

COMPARING TWO IDENTIFICATION METHODS OF MISSED
NURSING CARE

A DISSERTATION

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COLLEGE OF NURSING

BY

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DEDICATION

To Nurse Janie, my mother extraordinaire!

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There were many partners in my Ph.D. journey. I would like to honor God for giving me the dream and the resources to pursue this journey. My husband, Bill, has been the best advisor, confidante and resource person. His logic and technical skills have kept me grounded in reality and allowed me to progress. The understanding he provided is beyond description but will be forever with me. Thank you, Bill, for taking care of me these many years.

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ABSTRACT

DEBORRAH JANE WEGMANN

COMPARING TWO IDENTIFICATION METHODS OF MISSED NURSING CARE

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The purpose of this study was to compare two methods for identifying missed nursing care. The two identification methods were: (1) Self-reporting by nursing staff using the MISSCARE survey and (2) a medical record audit. The research questions asked if missed nursing care was identifiable by either method for the patient population of patients who experienced a pressure ulcer, (b) did personnel type (registered nurse vs. nursing assistant) make a difference in the identifying missed nursing care, (c) did the time of day (peak vs. off-peak hours) make a difference in the identification of missed nursing care, (d) was missed nursing care a predictor for the occurrence of pressure ulcers, and (e) if missed nursing care was a predictor for the occurrence of pressure ulcers which care variables contributed to the predictor model?

Data were collected from the study hospital's MISSCARE survey and a medical record audit. A comparison was conducted using (SAS 9.1) exploratory techniques, MANOVA, multinomial and logistic regression to test the five research questions. Three research questions were not supported by the data and were retired. The personnel type question showed that more missed nursing care was reported by the registered nurse

population. The time of day questions showed that ambulation that was missed at the 50%-75% level had a greater odds ratio than the other care variables. No other significant relationships were identified.

A second dependent variable was identified and used. The Braden Risk Assessment score for each patient was used a proxy for the potential of a pressure ulcer occurrence. The prediction capability of the Braden Risk Assessment score to identify missed nursing care was not significant for any of the care variables.

The comparison of the two identification methods revealed the same trending that is noted in other reported studies. The rates are lower than the other studies. Missed nursing care is comparably identified using either the self-reported MISSCARE survey or a medical record audit using the six selected care variables.

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CHAPTER I

INTRODUCTION

“It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm,” (Nightingale, 1859, p. iii). To do no harm has been a primary mandate since the beginning of professional nursing. Yet when one surveys the literature, research studies, projects and national initiatives, the focus is on outcomes, most of which are adverse or negative.

The Institute of Medicine’s (IOM) study, (Kohn, Corrigan, & Donaldson, 1999) reported the occurrence of 98,000 preventable deaths per year. While the number of deaths was debated the fact that there were preventable deaths occurring was established.

The last 20 years have seen the advancement of outcomes research. The investigations by the profession of nursing have largely been focused on the relationship of nurse staffing to patient outcomes such as mortality, length of stay and readmissions (Aiken, Clarke, & Sloan, 2002; Aiken, Clarke, Sloan, & Sochalski., 2001; Blegen, & Vaughn, 1998; Blegen, Vaughn, & Vojir, 2008; Kovner, & Gergen, 1998; McGillis, 2003; McGillis, Doran, & Pink, 2004, 2008; Spetz, Donaldson, Aydin, & Brown, 2008; Tschannen, & Kalisch, 2009; Van den Heede, Clarke, Sermeus, Vleugels, & Aiken, 2007). Other nurse researchers have examined the relationship between the nurse work environment (i.e., the hospital) and patient outcomes (Capuano, Bokovoy, Hitchings, & Houser, 2005; Lake, & Cheung, 2006; Mark, Salyer, & Wan, 2003; Smith, Hood,

Waldman, & Smith, 2005; Pape, 2002, 2003, 2005; Sovie, & Jawad, 2001; Ulrich, Buerhaus, Donelan, Norman, & Dittus, 2005). The focus on outcomes has led to the understanding that causal relationships are understood when examined by provider type (i.e., physician and nurse, and other healthcare providers).

One concept highlighted over the last decade has been missed nursing care or omitted nursing care. Missed nursing care occurs when expected nursing care is not provided. An excellent example of missed nursing care is noted in the Centers for Medicare and Medicaid Services' (CMS) national quality project, known as Hospital Quality Alliance project (HQA). As part of the project CMS recruited hospitals to report the implementation of care provided by physicians, nurses and others. The incentive to report was additional payment for good performance and a reduction in payment for sub-standard performance. The HQA project uses process measures to determine the quality of evidence based care provided. These process measures are often referred to as the National Inpatient Quality Measures "Core Measures" by the Joint Commission (see Appendix A). Each patient population group uses indicators to measure the standard of care being delivered to the patient population. The use of indicators standardizes the care and measurement of said care. This standardization allows for comparison between hospitals

Core Measures

The Core Measures were introduced in 1987 by the Joint Commission (TJC) as part of the Agenda for Change (The Joint Commission [TJC], 2006). In an effort to standardize content and measurement techniques for evaluation between hospitals, the

ORYX[®] initiative was created. The measurement indicators used in ORYX[®] are the precursors to today's Core Measure indicators. In 1999, TJC was continuing to refine a national quality measurement system. Input was sought from providers, hospitals, consumers, state hospital associations and professional societies. Once patient populations were identified, advisory panels were used to identify measures (TJC, 2006). Each panel was responsible for using clinical logic to provide a framework that identified inter-related, evidence-based measures that can assess the overall quality of care. TJC (2006) developed a process for the identification, testing, specification and implementation of core performance measures. The work of the panels was posted on TJC (2006) web site for public and professional comment. TJC received over 1,600 comments. The indicators were refined based on the feedback received.

The Core Measure indicators were developed using the following principles:

1. To fit with existing health care organizations' approaches to performance improvement.
2. To support TJC mission.
3. To meet the needs of all users.
4. To use measures that use criteria that is supported by clinical evidence.
5. To provide disseminated measurement data.
6. To coordinate with other national measurement projects.
7. To be cost effective and reduce waste.
8. To not place heavy burdens on health care organizations.

9. To ensure accuracy and completeness (TJC, 2009).

The objective of these activities was to establish the technical infrastructures within health care organizations, performance measurement systems and at the Joint Commission necessary to support the continuing evolution of performance measurement activities (TJC, 2008). The development of a standardized performance measurement system supports the public's call for health care quality transparency (TJC, 2008).

There are other organizations that are interested in assessing the quality of care provided in hospitals. One such organization is the Hospital Quality Alliance (HQA) comprised of the American Hospital Association (AHA), the Federation of American Hospitals (FAH) and the Association of American Medical Colleges (AAMC). HQA works closely with CMS and other stakeholders in the measure of quality by patient populations (TJC, 2008). It is a public-private collaboration that represents a wide range of stakeholders. The stakeholders include hospitals, health professionals, government agencies, quality experts, purchasers and consumer groups. The main goal of the HQA is to make hospital performance accessible to the public through the Hospital Compare website (TJC, 2008). The HQA, like TJC, collects data for quality measures from four sources: (a) claims, (b) medical record (audit), (c) surveys and (d) other organizations.

Over the years, it has repeatedly been found in the Core Measures that nursing care is routinely not provided (Centers for Medicare and Medicaid Services [CMS], 2010). National level results show for example, that heart failure patients receive 78% of the evidenced-based care needed for discharge instructions. For the patients with Pneumonia the required vaccinations are received less than 100% of the time. Of those

required vaccinations, Pneumococcal vaccination is received 86% of the time and the influenza vaccination is received 85% of the time (CMS, 2010). Hospital Compare also publishes other Core Measures with scores less than 100%. Other researchers also found similar results. Lucero, Lake, and Aiken (2009) reported that Acute Myocardial Infarction, Heart Failure and Pneumonia patients were receiving only 75.9% of the care expected. Those undelivered care measures may represent the tip of the iceberg, of care that is not received when expected. When Core Measure indicators and established clinical protocols are not implemented consistently, care not provided may be contributing to deficiencies in safety and quality patient care.

Currently, aside from mortality, there is no patient outcome (i.e., readmissions, length of stay, cost effectiveness, or infections) linked to the process measures. The lack of formal links between the process measures and patient outcomes increases the difficulty of ensuring that the proper care is provided and results obtained. It was reported earlier in the chapter that process measures are consistently not provided to patients thus creating missed nursing care occurrences. Understanding the impact of these missed nursing care events on the patient is unclear in these national projects since there are no direct links between outcomes and measures. With the introduction of the missed nursing care concept, another layer of uncertainty is added about how patient outcomes are impacted. The growing emphasis on patient safety in healthcare calls for nurses to be the primary gatekeeper for the safety of patients.

From these observations, a performance gap has been established in the national performance improvement programs. Granular examinations of missed nursing care have

determined that a gap exists between expected care to be provided, and missed nursing care. There is only speculation or inferences about the relationship between missed nursing care and patient outcomes (Kalisch, 2006). This study was designed to address two gaps in the current literature, (a) missed nursing care and patient outcomes by examining the relationship between selected interventions and the patient outcome pressure ulcer, and (b) to identify which of two methods for identifying missed nursing care works best.

Purpose of Study

There is growing evidence of missed care in nursing units (Bittner & Gravlin, 2009; CMS, 2010; Kalisch, 2006, 2009; Kalisch, Landstrom, & Hinshaw, 2009; Kalisch, Landstrom, & Williams, 2009; Kalisch, & Williams, 2009; Lucero, Lake, & Aiken, 2009; Thomas-Hawkins, Flynn, & Clarke, 2008). The link between missed care and patient outcomes has been theoretically established but not supported by research (Kalisch, & Williams, 2009). It is logical to expect there to be a link between missed nursing care and patient outcomes. With the IOM reporting that there are 98,000 preventable deaths per year in hospitals, it is conceivable that missed nursing care may be contributing to negative patient outcomes (Kohn, et al., 1999). Early investigators of missed nursing care have called for further study of missed nursing care and its relationship to patient outcomes (Lucero et al., 2009; Sochalski, 2004).

In response to the call for further study, this study proposed to examine which of the two selected methods is the best for identifying missed nursing care. The examination included two identification methods: self-reported missed nursing care and

missed nursing care identified through medical record audit. A determination will be made if either method best identifies missed nursing care for the patient population with at-risk Braden Risk Assessment scores.

To achieve that goal, the proposed study had two objectives. The first objective was to explore the relationship between two methods used to identify missed nursing care. The methods are self-reporting of missed nursing care and documentation of care provided identified by medical record audit. The second objective was to evaluate the potential link between missed nursing care and pressure ulcers, a patient outcome.

Rationale for the Study

In order to understand the contributions of nurses to the care of patients, it is necessary to describe not only what nurses do, but also how they do it. Nurses report that not completing patient care conflicts with their traditional care ethics and the expectation of patients to be cared for by nurses. There is an expectation that care be provided based on a care ethics theme. One characteristic of the care theme is that the patient and caregiver are placed at the center of the caring process (O'Conner, 2000). Together the patient and nurse engage in a caring relationship. The focus of care cannot be fully realized if missed nursing care is occurring. The moral and ethical issues associated with missed nursing care have repercussions for the patient, the nurse and the healthcare organization.

Healthcare providers and organizations have the ongoing challenge of identifying nursing care that is being missed and why missed nursing care is occurring. Consideration of this question from a moral perspective raises the question that nurses

ask: What should I do for this patient, at this particular moment, at this location? Abma et al., (2008) offer another perspective of the same thought, “What a good nurse is, also depends on the situation at hand” (p.791). When considering missed nursing care, imagine a nurse with five patients (considered a reasonable patient assignment today), three are being discharged and there are two admissions from the emergency room waiting to be admitted. One of the remaining patients is to be turned every two hours and has been turned twice over an eight hour period. The nurse elects not to share this information with anyone. Now imagine this occurring for two days to the same patient. Instead of being turned 24 times, the patient was turned 12 times. The patient may have been placed at greater risk for a pressure ulcer occurrence. From previous research studies, as mentioned above, it is evident that nursing staff are aware of missed nursing care. However, the patient/family may or may not be aware of the missed nursing care. This creates a potential for a negative impact on the nurse-patient relationship and can cause moral distress within the nursing staff. From a broader perspective missed nursing care can lead to negative patient outcomes, which may have undesirable outcomes for the healthcare organization as well.

It is also important to understand the patient’s point of view. Morath and Turnbull (2005) contend that the hospitalized patient has two expectations. First, that they will not be harmed as a result of their hospitalization. Secondly, that nurses will provide competent and compassionate bedside care.

The first expectation is implicit. Bartzak (2010) identified that no large scale studies have quantified how bedside nursing care is delivered or identified factors that

contribute to nursing care excellence. Understanding the relationship between nursing care and excellence is difficult. There are many confounding variables such as the patient's condition, the level of organizational support and the nurses providing the care. The identification of good nursing care will not include the concept of missed nursing care.

An evaluation of what makes nurses provide good nursing care is described in the following paragraphs. Bartzak (2010) writes about nurses' professional work ethics and its relationship to the quality of bedside care. Nurses who deliver minimal care may lack insight into personal action or the nurse who is aware but does not have the skills and commitment to change. Nurses without strong professional work ethics may be at risk for burnout which may lead to less than high quality patient care (Bartzak, 2010).

The ability of nurses to be sensitive to each patient's unique needs reflects nurses' sense of moral duty to their patients. Nurses participate in decisions about what care to provide and how to provide that care (Murphy & Robert, 2008). This concept is being used when missed nursing care occurs.

A link between missed nursing care and moral distress has been identified in Kalisch's (2006) original qualitative study. Moral distress occurs when one is aware of the right course of action but is unable to act in the correct moral way (Schluter, Winch, Holzhauser, & Henderson, 2008). Nurses have an obligation to care and to be sensitive to the physical and emotional needs of patients. Schuller, Winch, Holzhauser and Henderson, (2008) offer that normal distress results from awareness of a morally appropriate action, which cannot be performed owing to organization or other obstacles

as inadequate numbers of staff, time limitations and legal constraints. Moral distress, as reported by Ludwick and Silva (2003) was found to be a direct result of errors made because of nurse shortages. Along the same thought, Van den Arend and Remmers-ve den Hurk (1999) reported that the most common morally problematic situations are: (a) unprofessional collegian relationships, (b) nurses who lack knowledge and (c) those who do not report errors.

Missed nursing care has been identified as an unreported error of omission. Missed nursing care is practiced by Registered Nurses, Licensed Vocational Nurses, and Nurses Aides alike. Eight studies and one concept analysis (Kalisch, Landstrom & Hinshaw, 2009) have shown evidence of missed nursing care across many types of nursing units and hospitals. While the amount of missed nursing care varies between units, all types of units nursing staffs report the occurrence of missed care. The prevalence of reported missed nursing care ranges between 40 – 60% of patients experience missed nursing care (Bittner & Gravlin, 2009; Kalisch, 2006, 2009; Kalisch, Landstrom, & Hinshaw, 2009; Kalisch, Landstrom, & Williams, 2009; Kalisch & Williams, 2009; Lucero et al., 2009; Thomas-Hawkins et al., 2008; Sochalski, 2004).

Knowing how to best measure missed nursing care is not currently understood. “Errors of omission are more difficult to recognize than errors of commission but likely to represent a larger problem” (Agency for Healthcare Research and Quality [AHRQ], 2011, para. 2). Surveillance is a function provided by nurses. Knowing that there are errors of omission has the potential to disrupt surveillance. Hospitals count on nurses to provide surveillance to prevent error and to ensure the quality of care. Clarke and Aiken

(2003) expressed concern about there being too few staff to provide proper surveillance to prevent errors. Other questions are (a) who provides the surveillance and (b) how often does the surveillance occur?

Currently, there are two methods that can be used to identify missed care: self-reported missed nursing care (MISSCARE survey) and missed nursing care identified through medical record audit. The MISSCARE survey was developed by Kalisch, Landstrom, and Williams (2009) using the results of Kalisch's (2006) qualitative study. The tool consists of two sections, Part A and Part B. Part A has 24 items of missed nursing care that measures the amount of missed nursing care that was experienced on the last worked shift by each respondent. Part B measures the reported reasons why missed nursing care occurs. Currently, Kalisch, Landstrom, and Williams (2009) recommend the administration of the survey every 6-12 months. The MISSCARE Survey is new and has not been tested to determine if the findings match the documentation in the medical records.

The second method of identification of missed nursing care is the use of results from a medical record audit. The use of medical record audit results has been the traditional method of collecting data for review of nursing care. The Core Measures initiative uses medical record audit technique exclusively (QualityNet, 2010). Most hospital specific performance improvement projects use medical record audits to judge the level of care being provided in a specific situation (Bosek & Ring, 2010). Medical record audits are used to identify missed nursing care (i.e., the HQA national project).

The presence of missed nursing care requires a timely response from nursing leadership. The benefit of having an alternative method to identify missed nursing care in a timelier manner may support the feedback loop needed by nursing leadership. One example is the prevention of pressure ulcer occurrence. If nursing leadership found that the rate of turning a patient or patient skin assessment from the past 24-hours had not met unit policy, then immediate performance improvement action plans could be implemented. This would create a proactive environment for the prevention of pressure ulcers. Such findings will support the expectation by performance improvement specialists for real-time data and change. To meet today's external regulatory agencies expectations; change needs to be performed using a rapid cycle timeline.

This study examined the link between the two methods of identifying missed nursing care: missed nursing care identified by self-report, and missed nursing care identified by medical record audit. The patient population used for the study used two identification methods were patients who were at risk of obtaining a pressure ulcer. Pressure ulcers have been identified as a "Harm Measure" by CMS (2007). The significance of the Harm Measure identification is multiple. The patient is placed at-risk for obtaining an outcome that is harmful and many times avoidable. The development of a hospital acquired pressure ulcer places the patient in a compromised state. The other implication is for the organization that will not be reimbursed for a portion of the care of the patient with a hospital acquired pressure ulcer.

The key variables in this study were missed nursing care that is self reported, and missed nursing care that is identified by medical record audit in the pressure ulcer risk

population. Two organizational variables were added: (a) missed nursing care will be investigated by personnel type (licensed nurses versus nursing assistant), and (b) time of day (shift type: Peak hours: Monday-Friday, 0700 - 1859 versus off peak hours: Monday-Friday, 1900-0659 and Saturday, 0700 – Monday, 0659). These variables may help nursing leadership professionals understand who is missing nursing care, which could lead to appropriate performance improvement initiatives, which may lead to improved care outcomes.

Conceptual Framework

The conceptual framework serves: (a) to provide a common language for discussion (Mason & Waywood, as cited in Smith, 2004), (b) summarize existing knowledge (Portney & Watkins, 2009), (c) as a framework for interpretation of observations (Portney & Watkins, 2009), (d) to provide a structure development of new knowledge (Portney & Watkins, 2009), and (e) to frame conclusions (Bordage, 2009).

Conceptual frameworks incorporate the following ideas.

- To structure a problem or show results (Rew et al., 2005; Bordage, 2009).
- To identify variables and potential relationships.
- Conceptual frameworks are dynamic,
- Are interdisciplinary, and
- Is the backbone of a study (Bordage, 2009).

Bordage (2009) suggests using more than one conceptual framework to structure and guide a study. Bordage (2009) contends that a multiple framework study has more depth.

The selected framework, Quality Health Outcomes Model (Mitchell, Ferketch, & Jennings, 1998) evolved from Donabedian's model of structure -process-outcome. Donabedian's model addresses structure, process and outcomes in a linear process (Mitchell et al., 1998). The structure-process-outcome model was designed to guide the quality of medical care and has been applied to healthcare in general.

The Quality Health Outcomes Model

The model is considered a dynamic model with its components interacting via feedback loops. The model differs from the Donabedian approach by removing the direct link between intervention and outcome. While both, interventions and outcomes remain in the Mitchell model, they are not linked. An example is provided in a subsequent discussion of the Quality Health Outcomes Model.

The components and characteristics of the Quality Health Outcomes Model (Mitchell et al., 1998) (Figure 1) are:

- The system component has three characteristics: labor, material resources, and communication. System characteristics have feedback loops with all other model components. As a dynamic and interactive model, each of the other components (client, interventions and outcomes) may influence the system component. For example, if the client's condition is complex, this will impact the system characteristic of staffing. The reverse may also be occurring if the staffing may be less than adequate causing a complex client to have increased care needs.

Examples of system characteristics would be availability of supplies, nurse/patient

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The model is considered a dynamic model with its components interacting via feedback loops. The model differs from the Donabedian approach by removing the direct link between intervention and outcome. While both, interventions and outcomes remain in the Mitchell model, they are not linked. An example is provided in a subsequent discussion of the Quality Health Outcomes Model.

The components and characteristics of the Quality Health Outcomes Model (Mitchell et al., 1998) (Figure 1) are:

- The system component has three characteristics: labor, material resources, and communication. System characteristics have feedback loops with all other model components. As a dynamic and interactive model, each of the other components (client, interventions and outcomes) may influence the system component. For example, if the client's condition is complex, this will impact the system characteristic of staffing. The reverse may also be occurring if the staffing may be less than adequate causing a complex client to have increased care needs.

Examples of system characteristics would be availability of supplies, nurse/patient

ratios, rapport between nurses and doctors and rapport between nurses and nursing assistants.

- Client characteristics represent the patient and family and were linked to all other components via feedback loops.
- Interventions represent the nursing care provided (or not provided) and were linked to system and client characteristics only. Interventions for this study were ambulation, turning, hygiene care, shift assessments, focused assessments and wound/skin care.
- The last component was outcomes, which was linked to system and client characteristics. An example of outcomes would be the development of pressure ulcers, a fall, unexpected death, or in contrast, a healthy patient being discharged. There was no feedback link between outcomes and interventions. Feedback between the two components must come from either the system or client component.
- There were feedback loops between the system, client, and outcome components. The feedback loops provide direct and current information between the components. For example: when staffing ratios are high (a system characteristic of increased numbers of patients per nurse) it may result in interventions not being provided or cause delay. Feedback loops are not present between interventions and outcomes. For example: An elderly person may not receive the scheduled turning intervention, but is in good nutritional state, and moves enough to prevent pressure points. The outcome was that no pressure ulcer forms. The

intervention(s) combined with the client's characteristics impacted the outcome obtained. On the other hand, the same elderly person may have received all of the appropriate pressure ulcer prevention interventions and still experienced a pressure ulcer related to their overall poor health.

