic ulcers	20	24.4
Pressure ulcers	38	46.3
Surgical – Incisional	4	4.9
Traumatic	9	11.0
Venous ulcers	3	3.7

Table 4. Documentation of the Discharging Plan Summary

Factors	Total patients (n = 82) n	%
Discharge Summary		
Discharging medical service		
Burn surgery	1	1.2
General surgery trauma I	3	3.7
General surgery trauma II	5	6.1
Medicine A	5	6.1
Medicine B	7	8.5
Medicine C	5	6.1
Medicine D	3	3.7
Medicine E	8	9.8
Medicine CCU	2	2.4
Medicine ICU	1	1.2
Medicine hospitalist 1	1	1.2
Medicine hospitalist 2	12	14.6
Medicine hospitalist 3	2	2.4
Neurology S	1	1.2
Neurosurgery	3	3.7
Oral surgery	1	1.2
Orthopaedics	7	8.5
Otolaryngology	1	1.2
Plastic surgery	5	6.1
Rehab medicine	5	6.1
Thoracic-Vascular surgery	2	2.4
Urology	2	2.4
Discharge summary included PCP's information	40	48.8
Cognitively independent		
Yes	74	90.2
No	5	6.1
Unable to determine	3	3.7
Wound care related information – in discharge summary		
Patients need wound care supplies	69	84.1
Prescriptions for wound care	18	22.0
Wound care supplies ordered	7	8.5
Topical agents recommended for wound care	24	29.3
Follow-up appointment made for wound	64	78.0

Table 5. Patient Education and Caregiver Information

Factors	Total patients (n = 82) n	%
Patient Education and Caregiver Information		
Patients able to take care of themselves		
Yes	29	35.4
No	52	63.4
Unable to determine	1	1.2
Patients have caregiver during hospitalization		
Yes	33	40.2
No	49	59.8
Patients have family members or other caregivers after discharging		
Yes	56	68.3
No	26	31.7
Primary learner for patient education		
Patient	40	48.8
Spouse	5	6.1
Children	1	1.2
Other relative	4	4.9
Other healthcare giver in a rehab facility, respite care, or nursing home	32	39.0

Table 6. Patient 30-Day Readmission Information

Factors	Total patients who readmitted within 30 days (n = 20) n	%
30-Day Readmission Information		
Readmission admitting diagnosis related to wounds		
Yes	14	70.0
No	6	30.0
Readmission admitting diagnosis		
Foot cellulitis	1	5.0
Heel and mid foot ulcer	2	10.0
Acute respiratory fail trauma/surgery	1	5.0
Acute DVT leg NOS[1]	1	5.0
Atherosclerosis extremities with gangrene	1	5.0
Chest swelling/mass/lump	1	5.0
CKD[2] - stage	1	5.0
Disrupt internal operation (op) wound	1	5.0
Extremities with ulcer	1	5.0
Gangrene	2	10.0
Infection amputation stump	1	5.0
Intra-spinal abscess	1	5.0
Late effects trauma amputation	1	5.0
Osteomyelitis	1	5.0
Other foot ulcer	1	5.0
Post-op infection NEC[2]	1	5.0
Pressure ulcer	1	5.0
Toxic encephalopathy	1	5.0
Readmitted through		
Emergency department (ED)	10	50.0
Refer from clinic	3	15.0
SNF	2	10.0
Transfer	1	5.0
Non-facility point of origin	4	20.0

Note: [1] NOS: Not otherwise specified (ICD-9-CM)
[2] CKD: Chronic kidney disease
[3] NEC: Not elsewhere classified (ICD-9-CM)

B. The Discharge Plans for Clinic Follow-Up and Actual Clinic Follow-Up Summary Statistics

Table 7. The Discharge Plans for Clinic Follow-Up and Actual Clinic Follow-Up

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Discharge Summary					0.705
Follow-up appointment made for wound					
Yes	49	76.6	15	23.4.	
No	13	72.2	5	27.8	
Ambulatory Dare Follow-Up					0.559
Patients have any clinic follow-up					
Yes	53	76.8	16	23.2	
No	9	69.2	4	30.8	