The Quality Health Outcomes Model was designed to guide quality improvement databases and outcomes management, to identify key variables in clinical intervention research and to provide a framework for outcomes research and management (Mitchell et al., 1998). The model supports the measurement of nursing issues by identifying and examining relationships. The model is intended to demonstrate the dynamic processes of patient care and outcomes. The unique feature is the dynamic nature of the model (Mitchell et al., 1998) (Figure 1).

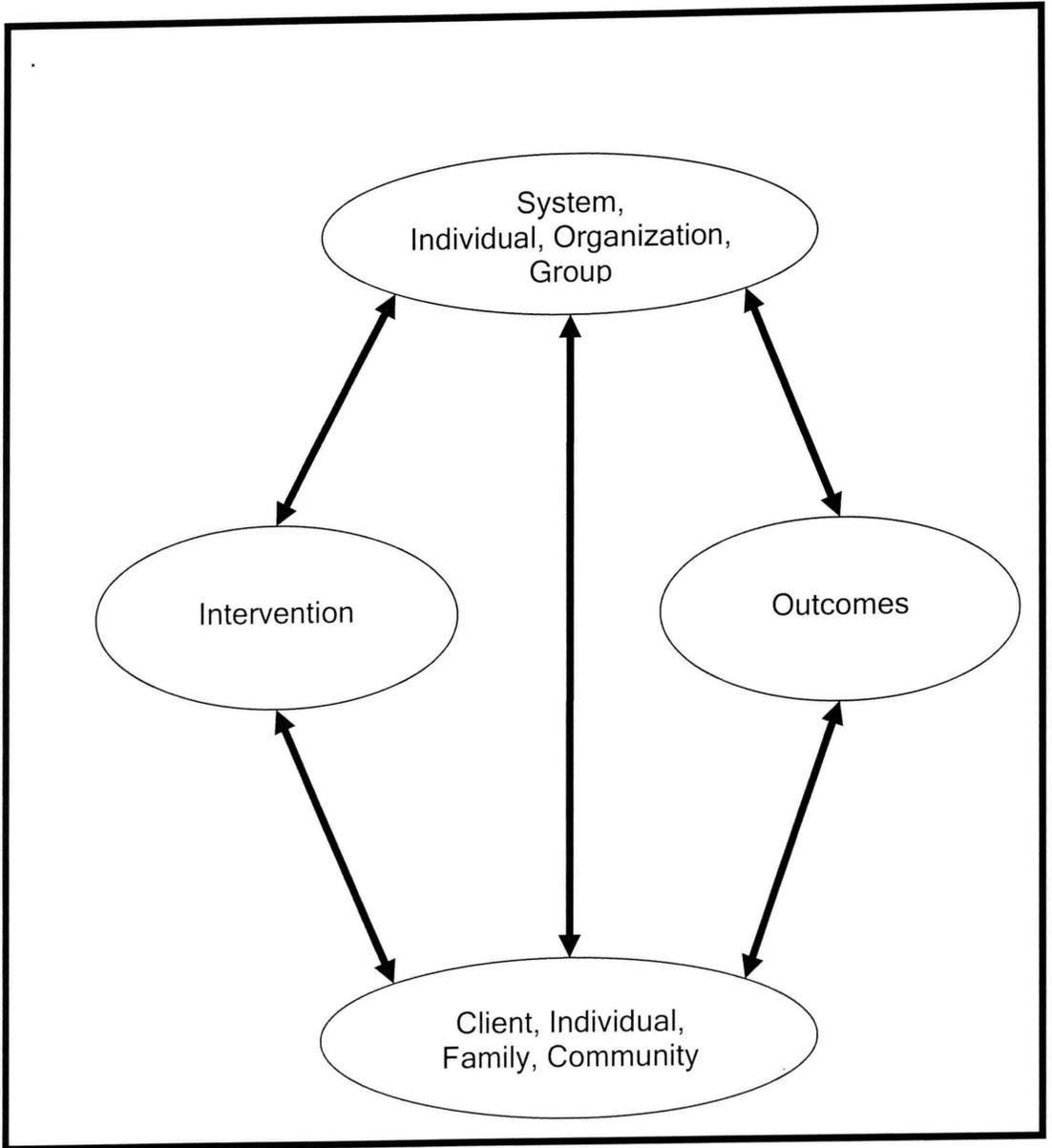


Figure 1. The quality health outcomes model. From Mitchell, P., Ferketch, S., & Jennings, B. (1998). Quality health outcomes model. *Journal of Nursing Scholarship*, 30(1), 43-47. Copyright 1998 by Sigma Theta Tau International Honor Society of Nursing

The conceptual frame work supported the analysis of missed nursing care (Figure 2). The model's components portray the variables used in the study. Each nursing staff member who responds to the MISSCARE survey and each nursing staff member who provides care to the at-risk of pressure ulcer patient meets the criteria for the system component.

The client characteristics were represented by each patient who is a recipient of care from June 1 to July 9, 2010 on the designated units. The population of clients were patients who were at risk for pressure ulcer occurrence. At risk was defined as having a Braden Risk Assessment of 15 points or less.

The intervention variables encompassed the nursing care provided to patients at risk for pressure ulcer formation. The interventions were: (a) ambulation, (b) turning, (c) hygiene care, (d) shift assessment, (e) focused assessment, and (f) wound/skin care. Each nursing intervention was assessed in the self-reported MISSCARE survey and the medical record audit of documented care provided. Other interventions for pressure ulcer prevention were not included in this study.

Patient outcomes were defined as “measures if a healthcare goal was achieved” (Wyszewianski, 2008, p. 34). The proposed study will evaluate pressure ulcers as present or not. The results showed either a positive (ulcer present) or a negative (no ulcer present) outcome. The outcomes component supports the variable of pressure ulcer. Pressure ulcers were identified as breaks in the skin and underlying muscles. Pressure ulcers were described as stages relating to the depth of tissue damage sustained (National Pressure Ulcer Advisory Panel [NPUAP], 2007). Pressure ulcers may result from the

patient's condition and the interventions of nursing staff and other care providers.

Successful prevention of pressure ulcers requires a multidisciplinary approach calling for each nursing staff member to perform their duties as expected.

Nursing work environments contribute to patient outcomes (Page, 2004). The characteristics of nurses' work environments (NWE) were (a) organizational management practices, (b) workforce deployment, (c) work design and (d) organizational culture (Page, as cited in McGillis, Doran, & Pink, 2008, p 40). Each of these NWE characteristics were part of the systematic characteristics identified in the study's conceptual framework, the Quality Health Outcomes Model. The IOM's findings support the conceptual framework selected for use in this study (Figure 2). Note that there is no feedback loop between the missed nursing care interventions and the outcome of pressure ulcers.

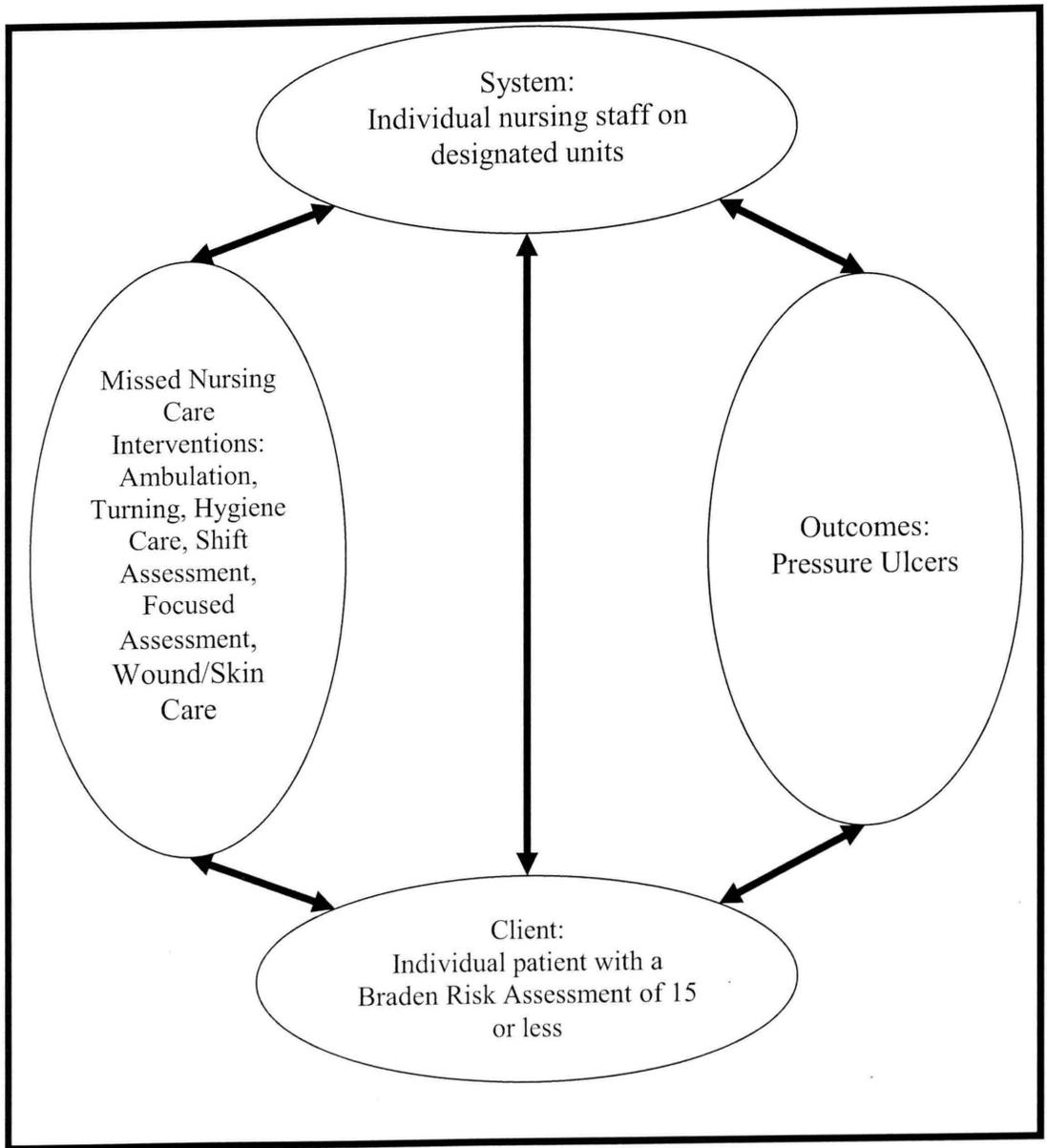


Figure 2. Quality health outcomes model applied to the concept of MNC. Adapted from Mitchell, P., Ferketch, S., & Jenning, B. (1998). Quality health outcomes model. *Journal of Nursing Scholarship*, 30(1), 43-7. Copyright 1998 by Sigma Theta Tau International Honor Society of Nursing.

Assumptions

1. Missed nursing care does occur and is present on all nursing units in all hospitals. (Kalisch & Williams, 2009; Kalisch et al., 2009).
2. The interaction between system and client characteristics and nursing interventions yield outcomes (Mitchell, Ferketch, & Jennings, 1998), whether positive or negative.
3. Process interventions and outcomes are measurable (Mitchell, Ferketch, & Jennings, 1998).
4. Nursing staff should document all care provided (Bosek & Ring, 2010).

Research Questions

1. Is there a difference between self-reported missed nursing care and the nursing care documented for the outcome of pressure ulcer?
2. Is there a difference between self-reported missed nursing care and the nursing care documented by time of day (peak vs. off peak hours)?
3. Is there a difference between self-reported missed nursing care and the nursing care documented by personnel type (RN, LVN, and NA)?
4. Can the presence of a pressure ulcer be predicted from knowing the rate of missed nursing care (self-reported versus documented) for ambulation, turning, hygiene care, shift assessment, focused assessment and wound/skin care?
5. Which missed nursing care predictor variables are key factors in the prediction of pressure ulcer status?

Definition of Terms

The following terms are conceptually and operationally defined within the context of this study.

Missed Nursing Care

Conceptual definition. *Missed Nursing Care* was defined as expected or scheduled care that was not provided on time or not provided at all (Bittner & Gravlin, 2009; Kalisch, Landstrom, & Hinshaw, 2009; Lucero, Lake, & Aiken, 2009; Sochalski, 2004). This study used the following nursing care interventions to determine if nursing care is missed. The interventions were: (a) ambulation, (b) turning, (c) hygiene care, (d) shift assessment, (e) focused assessment and (f) wound/skin care. *Ambulation* was defined as the patient walking with or without assistance. Turning was defined as the patient repositioned to side or back with or without assistance. Patients should be repositioned on an every two-hour schedule. *Hygiene care* was defined as daily cleansing of the skin and as needed. *Shift assessment* was defined as an assessment of multiple physical and emotional systems. It was performed by RNs and LVNs. *Focused assessment* was defined as an assessment that addresses a specific system; and it usually has its own assessment tool. *Wound/Skin care* was defined as physician ordered care of a wound or skin condition.

Operational definition. Missed Nursing Care was identified using two methods. The first method was via the MISSCARE survey, which represented the self-report method and was defined as a 2-part quantitative tool designed to measure the amount and types of missed nursing care and the reasons for the missed nursing care (Kalisch,

Landstrom, & Williams, 2009). In this tool the missed nursing care was self-reported by Registered Nurses (RNs), Licensed Vocational Nurses (LVNs) and Nursing Assistants (NA). This study uses the results of Part A and does not address Part B. Part A measures the missed nursing care by the frequency of occurrences thought to have occurred by the respondent and/or others.

The second method used was an audit of the medical records of the patient population that were at risk of a pressure ulcer (15 points or less). Each item in the audit will be evaluated for having documentation present or not. The number of times care was expected (per physician order or policy/procedure) was compared to the number of times care was documented as provided. A nursing care rate was determined for each of the designated interventions (ambulation, turning, hygiene care, shift assessment, focused assessment and wound/skin care). The medical record audit care rate was compared to the MISSCARE survey rate of reported frequency of missed nursing care. A determination was made about the value of the scores based on the comparison.

Personnel Type

Conceptual definition. The personnel type was comprised of nursing staff who are registered nurses, licensed vocation nurses and nursing assistants. Registered nurses (RN) were defined as a college-educated nurse who has RN credentials. Licensed vocational nurses (LVN) were defined as a trained nurse who has LVN credentials. Nursing Assistants (NA) were defined as a care provider with a brief training course in basic care and was certified as a nursing assistant.

Operational definition. The demographic data for personnel type was collected from two sources: (a) the MISSCARE survey, where the staff indicated their role, and (b) from the medical record audit where each staff member signs the record when documenting the care provided.

Time of Day

Conceptual definition. Time of day was defined as the shift worked (peak hours, Monday - Friday: 0700 – 1859 and off peak hours: Monday-Friday, 1900-0659 and Saturday, 0700 – Monday, 0659).

Operational definition. Time of day will be measured using demographic data. It was collected from two sources: (a) the MISSCARE survey, where the staff indicated what shift they worked routinely, and (b) from the medical record audit from the medical record, where each staff member records when the care was provided. The shift was determined from documentation times.

Pressure Ulcers

Conceptual definition. The National Pressure Ulcer Advisory Panel (2007) definition will be used and follows:

A pressure ulcer is localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction. A number of contributing or confounding factors are also associated with pressure ulcers; the significance of these factors is yet to be elucidated.

Operational definition. The stage of the identified ulcer will be captured during the medical record audit. The presence and stage of ulcer for each patient was noted in the documentation database. The highest staged pressure ulcer would be the identified pressure ulcer of record.

Braden Risk Assessment

Conceptual definition. The Braden Risk Assessment tool is designed for the purpose of evaluating a patient's risk of obtaining a pressure ulcer. The rating does not mean that the patient has a pressure ulcer, just a risk of obtaining an ulcer.

Operational Definition. The Braden Risk Assessment six subscales, five of the subscales use scores ranging from 1 to 4 (1 is the worst and 4 is the best score). The sixth subscale has a score range from 1 to 3 (1 is the worst and 3 is the best score). The six subscales represent the contributing factors for pressure ulcers. The subscales are: (a) sensory perception, (b) mobility, (c) activity, (d) moisture, (e) nutrition, and (f) friction/shear. An appropriate score is selected for each item, and then a total cumulative score is calculated. The score may range from 6 to 23 points. The fewer points scored on the Braden Risk Assessment, the greater the pressure ulcer risk. The risk rankings are: (a) "At-risk" (16 to 18 points), (b) "Moderate risk" (13 to 15 points), (c) "High risk" (10 to 12 points), and (d) "Very high risk" (9 or less points). Low scores that place a patient in an at risk category are associated with specific clinical interventions that target prevention of pressure ulcers.

Patient

Conceptual definition. The patient was defined as anyone admitted to the designated nursing unit. The patients identifies for inclusion were 18 years of age or older, did not expire on the designated nursing unit, and had a Braden Risk Assessment score of 15 points or less.

Operational definition. Patient inclusion will be determined by review of each medical record for the designated nursing units. Patients meeting the age requirement (18 years old or older), discharge status from the nursing unit (alive) and Braden score target (15 points or less) criteria were included in the medical record audit.

Delimitations and Limitations

Delimitations are items the researcher can influence and help define the boundaries of the study, and limitations are those things that are generally outside of the control of the study. There were two delimitations and five limitations to this study:

Delimitations

Delimitations of the study were:

1. The study was conducted in one geographic area in South-Central United States.
2. The sample was limited to medical/surgical patients therefore findings of this study were generalizable to the study participants only.

Limitations

1. Experimental bias: Hospital personnel, who choose to participate, may report fictitiously on the surveys so they appear favorable to the investigator.

2. Self-reporting.
3. The Braden score assessment of pressure ulcer presence may differ from nurse to nurse.
4. Nursing staff may not document care in the preferred designated location, making documentation of care difficult to locate.
5. Documentation may not reflect the care that was provided.

Summary

This study explored the relationship between two methods for identifying missed nursing care. The methods under review were: (a) self-reported by nursing staff responding to the MISSCARE survey, and (b) an audit of the medical record in an electronic format. The patient population examined the identification of missed nursing care are patients presenting with a Braden Risk Assessment score of 15 points or less. The at-risk categories of patients were targeted to determine if care that has not been provided is evident. The Braden scores identified the population to review for missed nursing care. The outcome of pressure ulcer present was examined to determine if there is a link to missed nursing care. The conceptual framework is the Quality Health Outcomes Model (Mitchell et al., 1998). There were two gaps to be addressed. The first gap was the lack of a timely identification method for measurement of missed nursing care. The second gap was attempting to understand if the method used to identify missed nursing care can be linked to a patient outcome (pressure ulcers).

Filling these two gaps with knowledge allows nursing leadership and staff to increase its response time to missed nursing care. This may be especially important if

missed nursing care is linked to negative patient outcomes. To conclude, Chapter I began with a quote from Nightingale, warning not to do harm. A century and a half later the profession of nursing continues to search for ways to prevent harm. The CMS has identified harm measures and since missed nursing care is on the harm list now is the time to understand and address the problem.

CHAPTER II

REVIEW OF LITERATURE

The concept of missed care has recently been introduced into nursing research. Seven studies revealed that the majority of nurses who participated in focus groups or surveys have reported many instances of missed nursing care (MNC). The seven studies included all types of nursing units. All of the MNC studies used self-reported data to infer that care was missed.

The literature review begins with an overview of nursing care and its role as a key concept to the profession of nursing. This discussion is followed by a detailed look at MNC and the related studies. The relationship between MNC and the nurse-sensitive patient outcome pressure ulcer is reviewed (this study's outcome measure). The other concept explored was time of day (shift). The time of day (TOD) concept is a confounding variable to MNC. The literature review laid the foundation for an examination of MNC measurement and the potential link to the occurrence of pressure ulcers.

Nursing Care

To understand missed nursing care, a discussion of nursing care occurred. There were multiple definitions of nursing care. For the purpose of this discussion only select definitions were reviewed. The role of caring implied in the term nursing care was explored. The researcher examined the role of nursing care in protecting the patient from

“...the deep and dangerous gaps [that] exist between the care that patients should receive and the care that they actually do receive” (Lavizzo-Mourey & Berwick, 2009, p. 3). The nursing care discussion was closed with a look at the connection with missed nursing care. The American Nurses’ Association (ANA) provided the following definition.

Nursing is the protection, proposition, and optimization of health and abilities, prevention of illness and injury, alleviation of suffering through the diagnosis and treatment of human response, and advocacy in the care of individuals, families, communities, and populations (as cited in Garity, 2005, para. 1).

The key concepts identified in the definitions of nursing and care related to the concept of missed nursing care are (a) prevention of illness/injury (American Nurses Association [ANA], 2003), (b) caring (Dal Pezzo, 2009; Fawcett, 2005), (c) a moral imperative (Dyson, 1996), (d) inclusion of all physical care (Brilowski & Wendler, 2005), (e) protection (Dal Pezzo, 2009) and (f) positive outcomes (Dal Pezzo, 2009). Each of these concepts is utilized during a patient’s hospitalization. With the occurrence of missed nursing care each of these concepts is compromised.

An examination of nursing practice by Finfgeld-Connett (2008) assesses the relationships between “... the art of nursing, presence and caring (p. 528).” From this the examination a theoretical framework of nursing practice evolved. The *art of nursing* was defined as the “expert use and adaptation of empirical and metaphysical knowledge and values” (Finfgeld-Connett, 2008, p. 528). The following attributes were identified to further define the nursing practice model: (a) relationship centered, (b) adaptive to meet

individual needs, (c) creative, (d) promote well-being through beneficent practice, and (e) nurses achieve professional growth and satisfaction (Finfgeld-Connett, 2008).

The second component is *presence*. Finfgeld-Connett (2008) described presence as an “interpersonal process, characterized by sensitivity, holism, intimacy, vulnerability and adaptation (p. 528). Overall, presence supports the well-being of the patient and nurse. The third component *caring* is based on nursing actions that result from multiple forms of knowledge and is based on beneficence and patient empowerment. The nurse (care giver) brings to the care venue (a) professional maturity, (b) morality and (c) a supportive work environment. The care adaptation to meet patient needs, the beneficent practice (do no harm), the moral component of care (to provide the care that is expected) and the patients’ well-being may be compromised when missed nursing care occurs (Finfgeld-Connett, 2008).

The concept of caring incorporates another aspect of the nurse-patient relationship, the concept of knowing the patient. It is the individualization of patient care. The findings of a summary of studies on knowing the patient was: (a) nurse understanding of a patient that results in the nurse’s selection of interventions, (b) nurse experience with caring for patients, (c) chronological time and (d) closeness between patient and nurse (Radwin 1996). Swanson (1993) identified knowing the patient as one of five caring processes. Swanson explains that “knowing ...centering on the one cared for, and engaging the self of both nurse and client (p. 320).” Having enough time to spend with the patient, supports knowing the patient. Knowing the patient is important to nursing practice in the following ways.

1. Patients are treated as individuals.
2. Nurse's expert decision making is based on knowing the patient.
3. Knowing the patient is based on the work environment's support (is there time to know the patient?).
4. Knowing the patient may contribute to positive patient outcomes (based on care that is personalized, comforting, supportive and healing) (Radwin, 1996).

Changes in the practice environment over the last two decades have decreased the amount of time spent with patients due to (a) reduced lengths of stay, (b) licensed nurses re-directed to non-patient care duties and (c) unlicensed personnel performing more direct care duties. Not knowing the patient may inhibit the care given and/or the documentation provided.

In summary, reflecting on the many definitions of nursing and care, all share attributes and characteristics as it has been noted throughout this discussion. By and large, nurses make a commitment to the patient to provide the care expected with skill, consistency and thoroughness. Understanding how to best measure MNC will support nurses' commitment to provide good care to patients.

Missed Nursing Care

In the discussion on nursing care, identification of gaps in patient care was made by Lavizzo-Mourey and Berwick (2009). The seriousness of the identified gaps in care was expressed as a comparison of what care patients should be receiving vs. what care patients actually receive. Do the care gaps create harmful situations? Eight studies conducted over the past six years (2004 to 2010) have been pivotal in beginning the

journey to understand and measure missed nursing care (MNC) (Bittner & Gravlin, 2009; Kalisch, 2006, 2009; Kalisch, Landstrom, & Hinshaw, 2009; Kalisch, Landstrom, & Williams, 2009; Kalisch, & Williams, 2009; Lucero, Lake, & Aiken, 2009; Thomas-Hawkins, Flynn, & Clarke, 2008). . In general, MNC is understood to occur across all nursing units and hospital types. Currently, measurement of MNC is collected by nursing staffs' self reported responses to questionnaires or surveys. Validation by direct observation is challenging due to observer/subject biases, access to units, and risk/legal implications of MNC. The discussion of MNC will present (a) a historical perspective, (b) measurement techniques, (c) study outcomes and (d) the findings of seven key MNC studies (Appendix B).

Historical Perspective, MNC.

The first research study on missed nursing care was by Sochalski (2004). This researcher examined the variation in inpatient hospital staff nurses' assessments of quality of nursing care and the effects of nurse staffing, patient safety problems and unfinished care on the variation in the quality assessments. A data set from a previous study was used and included 8,670 inpatient nursing staff working in acute care hospitals in Pennsylvania. The nurses reported leaving 2.1 tasks undone and 40% of the respondents reported three or more unfinished tasks. When the quality of nursing care was rated high by nurses the tasks left undone was less than one per shift. Sochalski identified a strong relationship between the number of tasks left undone and the level of the assessment of the quality of nursing care ($r = 0.634, p < 0.001$). Whenever increases in unfinished care were experienced, the results showed poor patient outcomes. Thus,

unfinished care is a “reasonable indicator of the quality of the process of that care” (p. 71).

In 2006, Kalisch published the second study on missed care. This study used focus groups to understand the incidence of missed care from the nurses’ perspective. The study was conducted in two hospitals, a 210-bed hospital in the southern region, and a 458-bed regional medical center in the northern region of the United States. Twenty-five focus groups were conducted asking nurses to identify occurrences of missed nursing care. The participants included 107 RNs, 15 LPNs and 51 NAs from medical/surgical units. From the focus group, nine tasks of regularly MNC were identified. The tasks were (a) ambulation, (b) turning, (c) feedings, (d) patient teaching, (e) discharge planning, (f) emotional support, (g) hygiene, (h) intake and output documentation and (i) surveillance. As a part of this qualitative study the reasons for the missed nursing care were also identified quantitatively. The metric of missed nursing care of the last shift worked was identified and from this study a quantitative tool was developed (MISSCARE Survey).

A third study by Thomas-Hawkins, Flynn, and Clarke (2008) focused on hemodialysis units. These nursing units were reported to have the largest volume of MNC in the Kalisch (2006) study. The primary finding of this study was the increased number of tasks left undone on the last shift worked, and was significantly associated with self-reported increased frequencies of dialysis hypotension, shortened and skipped dialysis treatments and patient complaints. The measurement metric was the number of tasks left undone on the last shift worked. The researchers concluded that this study

demonstrates that RN staffing when at appropriate levels and processes of care are provided by RNs then there is a reduced odds of adverse events occurring in dialysis units.

The fourth study's aim by Lucero, Lake and Aiken (2009) was to (a) describe RNs reports of unmet nursing care and (b) examine the variation of nursing care qualitatively across hospitals. Data from a previous administration of the Practice Environment Scale of Nursing Work Index (Lake & Friese, 2006) was analyzed. In the original sample 42,000 RNs responded. From this original sample a sub-sample of 10,184 nurses who worked in 168 acute care hospitals were used. The sub-sample participants were asked to rate the following unmet care categories: (a) teach, (b) prepare for discharge, (c) emotional support, (d) document nursing care, back rub and skin care, (e) oral hygiene, and (f) create and update care plans. The metric used for the study was unmet nursing care on your last shift worked. Across the hospital RNs reported leaving an average of two out of seven nursing care activities undone.

The importance of pointing out this study is two-fold. First, this the earliest study to examine the variation in unmet nursing care in a large cohort of hospitals. The researchers used a database from 1999, which establishes a baseline of unmet care. Second, the researchers proposed that there is need for nursing research to focus on the relationship between the process of care and adverse events to improve healthcare quality.

The fifth study was conducted by Kalisch, Landstrom, and Williams (2009) and compared MNC across three hospitals using the MISSCARE Survey. The Missed

Nursing Care (MISSCARE) Survey was completed by 459 staff nurses. The metric of “missed nursing on the last shift worked” was used. The findings were consistent across the three Michigan hospitals, and showed that there were six frequently occurring MNC interventions. These were (a) ambulation (84%), (b) medication assessment (83 %), (c) turning (82%), (d) mouth care (82%), (e) patient teaching (80%) and (f) timely PRN medication administration (85%). The results are interpreted for example that 84% of the participants reported not ambulating a patient on their last shift worked. Additionally, the stated rates of omissions were consistent across the three hospitals meaning that a large proportion of all patients are at-risk of MNC. This study demonstrated that a theoretical link was established between MNC and patient outcomes. An example of the theoretical link using ambulation was provided.

“Failure to ambulate leads to new onset delirium, pressure ulcers, pneumonia, increased length of stay, delayed discharge, increased pain and discomfort and physical disability” (Kalisch, Landstrom & Williams, 2009, p. 7). Examining MNC allows others to understand what it is specifically that nurses do or do not do that influences patient outcomes (Kalisch, Landstrom & Williams, 2009).

In one study Kalisch (2009) examined MNC in relationship to teamwork. The researcher studied teamwork between two groups of nursing personnel, RNs and nursing assistants using the MISSCARE Survey. The study focused on the comparison of RNs versus NAs perceptions of MNC using a mixed method design. Nursing staff were surveyed, followed by participation in focus groups. The sample consisted of 18 units in one hospital and included 633 RNs and 121 NAs. The RNs reported more MNC (a mean

of 1.71 missed events/shift) than NAs (a mean of 1.49 missed events/shift). RNs perceived that more nursing care was missed by NAs than NAs reported as missed. RNs reported more missed nursing care for NA tasks and combined RN and NA tasks. RNs perceived that 19 out of 24 elements were missed at a higher rate. While RNs and NAs reported similar rates of missed nursing care for medications administered within 30 minutes, as needed or PRN medications given within 15 minutes, focused reassessments based on patient condition, assessments performed every shift and discharge teaching. RNs reported more missed nursing care than NAs in these elements: (a) ambulation, (b) mouth care, (c) intravenous/central line care, (d) documentation, (e) bathing/skin care, (f) toileting, (g) feeding warm food, (h) turning, (i) assessing response to meds, (j) emotional support, (k) monitoring intake and output, (l) performing wound care, (m) obtaining vital signs, (n) monitoring blood glucoses and (o) attending interdisciplinary conferences (all with a $p < .01$). The following interventions were recommended: (a) improved RN and NA communication, (b) education on being a team member, (c) use of communication boards and (d) improving team assignments. This study established that there are differences in MNC amongst personnel type.

The seventh study related to MNC was conducted by Bittner and Gravlin (2009) and focused on critical thinking, delegation and missed care. The researchers used a qualitative descriptive approach with focus groups. Four focus groups, with four to eight medical/surgical RNs participated in each, for a total of 27. The final question was about care omissions, which provided new information regarding omitted and missed care. The omitted care occurred on every shift, every day and usually more than once per shift. The

care omitted was consistent with other studies' findings in the literature. Omitted care included: (a) hygiene, (b) feeding, (c) turning and positioning, (d) skin care, (e) routine vital signs, (f) frequent vital signs, (g) ambulation, and (h) mouth care.

Ultimately, all of these studies acknowledge that MNC occurs and was practiced by both licensed nurses and nurses' aides. Furthermore, the type of MNC was similar across all studies. Additionally, one study found that perceptions of MNC were not congruent between licensed nurses and nursing aides (Kalisch, 2009), while two studies (Kalisch, Landstrom et al., 2009; Thomas-Hawkins, Flynn & Clarke, 2008) linked an association between MNC and patient outcomes. However, it does not appear that an analysis by time of day was performed in any of the studies.

Patient Outcomes

Traditionally, quality of health care has been measured by providers' activities. The complexity of patient care and the outcomes achieved, make it difficult to determine the role or whether there is a link to the health care provider. Over the past several decades patient outcomes have become the focus of determining quality of healthcare (American Nurses Association, 2010; Maas, Johnson, & Moorhead, 1996). Patient outcomes were defined as "measures if a healthcare goal was achieved" (Wyszewianski, p. 34 as cited in Ransom, 2008). In *Crossing the Quality Chasm* the Institute of Medicine (2001) offered six aims that became the foundation for current patient outcomes. The major foci were on the quality of care provided. The expectation presented was that care is safe, effective, efficient, timely, patient centered and equitable (Wyszewianski, as cited in Ransom, 2008). Patient outcomes include cost of care and patient satisfaction

(Weingart & Iezzoni, 2003) as well as the traditional mortality, readmissions and length of stays.

In today's nursing profession, patient outcomes have progressed from the broad view of mortality rates, length of stays and readmissions to the more granular view of nurse-sensitive outcomes. Nursing-sensitive outcomes are related to the actual care provided by nursing staff with consideration of patient characteristics and were evidence-based with less emphasis on the financial outcomes.

Nurse-sensitive Patient Outcomes

Van den Heede et al. (2007) contends that nurse-sensitive outcomes are influenced by variation in the quality and quantity of nursing care received. The lack of nursing care received is the focus of the study, thus its impact on the chosen patient outcome of pressure ulcer occurrence. The ANA (2010) offers the following definition and explanation of nurse sensitive outcomes.

1. Nursing-sensitive outcomes represent the structure, process and outcomes of nursing care.
2. The structure of nursing care includes labor pool of nursing staff, the skill level of the nursing staff, and the education/certification of nursing staff.
3. Process indicators evaluate nursing care such as assessment, intervention, and RN job satisfaction.

4. Patient outcomes that are nursing sensitive are those that improve if there is a greater provision of nursing care nursing care (i.e., pressure ulcers, falls, and intravenous infiltrations)

The development of new outcomes occurs when no acceptable existing outcome represents nursing's contributions to patient care. The outcome was (a) based on empirically-based research, (b) reviewed by a panel of nurse experts, (c) the list of nursing-sensitive outcomes was shared with participating hospitals to determine data collection is reasonable, (d) pilot tested in a hospitals and (e) added to the menu of nursing-sensitive outcomes if proven to be of value (American Nurses' Association, 2010).

Examples of nurse sensitive outcomes were patient fall rates, pressure ulcer prevalence, central line infection rates, nurse satisfaction, skill mix and nursing care hours worked per patient day. The link between patient safety and staffing levels was identified in the mid-1990s (Haberfelde, Buffum, & Bedecarre, 2005). The linkage between patient outcomes and staffing level was a result of the changes in organizational structure and staffing patterns that emerged in the early 1990s. With the heightened awareness of patient outcomes, other hospital and nurse characteristics were reviewed and also linked to patient outcomes. Sidani, Doran, and Mitchell (2004) recommended the use of the following characteristics: (a) patient characteristics, (b) nurses characteristics, (c) organizational characteristics and (d) process of care, where structure and process variables are linked to outcomes. Another example of process of care linked to outcomes was identified by Sochalski (2001) who reported that an index of nursing

tasks left undone was a predictor of unmet patient needs and reflected on the quality of care provided.

With the input of numerous governmental agencies, a study was conducted from which the first outcome measures were developed (Needleman, Beurhaus, Mattke, Stewart, & Zelevinsky, 2001). The awareness of patient outcomes was reinforced by governmental hearings on the state of nursing care. The Institute of Medicine was requested by the federal government to investigate the nursing shortage and its relationship with the quality of care in hospitals. The final report called for scientific research on the relationship between quality of care and nurse staffing levels, mix and other organizational variables.

Also, from this work came the first list of patient outcomes that were sensitive to staffing levels and nursing staff mix. The results were obtained from administrative databases. However, it should be noted that administrative databases are not complete and may have led the study to underreport its findings (Needleman et al., 2001).

Efforts to standardize measurement and analysis of nurse sensitive outcomes by organizations are varied. The National Quality Foundation (2004) developed seven patient outcomes: failure to rescue, pressure ulcer, falls, restraints, urinary tract infection, central line infections, and ventilator associated pneumonia (Blegen 2006). In 2002, the AHRQ (2010) offered 20 measures Appendix C which included pressure ulcers (decubitus ulcers).

There have been three primary issues with nursing-sensitive outcomes research. The first issue was reflected in the early studies where outcomes focused on 30-day

mortality at the hospital level. Mortality data was easily accessible in large national databases. Mortality has since been shown not to be the best indicator of the quality of nursing care. A second issue with the early outcome studies was the inclusion of all RNs in the staffing calculations. The calculations included RNs not providing direct care which alters the accuracy of the actual nursing care being provided. Also, in question was that the calculations of RNs-to-patient ratios have not been standardized across the studies. A third issue is the aggregation of patient data at the hospital level. Data access was limited to the hospital level when extracted from national databases (Blegen, 2006).

Traditionally, quality of health care has been measured by providers' activities. The complexity of patient care and the outcomes achieved, make it difficult to determine the role or link to the health care provider. Over the past several decades patient outcomes have become the focus (Needleman et al., 2001; Maas et al., 1996). At the same time the Institute of Medicine's Committee on the Adequacy of Nurse Staffing reported that there was insufficient evidence linking nurse staffing and patient outcomes and that research in these areas was badly needed (Wunderlich, Sloan, & Davis as cited in Blegen, 2006). As was reported in 2006, continued research was needed linking nurse staffing and patient outcomes even today.

Nurse Sensitive Outcome: Pressure Ulcers

One study used one of the nurse-sensitive outcomes, pressure ulcers, to understand what nurses report not doing, and what they document as doing (or not doing), and its impact on the occurrence of pressure ulcers. To determine the occurrence

of pressure ulcers the Pressure Ulcer Prevention Protocol Interventions from the National Pressure Ulcer Advisory Panel (NPUAP) calculates an incidence rate. The incidence rate is the number of new cases of pressure ulcers (numerator) divided by the number of patient days for a unit or the hospital (denominator). This is stated as a percentage. Due to the infrequency of pressure ulcer occurrences the rate is multiplied by 100 to obtain a rate per 100 patient days. This standardizes the rate for comparison across units/hospitals (National Pressure Ulcer Advisory Panel [NPUAP], 2007).

An example of the calculation is that if Unit A has five pressure ulcers this month and 125 patient days, one would divide as such $5/125$ which equals 0.04 pressure ulcers or four pressure ulcers per 100 patient days. Next Unit B has 10 pressure ulcers this month and 100 patient days ($10/100=0.1$ pressure ulcers) or 10 pressure ulcers per 100 patient days. There are other variations on determining pressure ulcer rate. The denominator may be determined by unit, service or hospital. The numerator may be determined by the same locations, stage of the pressure ulcer or location. The number used to transform the rate to a standardize rate may be determined by professional organization, the hospital or regional agencies. The transformation number in this example is used by the National Database of Nursing Quality Indicators. It permits a standard number for national use (NPUAP, 2007).

“If he has a bedsore, it’s generally not the fault of the disease, but of the nursing” (Florence Nightingale, 1859, p. 8,). Since the inception of professional nursing, the responsibility for the occurrence of pressure ulcers has been assigned to nursing. The

skin is the first line of defense against the pathogens of the world, so the significance of the protection of the skin is great especially in the ill and compromised person (Lyder & Ayello, 2008).

A pressure ulcer is a “localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure of pressure in combination with shear and/or friction” (NPUAP, 2007, p. 11). Bansal, Scott, Stewart, and Cockrell (2005) provide a historical perspective on pressure ulcers that reveals the following points: (a) pressure ulcers have existed since the beginning of mankind, (b) human mummies were shown to have pressure ulcers, and (c) 19th century scientific literature reports finding ancient pressure ulcers.

Classification Systems

There were multiple pressure ulcer classification systems to consider. For the purpose of this study, the researcher will discuss the Daniel’s, Shea’s and NPUAP’s classification systems. The Daniel’s classification system contends that deep muscle and subcutaneous tissue damage occurs before dermal and epidermal changes are evident. The evolution of a Daniel’s pressure ulcer leads to an awareness that damage may have been sustained long before there are any visible signs of a pressure ulcer. It may also be noted that damage may not be treatable due to its duration prior to detection. Surgical and bedridden patients are especially susceptible to these deep ulcers (Bansal et al., 2005).

Shea’s classification system presented the development of a superficial ulcer that progress deeper into muscle and potentially bone. A primary premise of this

classification is that protection of the skin from incontinence, and friction/shearing may increase the resistance to pressure. In this system external signs were visible early on and may be treatable to prevent further deterioration of the pressure ulcer (Bansal et al., 2005).

The NPUAP classification system is a four stage classification method used to describe the depth of a visible ulcer. It does not explain progression or regression of the wound or document healing. It does not address un-seeable deep pressure ulcer wounds (Bansal et al., 2005). Clinically the pressure ulcer progression includes (a) blanching, (b) erythema, (c) non-blanching erythema, (d) dermatitis, (e) early ulcer, (f) healing ulcer, (g) chronic ulcer, and (h) black eschar/gangrene (Witkowski & Parish, 1982). Pressure ulcer development is dynamic and multiple stages may be occurring in one ulcer (Vermillion, 1990).

Ulcers develop when capillaries supplying the skin and underlying tissue were compressed enough to restrict perfusion, resulting in tissue necrosis. A normal blood pressure supplies the capillaries with 20-40 mm Hg of pressure, with 32 mm Hg of pressure being the norm. Keeping the capillary blood pressure in the above stated ranges protected the patient from the development of pressure ulcers. However, when capillary pressures were lower than the suggested range, which may be due to hemodynamic changes, reduced mobility and co-morbid conditions, and ulcer formation were possible. Bliss (1999) advises of the following functions. Blood supply through the capillaries (microcirculation) was influenced by the brain via sympathetic vasoconstrictor waves. The other controlling influence on the capillaries was from the localized endothelial cells

(Lyder & Ayello 2008). Since neural and endothelial control of blood flow is impaired during an illness state, the patient may be more susceptible to ischemic organ damage (e.g., pressure ulcers), and pressure ulcers can develop within two to six hours (Bansal et al., 2005).

The path to prevention is to rapidly and accurately identify at-risk patients, and follow up with implementation of preventive measures. The preventive measures suggested are (a) risk assessment, (b) implementation of a prevention plan, (c) skin care, (d) mechanical loading, (e) support surfaces, and (f) good nutrition (Lyder & Ayello 2008). Additional discussions of preventive measures (risk assessment, skin care and mechanical loading) occur in the interventions section below. Selected measures, risk assessment (Braden Risk Assessment), skin care (bathing), and mechanical loading (ambulation and turning) are represented in the variables addressed in the missed nursing care analysis.

Nursing Care and Pressure Ulcers

Besides the physiological processes that create a pressure ulcer, other nursing care issues should be considered. For example reduced nursing time may be contributing to the risk of pressure ulcer development in nursing homes. While the study was directed to the long term care environment, the concept is applicable to an acute care hospital.

Nursing time may be reduced by not having an appropriate amount of labor resources.

This study was concerned with care not being done or missed for whatever reason.

Reduction of nursing time can occur in multiple ways, limited resources, high acuity

patient(s) consuming what resources are available, other duties beside direct patient care or the instances of missed care that were reported by nurses (Smith et al., 2008).

Pressure ulcers were identified as a nurse-sensitive patient outcome. Pressure ulcers were directly related to the provision of nursing care. The physiological process that creates pressure ulcers can be halted or diminished. The influence of missed nursing care on the occurrence of pressure ulcers was investigated in order to determine if there is a link between the MNC and pressure ulcers.

Time of Day

The influence of time of day (TOD) has been well studied in a variety of settings from education, psychology, transportation and the health care industries. The interest in the time of day's impact on life has been part of the human awareness since ancient times. In modern times, time of day has been integrated into the research field since well before the 1900s when researchers began to explore how TOD influenced behavior, of both human and animal subjects. For example, an early 20th century time of day psychology study was conducted in an academic venue by Laird in 1925. The research study was focused on understanding the reading performance of college students. Specifically, students were tested for speed, understanding and grasp and retention of important points. Laird's team found that reading performance was at its greatest on Wednesday with a sudden decline on Thursday. Examination by hours found a steady decline from 0800 to 1700. However there is a rise in performance from 2000-2200. Test results from 1300 to 1400 were shown to score seven percent better than results from 0800 to 0900. This indicates that even with different variations in reading

performance, it still cannot be determined what time might be a more effective time in which to improve reading performance.