C. The Different Factors Between the Readmitted Patients and the Non-Readmitted Patients

Table 8. Wound Care Documentation

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Wound care plan/instructions in the discharge summary					0.085
Yes	44	71.0	18	29.0	
No	18	90.0	2	10.0	
Wound care instructions in the patient discharge instructions					0.040*
Yes	35	85.4	6	14.6	
No	27	65.9	14	34.1	
Wound care related patient education documented					0.811
Yes	54	76.1	17	23.9	
No	8	72.7	3	27.3	
24/7-callback number to patients					0.250
Yes	37	80.4	9	19.6	
No	25	69.4	11	30.6	

* Pearson Chi-square value under "Asymp. Sig. (2-tailed)" which less than 0.05 indicates that the rows and columns of the contingency are dependent.

Table 9. Documentation of the Discharging Plan Summary

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Discharge summary included PCP's information					0.248
Yes	28	70.0	12	30.0	
No	34	81.0	8	19.0	
Cognitively independent					0.106
Yes	57	77.0	17	23.0	
No	2	40.0	3	60.0	
Unable to determine	3	100.0	0	0	
Patients need wound care supplies					0.904
Yes	52	75.4	17	24.6	
No	10	76.9	3	23.1	
Prescriptions for wound care					0.388
Yes	15	83.3	3	16.7	
No	47	73.4	17	26.6	
Wound care supplies ordered					0.515
Yes	6	85.7	1	14.3	
No	56	74.7	19	25.3	
Topical agents recommended for wound care					0.629
Yes	19	79.2	5	20.8	
No	43	74.1	15	25.9	

Table 10. Wound-Related Information

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Wound(s) locations					0.822
Chest/Abdomen	1	100.0	0	0	
Head/Neck	5	71.4	2	28.6	
Lower extremities	28	70.0	12	30.0	
Upper extremities	1	100.0	0	0	
Pelvis/Hip	20	83.3	4	16.7	
More than one wound on multiple sites throughout the body	7	77.8	2	22.2	
Types of open wound					0.191
Abrasion	3	75.0	1	25.0	
Arterial ulcers	2	50.0	2	50.0	
Diabetic ulcers	15	75.0	5	25.0	
Pressure ulcers	31	81.6	7	18.4	
Venous ulcers	3	100.0	0	0	
Surgical – incisional	1	25.0	3	75.0	
Traumatic	7	77.8	2	22.2	

Table 11. Consultation During Hospitalization

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Wound care team consulted					0.788
Yes	57	76.0	18	24.0	
No	5	71.4	2	28.6	
Social worker consulted					0.076
Yes	58	78.4	16	21.6	
No	4	50.0	4	50.0	
Nutrition consulted					0.435
Yes	54	77.1	16	22.9	
No	8	66.7	4	33.3	

Table 12. Patient Education and Caregiver Information

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Patients able to take care of themselves					0.846
Yes	22	75.9	7	24.1	
No	39	75.0	13	25.0	
Unable to determine	1	100.0	0	0	
Patients have caregiver during hospitalization					0.980
Yes	25	75.8	8	24.2	
No	37	75.5	12	24.5	
Patients have family member or other caregivers after discharging					0.458
Yes	41	73.2	15	26.8	
No	21	80.8	5	19.2	
Primary learner for patient education					0.535
Patient	33	82.5	7	17.5	
Spouse	4	80.0	1	20.0	
Children	1	100.0	0	0	
Other relative	3	75.0	1	25.0	
Other healthcare giver in a rehab facility, respite care, or nursing home	21	65.6	11	34.4	

Table 13. Documentation of the Ambulatory Care Follow-Up

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Wound closure documented at first follow-up clinic visit					0.729
Yes	16	72.7	6	27.3	
No	37	78.7	10	21.3	
No ambulatory care follow-up	9	69.2	4	30.8	
Wound status described in any clinic visit within 30 days					0.733
Yes	36	75.0	12	25.0	
No	17	81.0	4	19.0	
No ambulatory care follow-up	9	69.2	4	30.8	

Table 14. Phone Call Management

Variable	No Readmission (n = 62)		Readmission (n = 20)		Asymp. Sig. (2-tailed)
	n	%	n	%	
Received the follow-up phone call management					0.186
Yes	44	80.0	11	20.0	
No	18	66.7	9	33.3	

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