While investigating circadian rhythm, Harrington (2001) found that transit workers who experienced an increase of errors and accidents were influenced by: (a) shortened sleep periods, (b) circadian rhythm disruptions and (c) decreased performance in the early afternoon period. In another study, Dorrian, Hussey, and Dawson (2007) conducted a simulation study that showed high fatigue level errors involving a failure to act (errors of omission) were increased. However, incorrect responses (errors of commission) were decreased in a simulated train-driving task. Cognitive disengagement was identified as explaining the effect of fatigue on error types. Cognitive disengagement is the withdrawal of a participant, giving up or being present but passive (Paris, Wasik, & Turner, as cited in Barr, Kamil, Mosenthal, & Peterson, 1996, p. 624). Included in cognitive disengagement are explanations that are offered as excuses and issues that are beyond the participants control (Paris et al., as cited in Barr, Kamil, Mosenthal, & Peterson, 1996, p. 625).

Other researchers tested 23 shift workers at a nuclear plant while on duty. The results showed a night time drop in task performance and self-reported alertness. These results indicate that there were evidence of slight changes in information-processing strategies, and participant memory was influenced by the time of day (Galy, Melan & Cariou, 2008).

In hospital settings health care services are provided 24-hours a day, seven days a week. The examination of care issues by time of day is a realistic and logical concern.

Understanding the nature of the services provided, no matter the time of day or day of week, has become a frequently used metric. In addition to addressing the emergence of time of day in health care research, a specific review of mortality and morbidity and neonatal mortality follows.

Health Care Time of Day Findings

Over the past century the time of day concept has been used in the research community. Increasingly, the health care industry has adopted time of day (TOD) as a variable. It has been found that human performance is affected by TOD factors (Bratzke, Rolke, Ulrich, & Peters, 2007). Indeed, the impact of human performance on clinical outcomes has progressively become a research topic of interest.

The first focus TOD focus in healthcare is the human response related to TOD and involves bio-rhythm. The second focus is the influence TOD has on human and organizational performance. The human performance factor has been shown to be affected by TOD (Bratzler et al., 2007; Becker, 2006; Webb & Culhane, 2002; Bell & Redemeir, 2001; Bliwise, Kutner, Zhang, & Parker, 2001). Thus the influence of TOD on human and organizational performance, applies to this study. Healthcare has focused on TOD to assess the functioning of systems and processes. Examples of general healthcare research studies using TOD are numerous. Some of the key works are displayed in Table 1.

Table 1

Key Time of Day Studies

Researchers	Year	Topic	Time Frame	Findings
Bell and Redemeir	2001	Mortality of patients with ruptured abdominal aortic aneurysm, abdominal aortic aneurysm repair, acute epiglottitis and pulmonary embolism	Compared weekend vs. weekday admissions	Patients with select serious medical conditions are more likely to die when admitted on a weekend vs. a weekday
Bliwise, Kutner, Zhang and Parker	2001	Elderly Hemodialysis patients	Survival rates	Greater survival rate when dialyzed in the morning vs. the afternoon.
Webb and Culhane	2002	Labor augmentation, episiotomy or cesarean section	Variation related to time of day	Increase augmentation, episiotomies and cesarean sections are associated with patient who labor at night and on the weekends Weekend hospitalizations yield delayed provision of intensive procedures and increased mortality for elderly AMI patients.
Becker	2006	Lower quality	Weekends vs. weekdays	

From these studies and others the influence of TOD was identified. The major areas of research where TOD was investigated were: (a) mortality, (b) quality of care, and

(c) health care provider and organizational performance. In addition, further discussion of each of these focus areas follows.

A literature search using the data bases CINAHL, Health Source and Medline plus identified the research publications that included time of day or time factors. There were 6,081 articles on health care related time of day. The time span ranged from 1938 to current. The key health care subject areas for TOD were: (a) mortality, (b) quality of care, (c) circadian rhythm physiology, (d) time factors, (e) stroke, (f) intubations, (g) sleep physiology and deprivation, and (h) exercise physiology. Another trend noted in the literature review was how TOD was being defined. The initial focus was on day time vs. night time. This was followed by an examination using seasonal variation which focuses on times of holiday, which may result in less services and staffing. Next, in the history of time of day research, evolved a focus on the day of week combined with the time of day. Over the past 10-15 years there has been awareness that performance and outcomes for the night hours worked are similar to the weekend hours. This has been labeled as off- peak hours.

Over time, the health care community has also begun to look at this issue of time of day and its effect on health care outcomes. An early TOD nursing study was conducted in the Veterans Affairs Medical System. The study addressed the relationship between suicide, TOD and day-of-week (DOW). A rash of Veterans suicides at one facility had occurred. An attempt to identify trends led to an examination by TOD and DOW. The events were categorized into two groups, In and Out-of-hospital. The groups were analyzed for day and hour of suicide occurrence. The findings showed an increase

of suicides on Mondays and Saturdays. The TOD results showed that 75% of suicides for the in-hospital group occurred between 1500 and 1800. The researchers surmised that the days and times identified were times of less interaction and supervision with patients. By understanding the impact of time on the event, the researchers were able to suggest corrective interventions (Vollen & Watson, 1975). Examples of other TOD studies that have established an association with patient outcomes include the following: (a) mortality and morbidity, (b) neonatal mortality, and (c) performance effectiveness (physicians, residents and nurses). These studies will be discussed below.

Mortality and morbidity. A focused literature search on mortality and TOD generated 213 articles. The articles ranged from 1963-2011. There were 22 relevant articles. Articles were deemed to be relevant when the following selection criteria were met: (a) published as original research, (b) addressed mortality and TOD factors, and (c) the subjects were adults. Examples of the general findings follow.

A recent hospital-based study showed that survival rates from cardiac arrests are lower during nights and weekends. A similar study examined weekend hospitalization for intensive cardiac procedures and the relationship with mortality and readmission rates (Perberdery et al., 2008). Becker (2006) found delays in weekend procedures which was associated with a 0.38% point increase in one-year mortality rates for elderly acute myocardial patients. There was also a 0.2% increase in one-year readmission rates for patients with congestive heart failure

A study conducted in the Veterans Affairs Medical System by Kelz, Freeman, Hosokawa, Asch, Spitz, Moskowitz, ... Itani, (2008) illustrates the association between

surgical start time and morbidity (complications) and mortality for non-emergent procedures. The researchers found that mortality was not significantly related to start time of operation. However, they did find that there was a relationship between off-peak hour start times and post operative complications. Start times between 1800 and 2300 were significantly more likely to be associated with complications than those starting between 0700 and 1600. The researchers suggested that extended work hours (12.5 hours or longer) may be contributing to fatigue and a disrupted circadian rhythm of nursing staff. Increased length of the shift worked has been associated with an increased risk of errors, near errors and decreased attentiveness (Rogers, Dean, Hwang, & Scott, 2008; Roger, Hwang, Scott, Aiken, & Dinges, 2004). In contrast to the increased mortalities during the off peak hours, Kelz et al., (2008) and Luyt, Combes, Aegerter, Guidet, Trouillet, Gibert, & Chastre (2007) did not find higher mortality for the off peak admissions. Kelz et al., (2008) did report an increase of post-operative complication related to off peak hour surgery start times.

Clinical interest in the comparison of weekend and weekday outcomes led to investigation of this topic. Further studies on weekend vs. weekday hospital admissions showed increases in undesirable outcomes. The patient populations examined increases in mortality, acute myocardial infarction, heart failure, stroke, pulmonary embolism, ruptured abdominal aortic aneurysm and intensive care unit admissions (Barnett, Kaboli, Sirio, & Rosenthal, 2002; Bell & Redemeier, 2001; Horwich, Hernandez, Liang, Albert, LaBresh, Yancy, & Fonarow, 2009; Reeves, Smith, Fonarow, Hernandez, Pan, & Schwamm, 2009; Saposnik, Baibergenova, Boyer, & Hachinski, 2007).

Neonatal mortality. A narrowly focused literature search on the topic of neonatal mortality and TOD yielded 93 articles of which 9 were identified as relevant. Articles were deemed to be relevant when the following selection criteria were met: (a) published as original research, (b) addressed mortality and time of day factors, and (c) the subjects were neonates. A discussion of neonatal mortality and TOD articles follows.

Additional TOD investigations have involved the patient outcome, neonatal mortality. This body of research has two components. The first component is cyclic patterns by day of week. The second component is by time of day of birth. Each of the components has shown an association with increased neonatal mortality rates. As in the other studies on mortality, neonatal mortality studies have suggested that the TOD of a birth (equivalent to a hospital admission) may represent issues with nurse staffing, availability of support services and other healthcare providers. The TOD may function as a proxy for these organization issues.

Researchers have examined the TOD for the birth of neonates who died. Gould Qin, Marks, and Chavez, (2003) and Hamilton and Restrepo (2003) found an increase in neonatal mortality during the weekend hours and found the lowest mortality rates during the mid-week time period.

Researchers have studied more details about working in the off-peak environment with (a) limited support services, (b) fewer support staff, (c) less supervisions and (d) poor communication with other healthcare providers. Focused interviews were conducted to determine what was unknown about nurse's work environments. The concept of off-peak environment was broadened to include nights, Monday-Friday (1900-

0659) and Saturday (0700) through Monday (0659). This definition included 36% of the nursing work hours to be performed on the Monday-Friday (0700-1859) shifts (regular day shift) and 64% of the nursing worked hours performed on Monday-Friday (1900-0659) and Saturday (0700) through Monday (0659) (off-peak hours) (Hamilton, Eschiti, Mathur, Campbell, & Geminhardt, 2010).

Performance effectiveness by TOD. Some studies address healthcare provider performance in relation to TOD. For example, a Canadian study examined adverse events by chart audit on medical/surgical units. The results indicated that the likelihood of making an error increased with longer work hours and that errors were three times more likely to occur when nurses worked longer than 12.5 hours. The risk of errors began to increase when shift durations exceeded 8.5 hours (Rogers et al., 2004).

Another investigation of healthcare errors related to TOD used a questionnaire (self-report), and studied accidents, errors, and sleep patterns; a comparison between day, evening, night and rotating shift nurses was made. The rotating nurses reported medication errors at 1.8 times the odds compared to the day and evening nurses. The study found that rotating shift nurses were sleep deprived and experienced circadian rhythm disruption. They had frequent lapses of attention and increased reaction time, which lead to increased error rates on performance tasks (Gold, Rogacz, Bock, Tosteson, Bausm, Speizer, & Czeisler, 1992).

Another study conducted in an intensive care unit used a detailed method to gather information about errors related to TOD and assessed errors by reviewing error reports and direct bedside observations. Statistical analysis included comparisons

between the average number of errors per hour and different times of day were conducted using t-tests. The analysis identified that 29% of the errors were serious and could cause harm or death. Of the total number of errors made by nurses, 68% occurred during the day and 32% occurred during the night shift ($p < 0.002$). Nurses had error peaks one-hour after physician rounds and then one-hour after each of the three shift changes (Donchin, Goher, Olin, Badihi, Biesky, Sprung, Pizov & Cotev, 1995).

While the discussion of TOD is not exhausted, it does represent some of the key findings in healthcare and other industries. TOD can be associated with general and neonatal mortality, complications and shift workers' inefficient performance. Understanding TOD is based on how it is defined, its association with the day of week and other organizational factors (nurse staffing, support services and other providers, to name a few). Knowing the relationship between TOD and MNC may assist nurses to improve the quality of care at the individual patient level. Ultimately, to understand how time of day may be contributing to the likelihood of MNC may be significant to identifying potential solutions. Understanding the influence that TOD has on MNC enables providers an opportunity to respond. Knowing when MNC was occurring permits a healthcare organization to implement a plan of prevention by altering training or staffing or other action plans.

Summary

The literature on MNC was limited and yet there is a growing interest and value in the concept. MNC was reported to be a common occurrence across all units and hospitals. The relationship between self-reported MNC and documented care has not yet

been established. The literature suggests that such a comparison was a labor intensive exercise and that no research group has undertaken this methodology. MNC varies across the units within a hospital. For example, an intensive care unit has less MNC due to a 1:1 or 2 staffing ratio vs. a 1:4 to 12 staffing ratio on a medical/surgical unit. The time of day of the MNC, reported or documented provides insight into how to manage MNC. Additionally, it is important to broaden our understanding of the concept of MNC: self-reported vs. documented. A richer understanding may better assist nursing leadership in its planning and in developing action plans.

Currently, it is unknown if there is a difference between MNC: self-reported vs. documented. This study helps nursing leaders to understand what has occurred on the study nursing units. The patients benefit from healthcare's understandings of MNC and its impact on patient outcomes. To that end, it is appropriate that all nursing professionals understand and address instances of missed nursing care.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

An increasing number of researchers report findings on the concepts of missed nursing care, care left undone and unmet care (Bittner & Gravlin, 2009; Kalisch, 2006, 2009; Kalisch, Landstrom, & Williams; 2009; Kalisch & Williams, 2009; Lucero, Lake, & Aiken, 2009; Thomas-Hawkins, Flynn & Clarke, 2008). The studies inform professionals that missed nursing care occurs across all nursing units and hospitals (Lucero et al., 2009). In light of this feedback, it is important to understand and validate these findings as they pertain to other measurement methods and outcomes. This study examined the effect of two different identification methods for missed nursing care. The potential relationship between the two missed nursing care identification methods and the relationship to the occurrence of pressure ulcers (patient outcome) was explored. This chapter presented the research methodology including research design, setting, population and sample, instruments, procedure for data collection and analysis, and the ethical considerations that were used in this study.

Research Design

A descriptive retrospective study design using secondary data from two different sources was used. Descriptive studies were used to describe the phenomenon (missed nursing care) and how the associated variables (care interventions) changed over time (Portney & Watkins, 2009). The classification of individuals, identification of variables

and development of research questions are based on descriptive data (Portney & Watkins, 2009). Retrospective study designs provide a view of a current outcome then identifies antecedent factors that caused it (Polit & Hungler, 1999) and provide analysis of data collected in the past. It is usually collected from survey or medical records.

This descriptive study describes the phenomenon of missed nursing care and two methods of identification of that missed nursing care. The two identification methods for missed nursing care were (a) nursing staff's self-reported missed nursing care and (b) missed nursing care identified from a medical record audit.

The data was collected retrospectively from a survey that the respondents (nursing staff) self-reported occurrences of missed nursing care. The survey results were collected from June 1, 2010 to July 9, 2010. The second data source was a medical record audit which identified documented occurrences of missed nursing care in the "at risk" of pressure ulcer patient population (Braden Risk score of 15 points or less). The medical record audit data was collected for the time period of June 1 to July 9, 2010. The study identified patients who experienced missed nursing care as determined by a medical record audit and compared to what the nursing staff self-reported as missed nursing care. The study examined the relationship between two identification methods of missed nursing care, and the relationship of each identification method with the patient outcome of pressure ulcer.

Setting

The setting for the proposed study was the south central region of the United States. The sample's nursing staff population and patients came from one hospital in that

region. Four medical/surgical nursing units within that hospital were selected for inclusion in the study.

Population and Sample

For this study, the target population was nurses who worked on medical/surgical units within a hospital, and the patients on those units who were at risk for a pressure ulcer. The sample for this study was obtained from the accessible population who were nursing staff who participated in the MISSCARE project and medical/surgical patients who were “at risk” of a pressure ulcer occurrence. The following discussion on the two populations informs the reader how each group was incorporated into the study.

Inclusion Criteria

Nursing staff:

- Nursing staff (Registered Nurses (RNs), Licensed Vocational Nurses (LVNs) and Nursing Assistants (NAs)) that completed the MISSCARE survey.
- Nursing staff (RNs, LVNs and NAs) that were classified as medical/surgical staff.

Patients:

- The patient population consists of patients who were 18 years-old or older,
- The patient population had a Braden Risk Assessment of 15 points or less
- The patient populations were those that did not expire.

- The patients were on a medical/surgical unit during the time period of June 1, 2010 to July 9, 2010 when the initial data was collected.

Exclusion Criteria

Nursing staff: Excludes staff that did not participate in the MISSCARE survey.

Patients:

- Patients who were not cared for on medical/surgical units.
- Patients that expired during the data collection time frame (June 1, 2010 to July 9, 2010).
- Patients who had a Braden Risk Assessment score of 16 points or greater.
- Excluded those patients with partial days of stay on the medical surgical nursing unit (< 24-hours).
- Excluded patients if the shift documentation was missing.

The sample size was determined *a priori* by power analysis. The desired sample size for the nursing staff self-reported section of this study was at least 64 subjects. Cohen supports sixty-four participants for an alpha of .05, medium effect size and (power .80) for tests of mean differences (1992). The desired sample size for the chart audit section of this study is 97 participants. Soper (2010) reports for an “ $\alpha = .05$, with a power of .80 ($\beta = .20$), and a medium effect size ($r = .15$), a required sample size 97 is required for multiple regression.

Protection of Human Subjects

Approval for the study was granted through Texas Woman's University's Institutional Review Board (IRB) and a health care system IRB in the south central region of the United States. The study was granted a waiver of consent. Participants in both the MISSCARE survey and medical record audit were unaware that the survey responses or data from the medical record were used in a retrospective study. The following breaks in subject protection could occur: (a) loss of confidentiality, (b) invasion of privacy and (c) loss of anonymity. Measures were taken to minimize these risks are listed as follows.

Patients

- Initially, account numbers without names were used to select the population, and then research code numbers were assigned and used in the database.
- The data collection was confined to the variables needed. The variables were obtained from the nurses' notes and the flow sheet sections. The data elements consist of the six variables (ambulation, turning, hygiene, shift assessment, focused assessment and wound/skin care).
- The data are not to be used in future studies without the express consent of Texas Woman's University's IRB and the south central health care system's IRB's approval.
- The medical record audits were conducted by one person, the researcher.
- Data collection was restricted to the patients selected to be in the study.

- Data collection was restricted to the patients selected to be in the study.
- The database created had no patient identifiers and was password protected on the researcher's private computer. The databases were kept in a locked secure environment. The database contained the documented information for each of the selected care interventions (independent variables as well as the Braden Risk Assessment score and the pressure ulcer staging when available).

Nursing Staff

The MISSCARE survey participants were de-identified when the survey website was accessed. De-identification of the participants was provided to ensure the nursing staff the ability to freely and accurately report missed nursing care. Upon logging on to the MISSCARE survey, each participant was assigned a research code number, no other identifiers were used that could identify the participant. Limited demographic data was used in this study: Unit, personnel type, and shift worked. These demographic elements were used to understand if personnel type and time of day had an impact on identification of missed nursing care and pressure ulcer occurrences. The demographic data did not identify a specific individual.

Instruments

Four instruments were used in the study: MISSCARE Survey (Appendix C), MISSCARE Survey Calculation Tool (Appendix D), Pressure Ulcer Assessment Tool, (Appendix E) and Braden Risk Assessment Scale (Appendix F).

MISSCARE Survey

The MISSCARE survey was the data tool used to collect nurses self-reported feedback regarding missed nursing care. The MISSCARE survey was developed by Kalisch, Landstrom & Williams (2009) and was based on the qualitative work of Kalisch (2006). Missed nursing care was defined as "...any aspect of patient care that is omitted (in part or whole) or is delayed" (Kalisch, Landstrom et al., 2009, p. 4). The tool consisted of two sections, Part A and Part B. Part A has 24 items of missed nursing care that measures the amount of missed nursing care that was experienced on the last worked shift by each respondent. The responses for Part A were (a) no missed care, (b) rarely, (c) occasionally, (d) frequently and (e) always. The responses were then converted to a dichotomous scale of "no missed care" or "missed care". The "missed care" consists of occasionally, frequently, and always. The response of "rarely" is scored as "no missed care." Missed nursing care rates were calculated for each of the items (nursing actions) in Part A. Part B measures the reported reasons why missed nursing care occurs and was not used for this study.

The MISSCARE survey development had five phases. Phase 1 was the interviewing of 25-focus groups. The groups included nurses, nursing assistants and unit secretaries. Nine elements or regularly missed nursing care (ambulation, turning, delayed or missed feedings, patient teaching, discharge planning, emotional support, hygiene, intake and output documentation and surveillance) and seven themes related to reasons for the occurrence of missed nursing care were identified. Phase 2 was the development of a concept analysis for the phenomenon of missed nursing care. Phase 3 was the

development of the quantitative instrument used to measure nursing staffs' perceptions of missed nursing care on medical/surgical nursing units. Phase 4 consisted of data collection from two studies (four hospitals, N=1098). Phase 5 involved the psychometric testing of the instrument (Kalisch, Landstrom, & Hinshaw, 2009).

The study used six of the 24 missed nursing care items from the MISSCARE survey. The six selected missed nursing care items were care interventions that were part of the clinical protocol used to prevent pressure ulcers (National Pressure Ulcer Advisory Panel, [NPUAP] 2007). The six missed care items were measured in the self-reported survey and were measured in the medical record audit. The six missed care items measured were: (a) ambulation three times per day or as ordered (ambulation), (b) turning patients every 2 hours (turning), (c) patient bathing/skin care (bathing) everyday, (d) patient total assessments performed each shift (shift assessment), (e) focused reassessments according to patient condition (focused assessments: Braden Risk Assessment) everyday, and (f) skin/wound care (wound/skin care) as needed/ordered.

MISSCARE Survey Psychometric Measurements. Kalisch and Williams (2009) reported the psychometric properties of the MISSCARE survey. The discussion focuses on Part A, which was examined for content validity and reliability. Part A was not examined for construct validity because the researchers determined “that part A of the MISSCARE Survey was a series of nursing actions to evaluate elements of missed care” and that the nursing actions were not related to each other (Kalisch & Williams, 2009, p. 217).

Content Validity. The purpose of content validity was to determine if a tool measures what it is supposed to measure (Duquesne University, 2010). While content validity was the weakest of all the validities, for Part A of the Missed Care Survey it serves to develop the concept of missed nursing care. Using Lynn's (1986) protocol, content validity was established by review of 19 expert staff nurses. The content validity index was 0.89, and a content validity index of 0.80 or better is considered to have good content validity. A pilot test of the instrument resulted in editorial alterations.

Reliability. Reliability of Part A was established by test-retest. A correlation coefficient of 0.87 was obtained.

Missed Care Calculation Tool

The Missed Care Calculation tool is a researcher developed tool specifically for this study. The calculation of the rate of missed nursing care for each of the care interventions was represented by the number of missed nursing care (numerator) reported by the nursing staff divided by the total of all nursing staff reporting for that care intervention (denominator). The response scale (Likert) was converted to a dichotomous scale of no missed care, and of missed care. The missed nursing care responses of always, frequently and occasionally were mapped to the missed nursing care numerator. The responses of rarely and not missed care were mapped to the numerator for no missed care. The missed nursing care (MNC) and no missed nursing care were summed to yield the denominator for the care intervention. Next, the missed nursing care numerator was divided by the denominator to obtain the rate of missed nursing care for that intervention. This was repeated for each missed care items (interventions).

When all six missed care items (interventions) have a proportion of missed nursing care calculated, then an overall proportion for all of the care interventions combined was calculated. The calculation follows:

1. Sum all of the missed nursing care numerators and the no missed care numerators.
2. Sum the count of MNC and no MNC to obtain the overall denominator.
3. Next, divide the missed nursing care numerator by the total denominator to obtain the overall rate of missed nursing care for the six care interventions (ambulation, turning, hygiene, shift assessment, focused assessment and wound/skin care).

Pressure Ulcer Assessment Tool

The Pressure Ulcer Assessment Tool was a hospital policy and procedure tool used to identify pressure ulcers by stages. Each ulcer was recorded on this form by a nurse. The pressure ulcer is evaluated daily and as needed. For all patients with a Braden Risk Assessment score of 15 points or less, data was collected on the patient's pressure ulcer status. The scores used were Stages 2 – 4. The highest scored pressure ulcer for each body location (i.e., right hip) was the pressure ulcer of record. Stages 0-1 were assessed as no pressure ulcer.

Braden Risk Assessment Scale

The Braden Risk Assessment (BRA) tool was used to determine which patient charts were audited. Patients with 15 points or less on the BRA were included in the study if age was ≥ 18 years and there was a discharge status of alive. The BRA was developed by Braden and Bergstrom in 1984 (Braden & Maklebust, 2005).

Reliability. The BRA interrater reliability (a measure of consistency of results when a tool is used by different raters) was performed using nursing staff who were not trained on how to use the Braden Risk Assessment tool. Braden and Maklebus (2005) identified the BRA to have an interrater reliability for RNs of 88% agreement (Pearson $r = 0.99$). A low of 11% to 19% agreement was identified for nursing assistants and licensed vocational nurses.

Validity. Validity of the tool was determined by examining the sensitivity and specificity. The ability of the tool to differentiate true positives from false negatives (sensitivities) range from 70% to 100%. In other words, 70% to 100% of the assessed patients who developed pressure ulcers were predicted to develop pressure ulcers. The other aspect of validity is specificity, a tool's accuracy in identifying the true negatives from the false positives. For the BRA tool specificity ranges from 64% to 90%. Or, 64% to 90% of the assessed patients did not develop pressure ulcers and were not predicted to develop pressure ulcers.

Screening tools, such as the BRA are expected to reliably measure risk factors and provide consistent results. The validity of the BRA tool was the best researched pressure ulcer risk assessment tool and has demonstrated a positive predictive validity (4.5% - 100%) (Pancorboro- Hidalgo et al., 2006). The BRA uses six subscales: (a) sensory perception, (b) moisture, (c) activity, (d) mobility, (e) nutrition, and (f) friction and shearing (Bergstrom, Braden & Laguzza, 1987). The tool's scoring ranges from six points (high risk) to 23 points (low risk). The cut off score is 15 points to be considered at-high risk. After training, hospital nurses were able to correctly identify the pressure

ulcer risk 75.6% of the time, when using the BRA (Maklebust, Sieggereen, Sidor, et al., 2005). Identifying patients in the mid-level of risk (score of 16-18) was the most difficult. However, identification at the high and low levels of risk was more successful than risk identified in the mid-range. (Braden & Maklebust, 2005).

Data Collection

After obtaining IRB approval from Texas Woman's University, from the study health care system and Graduate School approval, data collection occurred. The MISSEDCARE survey data from June 1, 2010 – July 9, 2010 was obtained from the hospital's data coordinator for the Miss Care project. The data was entered into a database. From the MISSCARE survey the following data elements were collected:

- Participant code number (de-identifies nursing staff)
- Unit
- Personnel type
- Shift usually worked
- Report of missed ambulation
- Report of missed turning
- Report of missed hygiene care
- Report of missed shift assessment score
- Report of missed focused score
- Report of missed wound/skin care

The MISSCARE Survey database used four Excel spreadsheets to capture the data (See Appendix G).

Worksheet #1 – MNC

The MISSCARE Survey results were recorded by nursing staff member. Column 1 housed the research code assigned to the survey respondent. Column 2 depicted the shift worked (TOD). Column 3 showed the personnel type responding. The remainder of the columns showed the responses for each of the six care interventions.

Worksheet #2 – MNC

The proportion of MNC was calculated by using the raw count results from worksheet #1. A calculation was made for each respondent. This was followed by an overall calculation that was generated for all respondents.

Worksheet #3 – MNC

The shift worked results are displayed with results by peak hour (Monday-Friday, 0700-1859) and off-peak (Monday-Friday, 1900-0659) hours were calculated to obtain a proportion missed nursing care for each time period. A TOD calculation of MNC was made.

Worksheet #4 – MNC

The personnel type data are presented in this worksheet. There are two personnel types (nurses (RNs & LVNs) and nursing assistants). A calculation of MNC by personnel type was determined.

The second data collection process used the hospital's electronic health record (EHR). The EHR was reviewed from a remote site via electronic media. First, a master

list of patients on medical/surgical nursing units was obtained from the Decision Support Service. Decision Support Services is a department tasked with providing data to organizational leadership for their analysis and use. Second, a review of medical records from the selected medical/surgical units was conducted. The review focused on the inclusion or exclusion of patients using the pre-determined criteria. Patients were included if admitted to a medical surgical unit between June 1-July 9, 2010, 18 years or older, discharged alive and scored 15 points or less on the Braden Risk Assessment. The master list was housed in the Principal Investigator's office in a protected computer file. Once the patient was identified from the master list, the patient was assigned a research code number. The research number coded list became the data collection file identifier. Medical record data was collected by retrieving the data elements listed below.

Physician orders were not accessible for determining the frequency of care. The expected frequency of care was established using Kalisch's (2009) criteria. Nurses' notes and flow sheets were reviewed for documentation of the care interventions. Data was entered into a database using four Excel worksheets, see Appendix H. From the medical record audit the following data elements were collected.

- Participant research code
- Unit
- Length of stay
- Personnel type who provided specific care
- Shift care was given on, using peak and off-peak definitions

- Documentation of ambulation care provided, number of times for 24 hour period
- Number of times ambulation care was expected to be provided within 24 hour period
- Documentation of turning care provided, number of times for 24 hour period
- Number of times turning care was expected to be provided within 24 hour period
- Documentation of hygiene care provided, number of times for 24 hour period
- Number of times hygiene care was expected to be provided within 24 hour period
- Documentation of shift assessment performed, number of times for 24 hour period
- Number of times shift assessment care was expected to be provided within 24 hour period
- Documentation of focused assessment performed, number of times for 24 hour period
- Number of times focused assessment care was expected to be provided within 24 hour period
- Documentation of wound/skin care performed, number of times for 24 hour period
- Number of times wound/skin care was expected to be provided within 24 hour period

Worksheet #1 – MRA

Data collection was recorded on Worksheet #1 (See Appendix H). Column 1 housed the patient's research code number. Column 2 depicted the date and time and the

personnel type (dt_pty). This information supported the analysis by time of day (TOD) and personnel type (PT). The Column 2 data is interpreted as

- The first number was the hundreds place, and signifies the first full day of stay (the day of admission and discharge day are excluded),
- The second number in the ten's place signified the date and time of peak or off peak (one equals Monday-Friday 0700-1859, while two equals all Monday-Friday 1900-0659, three equals all Saturday-Sunday 0700-1859 and four equals Saturday 1900-0659 and Sunday 1900-through Monday 0659, (Hamilton, Eschiti, Mathur, Gemeinhardt, et al., 2010) and
- The third number in the ones place signifies the personnel type, with one representing nurses (RNs and LVNs) and two representing nursing assistants (NAs).
- Used the appropriate date, time and personnel type (see dt_pty) score each care intervention for the care actually delivered in the numerator cell for that intervention. For example, if an RN ambulated the patient at 1200 on Monday (the first full day of stay), a tick mark would be entered under the heading am_num (ambulation numerator) on row 111. Another example would be if the NA gave the patient a bath on the third full day of stay at 2000, a tick mark would be entered under the heading bs_num (hygiene numerator) on row 322. A weekend example would be, if the NA turned the patient at 1400, on the fourth day of stay (Saturday). A tick mark was entered under the heading tu_num on row 432. Column 3 showed the length of stay minus the admission and discharge

day (los). The next 12 columns showed the six care interventions by numerator and denominator. For example, ambulation is expected to occur three times a day (denominator-den). The denominator was compared to how often ambulation did occur, once (numerator-num). The six missed care items (interventions) are ambulation (am), turning (tu), hygiene (bs), shift assessment (sa), focused assessment (fa) and wound/skin care (wsc). The remaining columns represent the pressure ulcer stages and location of ulcer for each stage. The next to the last column labeled PU Stage 5 represents the unstageable ulcers and deep tissue trauma injuries. The last column identifies the highest scored pressure ulcer. The highest scored pressure ulcer is the dependent variable for research questions four and five.

Worksheet #2 – Medical Record Audit (MRA)

The total raw score for the care intervention was entered and included totals for all patients. For each care intervention the rate of care was calculated, the care expected was recorded (1.0) and a rate of MNC for that variable was calculated. Two additional calculations were performed. The first is a total raw score for the overall patient population. A proportion of missed nursing care was determined. The second calculation was an overall calculation of each care intervention. A proportion of missed nursing care was determined for each of the six care interventions.

Worksheet #3 – Medical Record Audit (MRA)

The total raw scores for the care interventions by time of day were recorded here. The TOD categories were peak (Monday-Friday, 0700-1859) and off peak (Monday-

Friday, 1900-0659 and Saturday, 0700 through Monday, 0659). Each patient had missed nursing care identified by TOD. An overall calculation by TOD for each of the six care interventions was recorded.

Worksheet #4 – Medical Record Audit (MRA)

The total raw scores for the care interventions by personnel type was calculated and recorded within this worksheet. The personnel types are nurses (RNs and LVNs) and nursing assistants (NAs). The nursing care providers for each patient were identified by type. An overall calculation by personnel type for each of the six care interventions was recorded.

Treatment of Data

Data was coded and entered into SPSS statistical software version 19, the data was analyzed using descriptive statistics, the categorical variables were analyzed using frequencies, percentages, cross-tabulations with Pearson's Chi Square and Cramer's V. Logistic regression (Portney & Watkins, 2009; Polit & Beck, 2009) was used to evaluate the results of the MISSCARE Survey (Likert response set). The preset alpha of .05 was used to determine if a research question was accepted or rejected.

To understand the relationship between the results of the two identification methods, a comparison of the self-reported and documented data was conducted. Analysis included two sets of variables. The first came from the MISSCARE survey data and the second set came from the chart review data. For the MISSCARE survey data, frequencies and percentages were computed for the categorical variables of unit, role, and the six items of ambulation, turns, baths, shift assessments, focused assessments, and

wound care. The relationships among variables were calculated using cross tabulations with Pearson's Chi Square. Cramer's V was used to evaluate effect size. The data for the independent variables used for the personnel type Logistic regression model was to be analyzed for multicollinearity. The lack of findings for the dependent variable pressure ulcers eliminated the opportunity for data exploration or analysis by pressure ulcer.

The second data set originated from the medical record audit. Computation of frequencies and percentages was conducted using the categorical variable. The BRA scores were assessed for means and percentages. The relationship between the BRA score and the independent variables was evaluated using cross tabulation with Pearson's Chi-Square. Cramer's V was used to evaluate the effect size. Another statistical method used to evaluate the relationship between the BRA score and the independent variables was a one-way Analysis of Variance.

Research Questions and Statistical Methods

There were five research questions. This section will explain the proposed statistical test to be used for research question one to five. The selected statistical tests are: t-test, and linear regression. These tests were used to examine comparisons and variations in the different data sets. The same independent variables are used in each research question.

Research Question #1

Is there a difference between self-reported missed nursing care and the nursing care documented for the outcome of pressure ulcer?

The dependent variable was pressure ulcer (yes or no). The random sample yielded only one Stage 2 pressure ulcer. No other pressure ulcers were detected in the medical audit review. The patients in the sample had Braden Risk Assessment Scores of 8 – 15 points, placing the patients at moderate to very high risk of pressure ulcer occurrence (Table 2).

Table 2

Research Question One - Variables and Levels of Measurement

Variable	Levels of Measurement
Ambulation	Nominal, 1 = Missed, 2 = Not missed
Turning	Nominal, 1 = Missed, 2 = Not missed
Bathing	Nominal, 1 = Missed, 2 = Not missed
Shift assessment	Nominal, 1 = Missed, 2 = Not missed
Focused assessment	Nominal, 1 = Missed, 2 = Not missed
Wound/skin care	Nominal, 1 = Missed, 2 = Not missed
Pressure Ulcer, stage 2-5	Nominal, 1 = Missed, 2 = Not missed

Research Question #2

Is there a difference between self-reported missed nursing care and the nursing care documented by time of day (peak vs. off-peak hours)?

This question was answered using a t-test. The documented care given and nurses self-reporting were coded as peak hours or off peak hours. Peak hours were defined as: Monday – Friday, 0700 – 1859. Off-peak hours were defined as: Monday – Friday, 1900 – 0659 and Saturday, 0700 through Monday, 0659 (Table 3).

Table 3

Research Question Two - Variables and Levels of Measurement

Variable	Levels of Measurement
Ambulation	Nominal, 1 = Missed, 2 = Not missed
Turning	Nominal, 1 = Missed, 2 = Not missed
Bathing	Nominal, 1 = Missed, 2 = Not missed
Shift assessment	Nominal, 1 = Missed, 2 = Not missed
Focused assessment	Nominal, 1 = Missed, 2 = Not missed
Wound/skin care	Nominal, 1 = Missed, 2 = Not missed
Time of Day	Nominal, 1 = Monday – Friday, 0700-1859 2 = Saturday 0700 – Monday 0659

Research Question #3

Is there a difference between self-reported missed nursing care and the nursing care documented by personnel type?

This question used a multivariate of analysis of variance. The population was stratified by personnel type, nurses or nursing assistants. The data was grouped by identification method, self-reported vs. documented (Table 4)

Table 4

Research Question Three - Variables and Levels of Measurement

Variable	Levels of Measurement
Ambulation	Nominal, 1 = Missed, 2 = Not missed
Turning	Nominal, 1 = Missed, 2 = Not missed
Bathing	Nominal, 1 = Missed, 2 = Not missed
Shift assessment	Nominal, 1 = Missed, 2 = Not missed
Focused assessment	Nominal, 1 = Missed, 2 = Not missed
Wound/skin care	Nominal, 1 = Missed, 2 = Not missed
Personnel Type	Nominal, 1 = Nurses, Registered and Licensed 2 = Nursing Assistants

In order to assess whether there are differences between nurses and nursing assistants about the perception of missed nursing, a multivariate analysis of variance was computed with the six care variables serving as the dependent variables and personnel type as the independent variable.

Research Question #4

Can the presence of a pressure ulcer be predicted from knowing the rate of missed nursing care (self-reported versus documented) for ambulation, turning, hygiene, shift assessment, focused assessment and wound/skin care?

This question is predictive and may serve to allow nursing management to project the outcome of pressure ulcer based on missed nursing care (self-reported versus documented). Logistic regression was planned for the analysis of this question. The predictor variables were the six care interventions, stratified by self-reported or medical record audit. The dependent variable will be pressure ulcer yes or no. Of the five stages of pressure ulcer, only stages two-four were used to determine if a pressure ulcer has occurred. The national harm measures use only stages 3-4 (ECR Institute, 2008). The researcher included stage 2 due to the break in the skin barrier (Table 5).

Table 5

Research Question Four - Variables and Levels of Measurement

Variable	Levels of Measurement
Ambulation	Nominal, 1 = Missed, 2 = Not missed
Turning	Nominal, 1 = Missed, 2 = Not missed
Bathing	Nominal, 1 = Missed, 2 = Not missed
Shift assessment	Nominal, 1 = Missed, 2 = Not missed
Focused assessment	Nominal, 1 = Missed, 2 = Not missed
Wound/skin care	Nominal, 1 = Missed, 2 = Not missed
Pressure Ulcer, stage 2-4	Nominal, 1 = Missed, 2 = Not missed

Research Question #5

If pressure ulcer occurrence can be predicted, which missed nursing care predictor variables are key factors in the prediction of pressure ulcer status?

This query supplemented research question four by focusing on the identification of specific predictor variables that are contributing to the predictability of the occurrence of pressure ulcer. Logistic regression was planned to build the best fitting model (Table 6).

Table 6

Research Question Five - Variables and Levels of Measurement

Variable	Levels of Measurement
Ambulation	Nominal, 1 = Missed, 2 = Not missed
Turning	Nominal, 1 = Missed, 2 = Not missed
Bathing	Nominal, 1 = Missed, 2 = Not missed
Shift assessment	Nominal, 1 = Missed, 2 = Not missed
Focused assessment	Nominal, 1 = Missed, 2 = Not missed
Wound/skin care	Nominal, 1 = Missed, 2 = Not missed
Pressure Ulcer, stage 2-4	Nominal, 1 = Missed, 2 = Not missed

Further Analysis

Research questions one, four and five were not relevant after the data collection revealed only one Stage 2 pressure ulcer and one skin tear. These pressure ulcer results are close to the current national goal of 0% per 100 patients (ECR Institute, 2008). The

original plan to use multiple and logistic regression to determine if any of the care variables could predict pressure ulcer occurrence in an at-risk patient population was no longer viable. The alternative plan included the use of Pearson's Chi-Square to assess the relationship among the care variables by personnel type and time of day.

Research question one was modified by using the sample of patients with a Braden Risk Assessment score of 15 points or less as the alternative dependent variable. The focus became examining the care variables in relationship to the patients at risk of pressure ulcers instead of patients who had pressure ulcer occurrences. The medical record audit and the MISSCARE Survey data were graphed and visually inspected to determine whether the relationship between the self-report survey data and the missed nursing care data gleaned from the medical record audit were related.

Research questions four and five focused on the predictive capability of MNC of the independent variables for patients with pressure ulcer occurrences. Again, the focus will be turned to patients with high risk Braden Risk Assessment scores. The same variables and levels will be used. The Braden Risk Assessment score will be substituted for pressure ulcer. The BRA level of measurements are defined as the three high risk ranges: (a) moderately high risk, 13-15 points; (b) high risk, 10-12 points, and (c) very high risk, 9 or lower points.

The medical record audit data have a hierarchical structure (missing care data nested within each patient). Measures at one level affect and are affected by measures at the other level. This interaction must be considered in analysis of the data. Failure to

consider the hierarchical nature of the data leads to unreliable estimation of the pattern of missing care (Raudenbush & Bryk, 2002).

Logistic regression analyses was conducted and clustered by patient. In the first set of logistic regressions, peak vs. off-peak and BRA scores was used to predict each of the six care variables in order to test if BRA scores predict missing care, controlling for whether the care occurred during peak or off-peak shifts. Next, BRA score was predicted from peak vs. off-peak and each of the missed care scores in order to test if missed care predicts BRA scores, controlling for whether the care occurred during peak or off-peak shifts.

In addition, examination of the three hospital units was assessed in a multivariate analysis of variance. The dependent variables were the six care variables (a) ambulation, (b) turning, (c) bathing, (d) shift assessment, (e) focused assessment and (f) wound/skin care. The independent variable was unit. Findings and results are presented in Chapter IV.

Assumption of Analysis: Research Questions 1-5

Two sets of data were used to answer each of the five research questions. The data was examined for the following.

1. Each of the six independent variables (six from the self-reported MISSCARE Survey) were examined using a case summary to determine if all expected data is present (a review for missing data). A case summary for each individual participant revealed how each participant rated missed nursing for each of the care variables. For example, case one responded that care was missed for ambulation, turning and

bathing but not missed for shift and focused assessment and wound care. A deletion decision was made by for each participant and care variable. If data was missing it was deleted from that analysis. There was one missing case for ambulation, none missing for turning and two missing cases for bathing. The remaining care variables (shift and focused assessment and wound care) did not have responses from nursing assistants and that would be appropriate since nursing assistants do not provide that level of care. Exclusion of missing data was minimized. In regards to the independent variables (selected care interventions), clarification is presented. There are 12 independent variables. Each independent variable is used twice. The first measure of the independent variables is in the MISSCARE survey. This is when nursing staff report that on their last shift worked, a certain care intervention was not provided a certain amount of the time. The second measure of the independent variables is in the medical record audit, which is when the nursing staff document on every shift the care that was provided. Determination of missing data was conducted by reviewing data collected and entered during three separate reviews. Modifications were made to the data file to accurately reflect what was recorded in the data collection notebook. Additionally, an audit of 10 medical records showed a range of 4-6% error rate. This rate did not trigger a review of all medical records. Each identification method (self-reported and documented) has the potential to identify missed nursing care.

2. Descriptives for the self-reported MISSCARE survey results were examined through the following parameters.

- a. Measures of central tendency: mode, mean, and median were reviewed.
- b. Variability measures: Standard deviation and variance were reviewed. The standard error is presented as an estimate of the standard deviation of the mean for the sample size. The Interquartile (range between the 75th and 25th percentile value. Variability also shows the minimum, maximum and range. These descriptors can help to identify skewness, and abnormal data points.
- c. Shape of the distribution: Skewness and Kurtosis revealed information about the distribution of the data values. Regression does not assume a particular distribution for the predictor variables, normal distribution is not required (SPSS, 2000). Analysis included determining if gaps existed in the data.
- d. Extreme points: a list of the five upper and five lower most extreme points. The points are identified with an identification number and data values.
- e. Plot, stem and leaf: The stem and leaf plot is similar to the histogram, but provides additional information. It shows the shape of the distribution and the plot can offers the specific data values. Skewness and extreme points may also be identified using this technique.
- f. Relations between independent variables. The researcher will use a matrix of correlation for the independent variables. The correlations will be examined to determine if there is multicollinearity (highly correlated predictor variables). If multicollinearity exists then the Correlate, Bivariate test will be used.

3. The dependent variable, pressure ulcer occurrence, will be examined using the same techniques as was used to examine the independent variables. Additional analysis will include the following.

- a. Histogram: Ascertain the skewness of the data.
- b. Normal probability plots: The plot allows for a specific visual comparison of the observed distribution to that of normal.
- c. Box and whisker plot: Displays variable information as a summary.

To perform the analysis, it was necessary to have data from the medical record audit (patient level) and MISSCARE survey (nurse level) using the same predictor variables. The data was prepared using the techniques listed above. The selection of the independent (predictor) variables was guided by a theoretical rationale. The rationale for the predictor variables comes from the Clinical Practice Guidelines and were created by the National Pressure Ulcer Advisory Panel. The variable selections were based on the variable's support of the following factors used in the Clinical Practice Guidelines (NPAUP, 2007). Prevention of pressure ulcers incorporate the concepts of (a) relief of pressure points (ambulation and turning), (b) maintenance of clean and debris free skin (bathing), (d) frequent assessments (shift and focused assessments) and (e) skilled assessment and care of wounds (wound/skin care). The statistical models proposed coupled with the NPUAP guidelines for understanding the interpretation of the regression results guided this study to its conclusion.

Summary

This chapter has presented the procedures for collection and treatment of data for the study. The study attempted to identify which method best identifies missed nursing care, self-reported or documentation of care. Issues related to the design, participant selection, setting, sample size, protection of human subjects, instrument description, including reliability and validity, data collection techniques, and data treatment were discussed.

CHAPTER IV

ANALYSIS OF DATA

The study design was a retrospective, explanatory design using secondary data analysis comparing two methods of identifying Missed Nursing Care (MNC). The first database was comprised of the responses of nursing staff to a survey inquiring about occurrences of missed nursing care during the last shift worked. This data will be referred to as the *self-reported MISSCARE survey* data throughout the chapter. The second data base used was from results of a medical record audit which showed the documentation of care for six care variables. This data will be referred to as the *medical records audit* data throughout this chapter. Both databases were made up from data from the same time period, June 1, 2010 to July 9, 2010. The purpose of the study was to determine if one of the MNC identification methods was better at identifying MNC, and to answer five research questions. This chapter presents an analysis of the study data, findings as they relate to each research question, followed by additional analyses.

Description of the Sample

This section of the chapter provides a description of the demographic characteristics collected in the self-reported MISSCARE survey followed by the demographic characteristics collected from the medical records audit data. Due to strict confidentiality requirements, only limited demographic characteristics will be reported for both data sets. For example, hospital unit data will be identified as Unit 1, Unit 2, and

Unit 3 instead of reporting the actual unit. The MISSCARE survey data includes limited demographic information on the nursing staff and the medical records audit data includes limited information on the patients whose charts were reviewed.

MISSCARE Survey Demographic Information

The MISSCARE survey included several items which asked for information about the staff member completing the survey. Based on this information, only nurses and assistants were included in the analysis. Various clerical and other staff members were excluded as they were not the focus of the current project. Although several demographic items were completed in the MISSCARE survey, the hospital from which the data was collected only approved the job position variable and limited hospital unit data to be reported in the current project. Overall, data from 109 nursing staff from three hospital units where pressure ulcers are a frequent concern were used to measure self-reported missed nursing care (MNC).

The frequencies and percentages of roles and units and are presented in Table 7. Nurses made up the majority of the sample (73.4%) and nursing assistants (NA) made up the remaining participants (26.6%). Of the 80 nurses, 1 (1.3%) was a Licensed Vocational Nurse (LVN), 6 (7.5%) were managers, 1 (1.3%) was another type of nurse and 72 (90.0%) were Registered Nurses (RNs). Regarding the unit, data is only identified as Units 1-3 for the purposes of confidentiality. The results show that approximately half of those completing the survey worked in Unit 3 (50.5%), while just over one-third were from Unit 1 (34.9%) and 14.7% worked in Unit 2. The relationship between role and unit was assessed using a cross tabulation with Pearson's Chi-Square, see Table 8. The

findings revealed no significant relationship between the roles and nursing units ($\chi^2 = .751, p = .687, \text{Cramer's } V = .08$), see Table 8.

Table 7

Frequencies and Percentages of Demographic Variables from MISSCARE Survey

	n	%
Roles		
Assistant	29	26.6
Nurse	80	73.4
Unit		
Unit 1	38	34.9
Unit 2	16	14.7
Unit 3	55	50.5

Table 8

Frequencies and Percentages of Unit by Role from MISSCARE Survey

	Assistant		Nurse		χ^2	<i>p</i>
	n	%	n	%		
Unit					.751	.687
Unit 1	12	41.4	26	32.5		
Unit 2	4	13.8	12	15.0		
Unit 3	13	44.8	42	52.5		

Table 9 outlines the frequencies and percentages of nurse demographics for each shift. For the full sample of those who completed the MISSCARE survey, the majority

worked day shifts (56.9%) and the least amount worked evening shifts (7.3%). There was a similar pattern for both RN/LVNs and NAs. For both RN/LVNs and NAs, the majority worked day shifts (54.8% and 60.0%, respectively). Both RN/LVNs and nursing assistants had the lowest percentages working evening shifts (6.8% and 10.0%, respectively). There were twice as many managers who worked day shifts (n=4) when compared to those working night shifts (n=2). No manager who completed the MISSCARE survey reported working day shifts. Additionally, of all those who completed the MISSCARE survey, the largest amount were RN/LVNs (n=73), followed by nursing assistants (n=30), and the least amount being managers (n=6).

Table 9

Frequencies and Percentages of Job Title by Time of Day

	n	%
Day		
RN/LVN	40	54.8
Assistant	18	60.0
Manager	4	66.7
Evening		
RN/LVN	5	6.8
Assistant	0	0
Manager	3	10.0
Night		
RN/LVN	28	38.4
Assistant	9	30.0
Manager	2	33.3

In summary, the majority of the participants who completed the MISSCARE survey were RNs. The RNs worked on Unit 3 and were assigned to the day shift.

Medical Record Audit (Client) Demographic Information

Several demographic characteristics of the patients were collected in the medical record audit data along with information on their Braden Risk Assessment and amount of missed nursing care. Data were extracted from the medical records to measure the nursing care nursing staff documented as being given. There was an initial population of 366 patients on the selected units. Of the 366 cases, there were 199 patients that met the initial selection criteria to be in the audit. Of the 199 patients who qualified for the audit review, 97 patients were randomly selected using a random number generator. Each case was assigned a number, next the random generator was used to select 97 cases. Three additional cases were selected to cover for any cases that may become deselected. One case was deselected due to being from another hospital and was not cared for in the study hospital.

The selection criteria were cared for on one of the selected medical surgical units between June 1, 2010 and July 9, 2011, had a length of stay of three days or more, were discharged alive, were 18 years or older, and had a Braden Risk Assessment score of 15 points or less. Table 10 shows the number of patients by day of stay.

Table 10

Frequencies and Percentages of Overall Number of Patient Days of Stay from Medical Record Audit

Days of Stay	n	%
1	96	15.2
2	93	14.7
3	85	13.5
4	69	10.9
5	56	8.9
6	40	6.3
7	30	4.8
8	25	4.0
9	24	3.8
10	20	3.2
11	15	2.4
12	11	1.7
13	10	1.6
14	10	1.6
15	9	1.4
16	7	1.1
17	5	.8
18	5	.8
19	4	.6
20	4	.6
21	4	.6
22	2	.3
23	2	.3
24	1	.2
25	1	.2
26	1	.2
27	1	.2
28	1	.2

In summary, the client sample included 96 patients and 631 observations (days of care). At the patient level, the number of observations (days) per patient ranged from one to 28; with an average of 5.72 ($SEM=.564$; 95% CI : 4.60 – 6.84).

Reliability of Instruments

Four instruments were used to collect data for this study, MISSCARE Survey, MISSCARE Survey Calculation Tool, Pressure Ulcer Assessment Tool, and Braden Risk Assessment Scale. The MISSCARE Survey, using the 6 items used in this study, had a Cronbach's alpha of .83. The MISSCARE survey calculation tool would not demonstrate reliability because it is simply a calculation scale. Additionally the data used was from secondary sources, therefore, the reliabilities of the Pressure Ulcer Assessment Tool, and Braden Risk Assessment Scale could not be ascertained.

Findings

The focus of this study was to compare two methods of identifying MNC and then to determine if there was a link between MNC and the patient outcome pressure ulcers. It is important to understand the similarities and differences in the two identification methods of MNC. Accurate and timely identification of missed nursing care support the national patient safety agenda and the goal to do no harm. While MNC has not been included in the patient safety objectives or taxonomy, it has been shown to occur frequently with unknown but potentially harmful outcomes (Tierney, 2009).

There were six variables included in the study, and included the care interventions that were examined in both of the Missed Nursing Care (MNC) identification methods. The first identification method was the self-reported MISSCARE Survey. The second identification method was the medical record audit. The six care interventions were ambulation, turning, bathing, shift and focused assessments, and wound/skin care.

Multivariate exploratory data analysis was executed to examine the data for relationships and violations of statistical assumptions prior to conducting the primary statistical analyses. Primary analysis was conducted to explore the data from the Braden risk assessment tool, the MISSCARE survey and the medical record audit databases. The findings are then presented in the order of the research questions posed and are followed by additional analyses.

Data Preparation

The current section discusses the screening of missing data and outliers, and the assumptions related parametric measurement.

Screening. Missing demographic data in the MISSCARE survey was identified using frequencies. Nursing staff missing data for the unit, shift worked or role were excluded from the relative analysis. Incomplete responses or missing responses were eliminated from the variable data set being reviewed. For example, if the nursing staff participant did not record the shift worked, that participant was not included in the research question #2: Is there a difference between self-reported missed nursing care and the nursing care documented by time of day (peak vs. off peak hours)? The MISSCARE survey used a Likert-type scale and eliminated outliers. Missing data in the care intervention variable section of the survey were managed by not including that participant in that calculation, but retained the participant for all variables that had responses. No modifications or adjustments were made.

Missing data in the medical record audit was difficult to identify. The purpose of the medical record audit was to identify missing documentation which was interpreted as

missing nursing care. When an entire shift's documentation was missing it was excluded.

Missing data was carefully identified as being separate from missing nursing care.

Assumptions of linearity. The linearity between the dependent variables of missed nursing care identification (self-reported vs. documentation) and the independent predictor variables (ambulation, turning, hygiene, shift assessment, focused assessment and wound/skin care) were established. The hazards of non-linear relationships between the predictor (independent variables) and the predicted (dependent variables) would be to under-estimate the true relationship (Osborne & Water, 2002). Under-estimation has two concerns: (a) there is an increased chance of Type II (wrongly accepting a false null hypothesis) error for the independent variables being considered, and (b) an increased risk of Type I error (rejecting a true null hypothesis) for other independent variables that share variance with the offending independent variable (Osborne & Water, 2002).

There are three ways that an observation can be unusual.

1. **Outliers:** An observation with large residual. It is an observation whose dependent-variable value is unusual given its values on the predictor variables.
2. **Leverage:** An observation with an extreme value on a predictor variable is called a point with high leverage. Leverage is a measure of how far an independent variable deviates from its mean.
3. **Influence:** An observation is influential if removing the observation substantially changes the estimate of coefficients. Influence can be thought of as the product of leverage and outlierness. (University of California, Los Angeles, 2010).

Normality. The researcher examined the data for normal distribution. Statistical review of normality was performed by calculating skewness. It is a measure of the distribution of values around the mean. Negative skewness indicates that there are a greater number of values above the mean. A positive skewness indicates that there are a greater number of values less than the mean. The following results show the skewness of the distribution: (a) 0 = symmetry, (b) plus or minus 1 = excellent distribution, (c) plus or minus 2 = a satisfactory distribution around the mean and (d) plus or minus 3 = an extreme value and normalcy is not evident. Kurtosis shows how peaked the distribution is a) 0 = the shape is close to normal, (b) plus or minus 1 = excellent shape, (c) plus or minus 2 = a satisfactory shape, (d) plus or minus 3 = an extreme value and normalcy is not evident, and (e) greater than 5 = most values are in the tails of the distribution. The data was satisfactory for skewness and kurtosis.

Primary Data Analysis

The first step included describing the study variables of interest. Frequencies and percentages were calculated for all categorical variables. Means and standard deviations were calculated for continuous variables. Crosstabulation with chi square was used to test for a significant relationship between pairs of categorical variables. An exploratory factor analysis was conducted to determine whether the six items of the MISSCARE survey that measured self-reported missing care could be combined into one summary score that would describe missing care. Primary analyses included multivariate analyses of variance, logistic and multinomial regression, and visual inspection of data plots.

Braden Risk Assessment Scores

In the current research, the Braden Risk Assessment (BRA) was assessed as both in independent (predictor) and dependent (predicted) variable, and these findings will be presented in the primary analysis section. The BRA data for each patient was pulled from the medical record audit. For each patient, only the highest BRA score from their hospital stay was recorded. In the data this BRA score was associated with the MNC that occurred on each day of the patients stay. In other words, the BRA score was recorded at the patient level (each patient had one BRA score) such that their one BRA score was associated with all of the MNC recorded for that patient.

The average BRA score results for the study was 12.99 ($SD = 1.93$). Using the pre-set cut points, 373 (59.1%) days of stay were classified as moderate high risk (score of 13 - 15), 218 (34.5%) were classified as high risk (score of 10 - 12), and 40 (6.3%) were classified as very high risk (score of 9 or less). Due to the low percentage in the very high risk scores, the BRA score was split into two groups for analysis. Just over half of patients (59.1%) had moderate to high risk, while 40.9% had very high risk (Table 11).

Table 11
Frequencies and Percentages of High Risk Pressure Ulcer (BRA) by Day

Level of Risk	n	%
Moderate to High (BRA Score 13-15)	373	59.1
Very High (BRA Score 8-12)	258	40.9

When considering the BRA scores at the patient level, and using the first full day of stay, the 96 patients had an average BRA score of 13.24 points (SD=1.93; Median=14.00; range: 8 – 15 points). According to the pre-set cut points, five (4.2%) were classified as having very high risk, 27 (28.1%) patients were classified as having high risk, and 64 (33.3%) were classified as having moderate high risk. Using two groups of risk, 64 (66.7%) patients had low or moderate risk and 32 (33.3%) had high risk of developing pressure ulcers.

Missed Nursing Care

The missed nursing care is presented from the self-reported MISSCARE Survey and from the medical record audit. The same six types of missed nursing care are reported from each of the two data sources (survey and audit). The care variables are (a) ambulation, (b) turning, (c) bathing, (d) shift assessment, (e) focused assessment, and (f) wound/skin care. The decision to use these care variables is based on the clinically established relationship to the prevention of pressure ulcers (NPUAP, 2009).

MISSCARE survey data. In the MISSCARE survey, nurses and assistants reported their perception of the amount of missing care during their current shift at the level of the entire unit. That is, they were not reporting how much care they missed, but rather their perception of how much care was missed overall. Each of the six types of care was rated on a scale with the following options: never, rarely missed, occasionally missed, frequently missed, and always missed. Frequencies and percentages of the amount of care that was never or rarely missed are compared to the amount that was occasionally, frequently, or always missed for each of the six types of care (Table 12).

Means and standard deviations for the survey data and possible scores range from 1 to 5, with high scores representing more missed care (Table 13).

Table 12
Frequencies and Percentages of MISSCARE Survey Items

	Ambulation		Turning		Bathing		Shift Assess.		Focused Assess.		Wound Skin Care	
	n	%	n	%	n	%	n	%	n	%	n	%
Never/Rarely Missed	33	30.8	47	43.5	62	59.6	92	90.2	85	83.3	67	63.8
Occasionally/ Frequently/ Always Missed	74	69.2	61	56.5	42	40.4	10	9.8	17	16.7	38	36.2

Table 13
Means and Standard Deviations of MISSCARE Survey Items

	N	Mean	SD	Min	Max
Ambulation three times per day or as ordered	107	2.97	.95	1	5
Turning patient every 2 hours	108	2.71	.93	1	5
Patient bathing/skin care	104	2.32	.91	1	4
Patient total assessments performed each shift	102	1.67	.68	1	4
Focused reassessments according to patient condition	102	1.81	.75	1	4
Skin/wound care	105	2.28	.92	1	4

Medical Record Audit Data. For each patient in the sample, the amount of nursing care given and the amount of nursing care expected was used to compute the amount of missing care. For ambulation and turning, this process involved determining what types of care were expected during each shift based on whether the patient was able to get out of bed. For wound/skin care, the amount expected was based on doctor instructions. Bathing, shift assessment, and focused assessment were the most consistent; each was expected for each patient either once per day or at both shifts.

After determining the actual and expected amount of care for each patient on each day, issues emerged for the bathing/skin care and for wound/skin care variables. First, bathing/skin care was expected every day but reported missing over 90% of the time (90.7%). It is assumed, based on the author's familiarity with the hospital and its nursing documentation practices, that this is a consistent error of omission not to record bathing on patient charts rather than an actual failure to bathe patients over 90% of the time. Consequently, bathing/skin care was not included in analysis beyond simple descriptives. For the wound/skin care variable, the number of times this care was expected was so low that there is not enough data to include this variable beyond simple descriptive statistics.

The total number of days that each type of care was required is demonstrated, along with the number of occurrences of care that care was actually given (on the days it was required), and the average amount of care given on the days for which care was required. There were 135 days that required an ambulation intervention. In general, ambulation was supposed to be given three times per day. However, it was only provided an average of 1.43 ($SE = .15$, Range = 0-5) times per day of the 135 days it was required.

Ambulation was missed an average of 51.0% of the times it was required per day for each patient (Table 8).

There were 221 days that required turning (or repositioning). In general, turning was supposed to occur every two hours or 12 times per day. The mean number of times turns occurred (on days for which turns were required) was 4.96 ($SE = .44$, Range = 0-12). Overall, turns were missed an average of 56.8% of the times they were required per day for each patient (Table 14).

All 631 days of stay included in the medical record audit data required two shift assessments (one per shift with two shifts per day) and two focused assessments (one per shift with two shifts per day). The shift assessment was done an average of 1.94 times per day ($SD = .26$, Range = 0-2) and overall was missing 3.1% of the time. The focused assessments were done an average of 1.91 times per day ($SD = .32$, Range = 0-2).

Overall, the focused assessments were missed an average of 4.8% of the time (Table 14).

Table 14

Frequencies and Percentages of Number of Days of Care (Required and Actual)

	Actual Care Given (Based on Days Required)		Average Care Given (Based on Days Required)	
	n	%	Mean	SD
Ambulation (Days Required)	135		1.43	1.00
Days with 0 Ambulations	22	16.3		
Days with 1 Ambulations	61	45.2		
Days with 2 Ambulations	24	17.8		
Days with 3+ Ambulations	28	20.7		
Turning (Days Required)	221		4.96	3.29
Days with 0 Turns	20	9.0		
Days with 1 Turn	12	5.4		
Days with 2 Turns	27	12.2		
Days with 3 Turns	28	12.7		
Days with 4 Turns	16	7.2		
Days with 5 Turns	27	12.2		
Days with 6 Turns	28	12.7		
Days with 7 Turns	12	5.4		
Days with 8 Turns	14	6.3		
Days with 9 Turns	12	5.4		
Days with 10 Turns	7	3.2		
Days with 11 Turns	10	4.5		
Days with 12 Turns	8	3.6		
Shift Assessment (Days Required)	631		1.94	.26
Days with 0 Assessments	2	.3		
Days with 1 Assessment	37	5.9		
Days with 2 Assessments	592	93.8		
Focused Assessment (Days Required)	631		1.91	.32
Days with 0 Assessments	3	.5		
Days with 1 Assessment	55	8.7		
Days with 2+ Assessments	573	90.8		

In order to standardize the amount of missed care for each type of care, the missed nursing care values were categorized into groups for analysis. For ambulation and turning, the data was categorized as: 0=did not require care; 1=received all recommended amount of care; 2=missed between 1 and 50% of expected care; 3=missed between 51% and 75% of expected care; and 4=missed 75% or more of expected care. For shift and focused assessments, missed care was categorized into two groups: 1=received all recommended assessments; and 2=missed any assessment (Table 15). One important factor that makes these percentages different from the percents reported in Table 14 is that the days of care not required are included in Table 15. Also taken into account are days where the amount of expected care was different than the standard care required. For example, some patients may have required turns or ambulation for only part of the day, decreasing the amount of care expected.

Table 15

Frequencies and Percentages of Missed Care

	n	%
Ambulation		
Not Required	496	78.6
No Care Missed	32	5.1
1% - 50% Care Missed	24	3.8
51% - 75% Care Missed	57	9.0
>75% Care Missed	22	3.5
Turning		
Not Required	410	65.0
No Care Missed	9	1.4
1% - 50% Care Missed	90	14.3
51% - 75% Care Missed	66	10.5
>75% Care Missed	56	8.9
Shift Assessment		
No Care Missed	594	94.1
Missed any Shift of Care	37	5.9
Focused Assessment		
No Care Missed	573	91.0
Missed any Shift of Care	57	9.0

Comparison of Missed Nursing Care MISSCARE Survey vs Medical Audit.

A comparison of the missing care from the two identification methods (survey vs. medical record audit) is presented. Overall, the percent of missing care reported in the MISSCARE survey is higher than from the medical record audit data across the various types of care. Bathing/skin care is the exception. Caution must be used when interpreting the percentages for bathing/skin care. As previously discussed, it is expected that the very high percentage of missed bathing care is due to failure to document bathing rather

than actual missed bathing. Caution must also be used when interpreting the wound/skin care variable as the amount of required care was very low for this variable (Table 16).

Table 16

Comparison of Percentages of Missed Care between MISSCARE Survey and Medical Audit Data

	Missed Care %	
	MISSCARE Survey (N=109)	Medical Audit Data (N=96)
Ambulation 3 Times Per Day	69.1	62.5
Turning Every 2 Hours	56.4	56.3
Bathing/Skin Care	40	90.7
Shift Assessments	9.8	2.9
Focused Assessments	16.5	4.6
Wound/Skin Care	36.2	44.1

Figures 3-6 show the distribution of missing data for each type of data, for ambulation, turning, shift assessments, and focus assessments. In each figure, a similar shape in distribution between the two charts would indicate that the medical record audit data and MISSCARE survey were capturing approximately the same information. In Figure 3, the medical record audit data shows a higher percentage being missed at the 67% *missed* ambulation level. The MISSCARE data shows the highest percentage of perceived missed ambulation at the *occasionally missed* level.

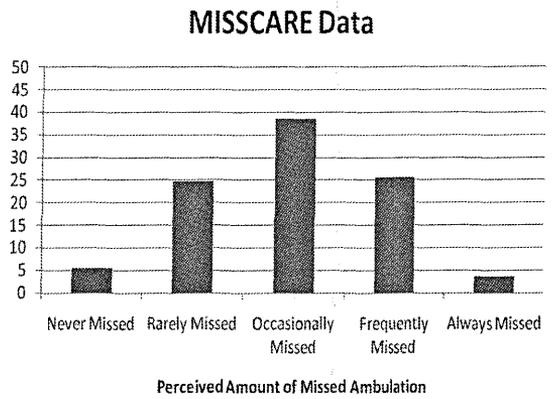
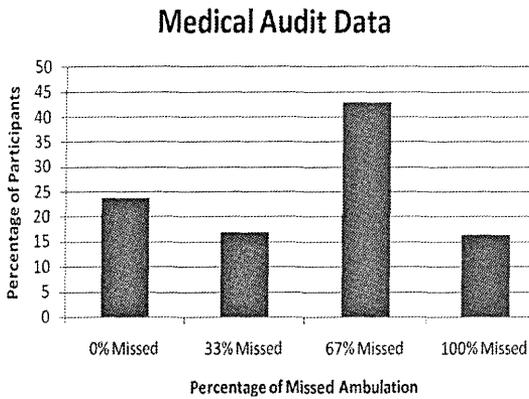


Figure 3. Comparison of the distribution of the missed ambulance medical audit data and MISSCARE survey data. Both charts have been standardized to the same percentage. Medical Audit Data compares actual percentage of missed ambulance to the reported/perceived amount of missed ambulance from the MISSCARE Survey data.

In Figure 4, the medical record audit data shows that the highest percentage of nurses and assistants missed turning patients in the 34%-67% missed category. In the MISSCARE survey, they perceived that they rarely missed turns and occasionally missed turns approximately equal proportions of the time.

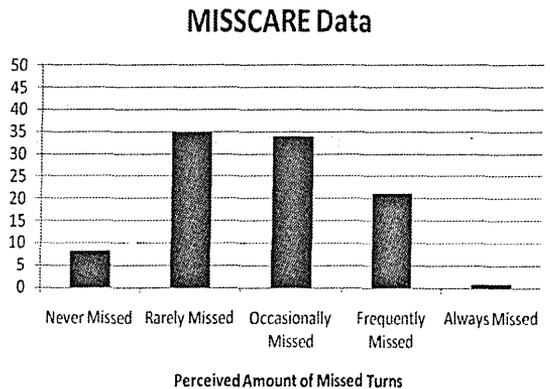
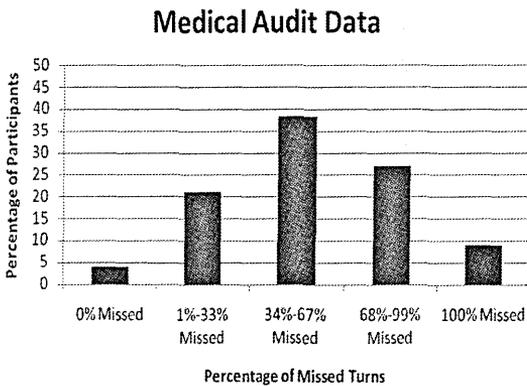


Figure 4. Comparison of the distribution of the missed turning medical audit data and MISSCARE survey data. Both charts have been standardized to the same percentage. Medical Audit Data compares actual percentage of missed turning to the reported/perceived amount of missed turning from the MISSCARE Survey data.

The missed shift assessments and missed focus assessments comparisons are shown in Figures 5 and 6. The medical record audit data shows that these assessments were never missed over 90% of the time. The perceived amount of missed care was reported never or rarely missed over 40% of the time each. Therefore, if never missed and rarely missed were combined for the MISSCARE survey data, the charts would show nearly the same distribution, indicating that the actual number of missed assessments was very similar to the perceived number of missed assessments.

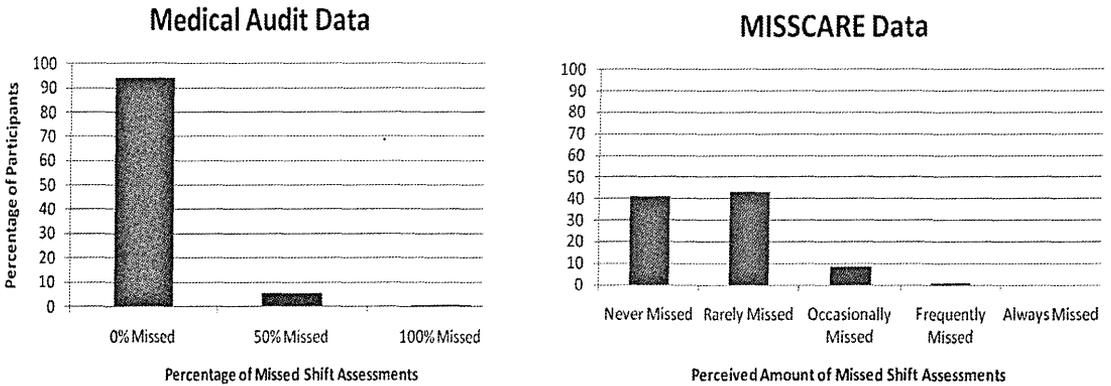


Figure 5. Comparison of the distribution of the missed shift assessment medical audit data and MISSCARE survey data. Both charts have been standardized to the same percentage. Medical Audit Data compares actual percentage of missed shift assessment to the reported/perceived amount of missed shift assessment from the MISSCARE Survey data.

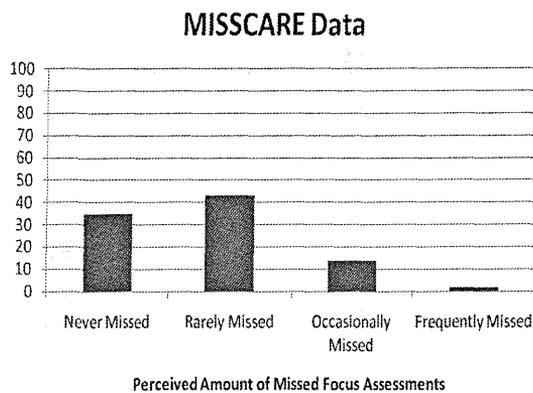
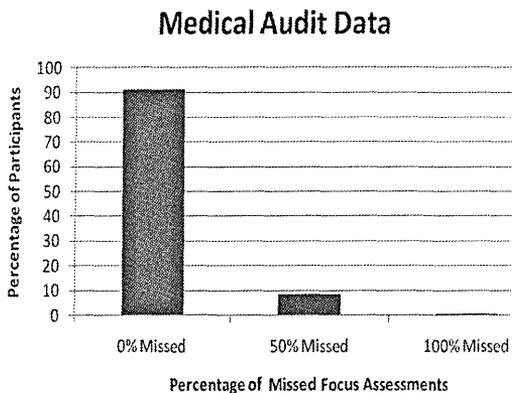


Figure 6. Comparison of the Distribution of the missed focused assessment medical audit data and MISSCARE survey data. Both charts have been standardized to the same percentage. Medical Audit Data compares actual percentage of missed focused assessment to the reported/perceived amount of missed focused assessments from the MISSCARE Survey data.

Exploratory Factor Analysis

An exploratory factor analysis with varimax rotation was conducted in order to examine the structure of the 6 items of interest from the MISSCARE survey. The results revealed that a one-factor solution accounted for 55.5% of the variance and all items had acceptable loadings (Eigenvalue > .50) (Table 17). Further, a Cronbach's alpha was computed to test the reliability of the six items used to measure MNC. The Cronbach's alpha of .84 indicates excellent reliability and supports the calculation of one score for overall MNC to measure the overall level of self-reported missed nursing care.

Table 17

Eigenvalue Loadings for a One-Factor Solution of MISSCARE Survey Items

	Eigenvalues
Skin/Wound care	.84
Turning	.78
Bathing/Skin Care	.75
Focused Assessment	.73
Shift Assessment	.69
Ambulation	.67

Primary Analyses

The primary analyses were conducted to address the five research questions as well to so some additional analysis on the data. The results are presented in the order of the research questions. It is important to note that the initial outcome of interest was pressure ulcers, stage 2-4. The review of the selected 96 medical records revealed one Stage 2 pressure ulcer. This is below the national standard of 3-4 ulcers per 100 patients. The low volume of pressure ulcers renders this as an unusable dependent variable for research questions one, four and five. The MNC finding for the one patient who experienced a pressure ulcer follows.

Case 72 experienced a Stage 2 pressure ulcer, located in the coccyx region. The following scores were noted: (a) ambulation care was given 9% of the time it was expected (out of bed, three out of the 33 expected times), (b) turning was not documented, (c) shift assessment was completed 100% of the time, (d) the focused

assessment was completed 95% of the time, and (e) wound/skin care was performed daily for three days starting the day after the pressure ulcer was identified.

Research Question 1

Is there a difference between self-reported missed nursing care and the nursing care documented for the outcome of pressure ulcer? The identification of only one pressure ulcer has rendered this question as unanswerable within the results of this study.

Research Question 2

Is there a difference between self-reported missed nursing care and the nursing care documented by time of day (peak vs. off-peak hours)? The hospital from which the study data was obtained did not agree to allow the reporting of missed nursing care by shift time. Therefore the results will be presented for the medical audit review only. Separate multinomial regression analyses were conducted to predict amount of missed nursing care (dependent variable) from peak vs. off-peak shift and BRA scores (predictors). Missed ambulatory care, peak shift predicted higher odds of more missing care (Odds Ratio = 1.304, $p < .05$). The BRA score was not a significant predictor of missing ambulatory care. For missing bed turns, missing shift assessment, and missing focused assessment neither shift nor BRA score predicted missing care (Table 18).

Table 18

Logistic Regression Analysis Predicting MNC Risk from Peak Shift and BRA Score while Controlling for Patient Level Data

	β	SE	Confidence Limits		Odds Ratio	p
			Upper	Lower		
Peak Shift (vs. off-peak)	.265	.103	.063	.468	.571	.010
BRA Very High Risk (vs. moderate-high risk)	-.264	.531	-1.306	.777	1.304	.619

Research Question 3

Is there a difference between self-reported missed nursing care and the nursing care documented by personnel type (Nurse vs. Assistant)? Job title was only recorded in a useable way in the MISSCARE survey. Initially, the missed care documented by nurses versus nursing assistants was examined in the medical record audit. However, it was found that care was documented almost solely by the nurse, regardless of whether the nurse or assistant performed the care. Thus, the differences in missed care between nurses and assistants were examined for the MISSCARE survey only.

A MANOVA was conducted with the six types of care as the dependent variables and job title as the between subjects factor. The results revealed no significant multivariate differences in the perceived amount of care reported by nurses and nursing assistants, $F(6, 91) = 1.63, p = .149$. Further examination of the data did reveal a significant difference between missed ambulation between the nurses and assistants, $F(1, 96) = 6.85, p < .05$, such that nurses ($M = 3.13, SD = .85$) reported more missed care than

assistants ($M = 2.55$, $SD = 1.14$). No significant differences were found between nurses and assistants for any of the other types of missed care (Table 19).

Table 19
Means and Standard Deviations of Self-Reported Missed Nursing Care (MISSCARE Survey) by Job Title

	Mean	SD	F	P
Ambulation			6.85	.010
Assistant	2.55	1.14		
Nurse	3.13	.85		
Turning			2.02	.159
Assistant	2.50	1.01		
Nurse	2.82	.89		
Bathing			2.47	.120
Assistant	2.09	1.02		
Nurse	2.42	.82		
Shift Assessment			.05	.822
Assistant	1.68	.65		
Nurse	1.64	.69		
Focused Assessment			.31	.586
Assistant	1.68	.57		
Nurse	1.82	.76		
Skin/Wound Care			1.37	.090
Assistant	2.00	.87		
Nurse	2.37	.89		

Note. Multivariate effect, $F(6, 91) = 1.626$, $p = .149$, $\eta^2 = .097$, boldface indicates a significantly higher value

A one-way ANOVA was used to compute the difference between the overall self-reported missing care from the MISSCARE survey between nurses and assistants. A

significant difference was found between nurses and assistants, $F(1, 107) = 5.07, p < .05$. Overall, nurses reported more missing care ($M = 2.39, SD = .64$) than did assistants ($M = 2.07, SD = .62$) (Table 20).

Table 20

Means and Standard Deviations of Overall Missed Care by Personnel Type

	Mean	SD	F	p
Nurses	2.39	0.64	5.07	.026
Nursing Assistants	2.07	0.62		

Research Question 4

Can the presence of a pressure ulcer be predicted from knowing the rate of missed nursing care (self-reported versus documented) for ambulation, turning, hygiene, shift assessment, focused assessment and wound/skin care? This question, like research question number one, is unanswerable from this study's results due to the identification of only one pressure ulcer.

Research Question 5

Which missed nursing care predictor variables are key factors in the prediction of pressure ulcer status? As previously stated, pressure ulcer status was not available for analysis. However, since the risk score (BRA) for developing a pressure ulcer was recorded, analysis were conducted to predict the BRA score from the amount of missed nursing care reported in the medical record audit. A logistic regression with the

dichotomous variable of high vs. low risk (based on the BRA scores of 12 or less vs. greater than 12) as the dependent variable and the four types of missed care available in the medical chart audit as the predictors was conducted using the PROC GENMOD procedure available in SAS 9.1. This software was used to control for clustering at the patient level. The predictor variables included the dummy coded categorical levels of missing care. The findings revealed that patients for whom 51%-75% of their ambulatory care was missed had lower odds of a high risk score (*Odds Ratio* = .401, $p < .05$) (Table 21).

Table 21

Logistic Regression Analysis Predicting BRA Risk from Missing Care while Controlling for Patient Level Data

	β	SE	Confidence Limits		Odds Ratio	p
			Upper	Lower		
Ambulatory Missing None	-.930	.760	-2.419	.559	.395	.221
Ambulatory Missing 0% to 50%	-.560	.563	-1.664	.544	.571	.321
Ambulatory Missing 51% to 75%	-.914	.450	-1.796	-.032	.401	.042
Ambulatory Missing > 75%	-.396	.930	-2.218	1.426	.673	.670
Turn Missing None	.053	1.047	-1.998	2.105	1.055	.959
Turn Missing 0% to 50%	.039	.581	-1.100	1.179	1.040	.946
Turn Missing 50% to 75%	-.291	.520	-1.309	.728	.748	.576
Turn Missing > 75%	-.390	.560	-1.488	.708	.677	.487
Shift Assessment Missing Any	.569	.524	-.458	1.596	1.767	.278
Full Assessment Missing Any	.278	.328	-.365	.921	1.320	.397

Further Analysis

Differences in Reported Missed Care (MISSCARE SURVEY) Among Units

The additional analysis included an examination of MNC by nursing units. The units were de-identified per the healthcare organization IRB's requirements. A MANOVA conducted with the six types of care as the dependent variables and unit as the

between subjects factor revealed a significant multivariate effect between the perceived amount of care reported by staff in the three units, $F(12, 180) = 2.59, p = .003$. Further examination of the data revealed significant differences between missed ambulation among the units, $F(1, 96) = 3.50, p < .05$, such that unit three ($M = 3.22, SD = 1.05$) reported more missed care than unit one ($M = 2.67, SD = .74$). Significant differences were also shown between missed turns among the units $F(1, 96) = 3.24, p < .05$, such that unit three ($M = 2.88, SD = .91$) reported more missed care than unit one ($M = 2.42, SD = .94$). Finally, significant differences were also shown between missed bathing among the units $F(1, 96) = 3.84, p < .05$, such that unit two ($M = 2.93, SD = .73$) reported more missed care than unit one ($M = 2.27, SD = .98$) or unit three ($M = 2.24, SD = .79$). No significant differences were found between units for any of the other types of missed care (Table 22).

Table 22

Means and Standard Deviations of Self-Reported Missed Nursing Care (MISSCARE Survey) by Units

	Mean		SD	F	p
Ambulation				3.50	.034
Unit 1	2.67	a	.74		
Unit 2	3.00	a,b	.88		
Unit 3	3.22	b	1.05		
Turning				3.24	.044
Unit 1	2.42	c	.94		
Unit 2	3.00	c,d	.78		
Unit 3	2.88	d	.91		
Bathing				3.84	.025
Unit 1	2.27	e	.98		
Unit 2	2.93	f	.73		
Unit 3	2.24	e	.79		
Total Assessment				.24	.789
Unit 1	1.70		.68		
Unit 2	1.71		.61		
Unit 3	1.61		.70		
Focused Assessment				1.38	.257
Unit 1	1.70		.64		
Unit 2	2.07		.73		
Unit 3	1.76		.76		
Skin/Wound Care				.46	.631
Unit 1	2.24		.94		
Unit 2	2.50		.76		
Unit 3	2.25		.91		
Average Missing				1.68	.170
Unit 1	2.17		.59		
Unit 2	2.54		.52		
Unit 3	2.33		.67		

Note. Multivariate, $F(12, 180) = 2.59, p = .003, \eta^2 = .008$; Differing superscripts indicates means that are statistically different at $p < .10$ using Tukey's posthoc tests.

Comparison to Kalisch Study

When comparing these results to the Kalisch studies (Table 23) shows that the self-reported MNC proportion for the study hospital had lower amounts of missed nursing care. The rate of MNC between the study hospital's self-reported results (MNC) and the medical record audit (MRA) was comparable for the turning care variables. The ambulation variable was 6.6% lower when assessed by medical record audit. The nurses reported less MNC for ambulation. Both ambulation and turning were reported at markedly lower rates than Kalisch's studies (2009). The bathing/skin care variable showed a large difference (50.7%) between the self-reported and medical record audit results. The medical record audit result was verified with a small focus group of nursing staff. The group reported that most baths were completed and that documentation was lax (Nurse, X., personal communication, January 28, 2011). However, there was a non-significant relationship between the two identification methods to see if there was a difference in missed care results between the MISSCARE survey and the medical record audit a Z-test for two proportions was calculated (Dimension Research, 2010). The results were calculated at the 95% confidence level among the two databases (Table 17). A z value was calculated at the one and two-tailed confidence levels.

Table 23

Comparison with Kalisch's Studies; Part A: Missed Nursing Care Percentages

	Kalisch Studies		Study Hospital	
	Study 1 %	Study 2 %	MNC %	MRA %
Ambulation 3 times per day	83.6	88.7	69.1	62.5
Turning every 2 hours	82.4	68.8	56.4	56.3
Bathing/skin care	63.1	57.7	40.0	90.7
Shift assessments	17.0	13.0	9.8	2.9
Focused assessments	36.9	30.9	16.5	4.6
Wound/skin care			36.2	44.1

Each comparison examined two groups, size of the group and proportion. The comparison of the MNC and MRA data revealed the following: (a) ambulation wasn't significant ($z = 0.756$, CI = 77.5% for one-tailed, CI = 55.1 for two-tailed), (b) turning was also not significant ($z = -0.141$, CI = 44.4% for one-tailed, CI = -11.2 for two-tailed). (c) bathing was significant ($z = 7.441$, CI = 100% for both the one- and two-tailed), (d) focused assessment was also significant for both the one- (99.3%) and two-tailed (98.6%) ($z = 2.449$), (e) shift assessment was significant at the one-tailed (95.6%), while the two-tailed was not significant (91.2%) ($z = 1.705$), and (f) wound/skin care was not significant at either the one- (84.8%) or two-tailed (69.5%) ($z = 1.026$).

Summary of Findings

The primary objective of this study was to determine if there was a difference between two MNC identification methods. The data was also examined for the influence of time of day (peak vs. off-peak hours). Continuing to examine potential influences, the personnel type providing nursing care was considered. The personnel types were nurses and nursing assistants. The findings showed that nurses overall reported more MNC than nursing assistants.

The occurrence of only one pressure ulcer in the medical record audit sample prohibited the examination of research questions one, four, and five. In response to this restriction of data for analysis, the existing data was re-evaluated and determined to provide another dependent variable, the BRA score which was collected for every patient. Using the BRA score allowed for the prediction of missed nursing care based on the potential of a pressure ulcer occurring. The examination by the BRA score was also reviewed for the influences of time of day (peak vs. off-peak hours).

In conclusion, missed nursing care is identified comparably whether using self-reported answers (MISSCARE survey) or when identified by a medical record audit. Examination of the results by time of day (peak and off-peak) revealed that peak hours had more MNC occurrences for ambulation at the 51% - 75% rate of missed nursing care. The role of personnel type showed that nursing assistants reported more missed nursing care for the care variable of ambulation. Overall, nurses reported more MNC. With further analysis it was shown that there was difference between self-reported missed care and missed care identified by medical record audit. These methodologies and findings

indicate that any study examining MNC related to an outcome should consider the expected occurrence rate of the outcome and adjust the sample to reflect that occurrence rate.

Missed nursing care is a fact of life for the nursing profession. Understanding missed nursing care is dependent on the profession's ability to identify the care not delivered. Once identified strategies for improvement may be developed and implemented. The on-going identification of missed nursing care will be required in order to ensure that it is minimized and not causing harm to patients. This study supports nursing's primary challenge to do no harm.

CHAPTER V

SUMMARY OF THE STUDY

This study was designed primarily to investigate which identification method was more effective in identifying missed nursing care in one hospital's medical surgical units and to determine whether time of day and personnel type contributed to the occurrence of missed nursing care. A second focus was to determine if there was a relationship between the occurrence of pressure ulcers and missed nursing care using the six selected care interventions (ambulation, turning, bathing, shift and focused assessment, and wound/skin care). In addition to a brief summary of the study, this chapter includes a summary of results related to the research questions, discussion of findings, conclusion, implications and recommendations for further study. In the discussion of findings, the findings of this study are addressed in relation to the current literature on missed nursing care documentation and time of day.

Study Summary

Through the use of parametric and non-parametric analysis, the following five research questions were addressed in this study. The first question asked if there was a difference between self-reported MNC and the nursing care documented for patients who experienced pressure ulcers (Stage II or greater). The second question asked if the time of day contributed to the occurrence of missed nursing care when identifying MNC by nursing staff's self-reported feedback. The variables included a dependent variable (time

of day, peak vs. off-peak hours) with independent variables of ambulation, turning, bathing, shift assessment, focused assessment and wound/skin care. The third question asked if the personnel type contributed to the occurrence of missed nursing care when identifying MNC by nursing staff's documentation of nursing care provided. The variables included a dependent variable, personnel type (registered nurse or licensed vocational nurse vs. nursing assistant) with the independent care variables of ambulation, turning, bathing, shift assessment, focused assessment and wound/skin care. The fourth and fifth questions asked if missed nursing care could predict the occurrence of pressure ulcers and if so, which of the six care variables were predictors. The fifth question was supplemented by adding an additional dependent variable, the Braden Risk Assessment score (BRA). The revised question reads: Which missed nursing care predictor variables are key factors in the prediction of a high risk BRA score?

The concept of missed nursing care was considered an especially suitable research topic as it has been already established that it occurs in all hospital and across all nursing units (Kalisch, 2009). Secondary analysis of data collected from the MISSCARE survey obtained from the study hospital and data obtained from a medical record audit review at the same study hospital provided a rich source of information. The Quality Health Outcome Model (Mitchell et al., 1998) provided the conceptual framework and guided the variable identification used in this study. The Quality Health Outcomes Model was designed to guide quality improvement databases and outcomes management, to identify key variables in clinical intervention research and to provide a framework for outcomes research and management. The model supported the measurement of missed nursing care

by identifying and examining relationships between the dependent variables self-reported missed nursing care and evidence of documentation of missed nursing care. The model demonstrated the dynamic processes of patient care and outcomes. The unique feature was the dynamic nature of the model (Mitchell et al., 1998).

The sample for this study was determined for each identification method. The MISSCARE survey consisted of 109 nursing staff participants. All participants were medical/surgical staff and were either registered nurses (RN), licensed vocational nurses (LVN) or nursing assistants (NA). Of the participants, 77% were nurses (includes RNs, an LVN and registered nurse managers). Nursing assistants comprised the other 23% of the participants. The medical record audit sample consisted of 96 patients who were cared for on a medical surgical nursing unit between June 1, 2010 and July 9, 2010, were discharged alive, were 18 years or older and who had a BRA score of 15 points or less.

The average length of stay was 5.77 days with the shortest stay being three days and the longest stay being 28 days. The BRA scores ranged from eight to fifteen points. The rate of occurrence for those scores was (a) eight points was 2.9%, (b) nine points was 3.5%, (c) 10 points was 4.9%, (d) 11 points was 8.2%, (e) 12 points was 21.4%, (f) 13 points was 11.7%, (g) 14 points was 14.4%, and (h) 15 points was 33.0%. There was one Stage II pressure ulcer in the sample.

The instruments used to examine the data in the study were the MISSCARE survey and the medical record audit assessment tool. Univariate and multivariate exploratory analysis were performed to examine the variables for patterns and variations

in distribution. Factor-analytic techniques and reliability studies confirmed the validity, reliability, and appropriateness of using summated scores.

Since the data collected did not support the original research questions 1, 4, and 5, it was reasonable to consider the identification of another dependent variable (patient outcome). The BRA score was selected to be an alternative dependent variable, and each patient had only the lowest BRA score identified and recorded. Examination of this score as a dependent variable resulted in additional findings. Although the value of the MISSCARE survey has been established (Kalisch & Williams, 2009), the use of the medical record audit to identify missed nursing care has not yet been established.

In summary there were two foci of this study. The first focus was to investigate which identification method was more effective in identifying missed nursing care in one hospital's medical surgical units and to determine if time of day and personnel type contributed to the occurrence of missed nursing care. The results show that both identification methods were comparable in identifying missed nursing care. A second focus was to determine if there was a relationship between the occurrence of pressure ulcers and missed nursing care using the six selected care interventions (ambulation, turning, bathing, shift and focused assessment, and wound/skin care). The data did not support the answering of this question, since there was only one pressure ulcer in the study population. Further analysis was conducted using the Braden Risk Assessment as a proxy for pressure ulcers.

Discussion of Findings

A discussion of the three main concepts, nursing documentation issues, time of day and personnel type will be presented, followed by the findings of research questions one to five. This is followed by a discussion of findings resulting from additional statistical analysis. The additional analysis included an examination of the BRA score as a predictor of MNC. A comparison between three nursing units was performed. A factor analysis determined the construct validity between the selected care variables. Also, logistic regression was used to examine the relationship between each type of missed nursing care and the BRA score. A multinomial regression model was generated using peak and off-peak hours as predictors. A comparison between previous studies and the study hospital was performed. A z-test for two proportions was used to determine if there was a difference between self-reported missed nursing care and the medical record audit. Lastly, a comparison is included which examines the MNC and medical record audit (MRA) results by each of the six care variables. The purpose is to identify significance or non-significance between the two identification methods for each variable.

Missed Nursing Care Documentation

Issues contributing to the lack of significant findings in this study may be related to a number of documentation issues. The role of a medical record audit in determining the occurrence of missed nursing care was one purpose of this study. Understanding the relationship between what is self-reported and what nursing staff document may provide insight into the best monitoring method of missed nursing care. Following is a discussion of the challenges of conducting a medical record audit for missed nursing care.

The documentation challenges were present for all six independent variables. For the care variable, turning, the use of the term per self (PS) was frequently used, usually without a position being designated. There was no way to determine if the patient was actually repositioned. Many of these patients were classified as “bedfast” in other parts of the medical record. If the turned position was listed, there was no way to determine if this was the position the patient was already resting in or the position the patient was turned to. A focused interview with three medical/surgical nursing assistants indicated that it could mean either (Nursing assistants Y, personnel communication, January 28, 2011). The turning position was documented as being the same for an entire shift (0700-1900). For example, documentation showed the patient as being supine for 12 hours. These patients were eliminated from the turning variable analysis, since documentation was not evident to determine if turning occurred or not.

Bathing was expected to be performed everyday whether per self or with assistance. It was unusual for a bath of any kind to be recorded. A bath was assigned to each patient’s day of stay (formulated the bathing denominator). The focused interview with the three medical/surgical nursing assistants revealed that all patients are bathed daily, but that charting is not always completed. The documentation location that was used for the medical record audit was verified with the nursing assistants. A match was confirmed (Nursing Assistants Y, personal communication, January 28, 2011).

Wound/skin care frequency expected was difficult to determine without access to physician orders. Frequency was determined by the first shift of care provided and the

shift assessment frequency. Note that frequent wound/skin care occurrences were noted during the day time and rarely during the night time, this applied to weekends also.

Ambulation patterns were erratic. For example, a patient would be out of bed on day one and day four, with no out of bed events documented for day two and three. The expectation is that once the patient is out of bed that the patient would be out of bed every day (Nurses X, personal communication, January 28, 2011).

Shift and focused assessments were not scored as completed if the time of the assessment was more than two hours past the start of the shift. For example, a shift assessment was documented at 1600 when the shift began at 0700.

The interpretation of the documentation had the potential to be inconsistent. However, one reviewer was used (the researcher). This strategy provided consistent evaluation of the documentation reviewed. Patterns and trends in documentation were recognized and extraction techniques were modified. In addition, ten charts were re-audited to determine if a second examination matched the first. There was less than a 9.5% difference in results. Reliability was enhanced by discussing the above listed limitations with the nursing staff that provided care.

An additional challenge was encountered with the use of an electronic health record. The electronic health access provided to the reviewer did not include access to the physician orders. An alternate determination of the frequency of expected care (denominator) was to use the policy and procedure from the study hospital. This was appropriate for all but one of the independent variables, wound/skin care. The

uniqueness of wound/skin care does not lend itself to standardization. However, for the purpose of this study the shift assessment expectation of twice a day was applied.

The original plan to identify the patient population from which a random sample would be selected did not work. A special report that had been available in the recent past was no longer available. The modified report did not provide the needed information. This change resulted because: (a) an initial patient list was obtained from a department with access to the needed data, and (b) an electronically generated list with all patients BRA scores and pressure ulcers was not available. This resulted in a manual screening of the 366 patients provided in the original list for the BRA score and pressure ulcers. A manual review and screening increases the potential for data collection error.

The five nursing members interviewed in a focused interview (Nurses X and Nursing Assistants Y, personal communication, January 28, 2011) had used the electronic health record (EHR) for eight to nine months at the time of medical record data collection. The interviewed nursing staff members reported that the EHR is inconsistent in documentation locations and who documents care provided to the patient. Verification of the documentation locations were matched to the documentation locations used by the reviewer.

The literature review supplements the researcher's findings in this clinical setting. A key component of a chart audit is the qualification of the person performing the audit. The auditor should be able to "determine the quality of documentation and the significance of the issues in documentation" (Edlestein, 1990, p. 40). Most chart audits are performed retrospectively (Wong, 2009). Retrospective reviews are limited in their

ability to determine what has or has not been done based on what was documented (Akhtar, Weaver, Pierson, & Rubenfield, 2003; Carroll, Taregy-Hornach, O'Reilly, & Christakis, 2003; Hanscho, Kihlgren, & Ljunggen, 1999).

The chart audit study by Wong (2009) revealed that nursing documentation was “inconsistent among nurses (p. E-1).” The differences among nurses were (a) timeliness of charting, (b) data recorded, and (c) style of charting (Brown, 2006; Wong, 2009). The purpose of Wong’s (2009) chart audit study was to assess the completeness of nursing documentation and to review nursing practice standards of care and consistency of care. In the study the documentation accuracy was compared to physician’s orders or departmental policies. This technique was attempted in this study, but was not successful.

Most documentation studies focus on the charting of procedures, assessments, discharge instruction and general patient education interventions. However, the smaller, routine nursing tasks are usually bypassed. A study on the documentation of vital signs showed that an error rate of 0.66% (60 total errors out of 906 data elements reviewed). The significance of the finding was that 60 instances occurred were patients’ assessments were not complete. The study did not report on the harm that individual patients may have incurred from the missed vital signs, so no conclusion may be made. The researchers did emphasize the importance of the vital signs and the impact of missing vital signs on patient safety (Smith, Banner, Lozano, Olney & Friedman, 2009). The researcher includes this study in the discussion on documentation audits to support the

importance of the routine nursing tasks (ambulation, turning, bathing, assessments and wound/skin care) that this study evaluated.

The use of technology to determine what care was provided has become a federal mandate. An American Hospital Association survey (2007) revealed that 68% of surveyed hospitals were using an electronic health record (EHR) (as cited in Whittaker, Aufdenkamp & Tinley, 2009). EHRs are thought to improve the quality of care by providing easy access to patient information, supporting the use of evidence based standards, and improving the coordination of care (Whittaker, Aufdenkamp, & Tinley, 2009; Hakes & Whittington, 2008; Simson, 2005; McDowell, Dillon & Lending, 2008; Franekel, Cowie, & Daley, 2003). With the implementation of technology comes the expectation of acceptance by nursing staff. Understanding and predicting the acceptance by nursing is difficult.

Differences in systems and nursing populations inhibit the identification of trends that may predict a successful EHR implementation (Poissant, Perferia, Tamblyn, and Kawasumi, 2005). This is relevant to the study due to the study hospital's migration to an EHR system nine months prior to the data collection period. The time period audited, June 1-July 9, 2010, represented 9 months of EHR use in the study hospital.

Lee (2004) determined that nurses' acceptance of computerized documentation was a result of their "perception of advantages, visibility, complexity, and compatibility with existing values and experiences, (p. 237)." The nursing staff at the study hospital's acceptance of EHR is an unknown factor. The results of a national survey found that there were no significant differences in patient care related documentation between a

computerized documentation system and a traditional paper system (Des Roches, Donelan, Buerhaus & Zhonghe, 2008). This finding supports the expectation that documentation should be consistent during the transition to the EHR at the study hospital. On a similar note, 30% of the time (more than 3 hours per a 12 hour shift) documenting using a traditional paper system. This is compared to 1.5 hours per 12 hour shift when using an EHR. The extra time gained by using an EHR is intended to be re-directed to patient care (Hakes & Whittington 2008). The amount of time spent on documentation is influenced by (a) skill mix, (b) unit type, and (c) unit activity (Bosman, Rood, Oudesmans-van Straaten, Van der Spoel, Wester, & Zandstra, et al., 2003). There was also an acknowledgment of the impact of seasonal variation (time of day) on the amount of time spent on documentation.

Korst, Eusebio-Angeja, Chamorro, Aydin, & Gregory, (2003) reported day time documentation at 19.17% of nurses' time, while the night shift was 12.41%. Hakes and Whittington (2008) concluded from work sampling that nursing documentation time was correlated to patient volume and was influenced by time of day. They also report that routine documentation makes up the greater amount of documentation activities for nurses.

Another consideration is the accuracy of documentation. Spath (2008) acknowledges that the time required for nursing documentation demands concern about accuracy and quality of the care provided. This is addressed by Bosek and Ring (2010) in their article exploring the origins of poor documentation. By accuracy, the authors mean truthfulness of the documentation and does it reflect the care provided. For

example, did the patient really understand the educational material (Bosek & Ring, 2010)? Another documentation concern is addressed by Spath (2008) with the statement, “Just because you document does not mean the process has been done well (p. 87).” The concept is also addressed by Bosek and Ring (2010) in their assumptions. The Bosek team’s ethical discussion informing the reader that inaccurate and false documentation can create harm potential for the patient, nurse, and organization. Spath (2008) goes on to say that “documentation does not stop mistakes if people are not doing things the right way (p. 87).” Spath’s final comment is “...it all comes back to the commitment of the staff to patient safety. If they do not think it’s important, they may just report that they did the right thing (2008, p. 87).” The method to verify documentation would be to conduct an observational study. An observational method is not difficult and would introduce observer and subject bias. This study used a retrospective chart audit.

McDowell, Dillon and Lending’s (2008) study identified that difficult to use EHRs decrease accuracy, increase error and lead to a distrust of others’ data due to others making errors. McDowell, et al. (2008), additionally, reported that EHRs that are easy to use generate less documentation errors. In their study, the ease of use and accuracy of documentation lead to improved quality of care.

In a systematic review by Saranto and Kennunen (2009), an evaluation of nursing documentation identified the following issues that were relevant to this study. First is the variation in the quality of nursing documentation which complicates the task of documentation evaluation. Second, out of 22 studies on the assessment of documentation, 19 were done retrospectively and three were perspective. Most were

patient-centered documentation (i.e., focused on a disease population, falls or pressure ulcers). Twenty-nine out of 35 patient centered audits used an audit tool for assessing and comparing nursing documentation. Interestingly, the researchers commented on the difficulty they encountered when assessing the use of an electronic database for data collection. One final point is extracted from the Saranto and Kennunen (2009) review, a study by Gunningberg, Lindhom, Carlsson, and Sjoden (2000) on documentation of pressure ulcers and the associated wound/skin care reveals that the documentation is usually insufficient and scattered. Saranto and Kennunen (2009) comment on the Gunningberg's team's (2000) comment by stating that this "dilutes the quality and safety of the wound and patient care (p. 473)." This finding was evident in this study when evaluating the documentation of pressure ulcer wound/skin care in the EHR at the study hospital.

In Bosek and Ring's (2010) examination of poor documentation, they present three documentation scenarios that nurses may encounter. First, nursing care may have been provided, but not accurately/completely documented. Second, nursing care may have been omitted and was not documented. Third, there is no documentation of the nursing decision to purposefully withhold care. The researchers suggest that intentions may need to be questioned. They propose that the ideal intention would be based on an ethical commitment to promote beneficence. Using the beneficence framework nurses would be expected to be truthful and free from bias. It is possible that a commitment to beneficence does not exist and does not guide a nurse's documentation.

As the nation's hospitals move toward EHRs, the transition is expected to reduce the time that nurses spend documenting. The additional time is projected to be used for direct patient care. The extra patient care has the potential to improve the quality of care.

Several key statements about documentation were common themes among the literature examined. First, the wide variation of charting styles, techniques and methods used among nurses contributes to variation in the results of chart audits. Second, typically chart audits are retrospective. Third, documentation errors occur. Fourth, the intention of the nurse when errors are created is unknown. It is difficult to ascertain if an error is innocent, unintended or if an error is an intentional act of omission. And, fifth, nurses experienced in using an EHR have reduced documentation time and more available time to provide direct patient care.

Each of these five points has influenced the findings of this study. An awareness of the potential of documentation errors will not promote the identification of the errors. The use of an EHR should provide standardization of charting and make the data elements retrieval successful. The researcher's approach to collection of documentation data was that nursing staff provided the care and that the provided care was documented in a timely and accurate manner.

Missed Nursing Care: Personnel Type

This study was designed to test additional concepts compared to the studies conducted by Kalisch et al. (2009), Lake, (2006), Lucero, et al., (2009), and Thomas-Hawkins et al., (2008). The inclusion of personnel type is the one concept that links this study to the others, especially the Kalisch study (2009). Kalisch has proceeded to study and write about the relationships between nurses and nursing assistants and their influence on missed nursing care (2009).

The MISSCARE survey's findings at the study hospital revealed that more missed nursing care was identified by nursing staff's reported knowledge of nursing care not delivered on the last shift worked. Another influence examined was the role of the nursing staff member who was reporting missed nursing care. The roles used were registered nurses (RN) and licensed vocational nurses (LVN) and nursing assistants. The nurses participated in the MISSCARE survey at a higher rate than nursing assistants. The chi-squared test indicated that more missed nursing care was reported using the MISSCARE survey. Kalisch's team (2009) reported that nurses reported more missed nursing care than nursing assistants. This study supports that finding for all variables examined.

The medical record audit's findings at the study hospital revealed that less missed nursing care was identified by nursing staff's documentation of nursing care on the last shift worked. Examination of the personnel types of the nursing staff member who were documenting nursing care was conducted. The personnel types used were nurses (RNs and LVNs) and nursing assistants. These personnel types were used because: (a) there

were a higher number of nurses than nursing assistants at this hospital and (b) nurses documented in the medical record at a higher rate than nursing assistants. This observation was confirmed by a focused interview with three medical/surgical nursing assistants (Nursing Assistants Y, personal communication, January 28, 2011). The nursing assistants reported that frequently the care provided by nursing assistants was reported to the nurse who then documented that care.

Missed Nursing Care: Peak and Off-Peak Hours

The results of the MISSCARE survey were similar to the findings reported by Kalisch, Landstrom, and Williams (2009). Other findings that share some similarities with this study's findings were Lake (2006), Lucero et al., (2009), and Thomas-Hawkins, et al. (2008). This study's original plan differed from the previous studies by including an examination of the time of day for each of the two methods for identifying missed nursing care. This study intended to examine the independent variables (ambulation, turning, bathing, shift assessment, focused assessment and wound/skin care) by the time of day (peak vs. off-peak hours) the care was rendered (medical record audit). The time of day was represented by the day of week and the time of day worked by the nursing staff member. The MISSCARE survey results were not able to be used in the time of day analysis. The time of day designation in the MISSCARE survey did not match the metrics used to define peak and off peak hours in this study. Therefore time of day was modified to represent days vs. night shifts in the MISSCARE survey database.

The findings in other time of day studies show increased mortality (Bell & Redemeir, 2001), increased neonatal mortality (Gould et al., 2003; Hamilton & Restrepo,

2003), lower quality of care (Barnett et al., 2002; Becker, 2006; Bliwise et al.,2001) and increased morbidity (Kelz et al., 2008) during the off-peak hours (nights and weekends). This study used the time periods of peak and off-peak hours as proposed by Hamilton et al. (2010). Peak hours were Monday – Friday, 0700 to 1859. Peak off-hours were Monday – Friday, 1900-0659 and Saturday, 0700 to Monday, 0659.

Understanding when care is expected to be provided was vital to this study. For example, was a bedfast or limited mobility patient to be turned every two hours around the clock? Or was it expected that this care be provided only during waking hours. The same issue exists for the other variables.

A determination was made on how to assign the expected care to each shift. The ambulation was expected to occur on the peak hours twice, and one time on the off-peak hours. Turning was expected to occur around the clock for a total to 12 times, with six times assigned to the peak hours and six times assigned to the off-peak hours. Bathing was assigned as a daily event and occurred around the clock. Shift and focused assessments were expected to be completed within two hours of the beginning of the shift. Both peak and off-peak hours had assessments assigned. Wound/skin care was not assigned to a specific time period, but was provided on a random base. Once the expected care was assigned a time period, then identification and measurement of time of day of care was conducted. This strategy allowed a denominator for each time period to be established.

This study identified the peak hours as having the most missed nursing care (self-reported). This is opposite of the previously mentioned time of day studies. This finding

may be due to increased activity during the peak hours, the staffing levels, the working relationships among the nursing staff and/or the workload.

Research Questions: Results Summary

Research Question #1. The first research question (Is there a difference between self-reported missed nursing care and the nursing care documented for the outcome of pressure ulcer?) was not answered due to no pressure ulcers within the sample

Research Question #2. The second research question (Is there a difference between self-reported missed nursing care and the nursing care documented by time of day (peak vs. off peak hours)?) was answered with MANOVA, multinomial regression, and Chi-squared test. The results of these test indicated that missed nursing care is identified at a greater rate by self-reports of nursing staff than by the findings of a medical audit report during the day shift. The MISSCARE survey's findings at the study hospital revealed that more missed nursing care was identified by nursing staff's self-reporting of what was experienced on the last shift worked. Missed nursing care was significant during the peak hours. The time of day was represented by the time of the last shift worked by the reporting nursing staff member.

The medical record audit's findings at the study hospital revealed that less missed nursing care was identified by nursing staff's documentation of nursing care on the last shift worked. The influence of the time of day the missed nursing care was reported was only significant for missing ambulation at the rate of 51% - 75% in the medical record audit.

Research Question #3. The third research question (Is there a difference between self-reported missed nursing care and the nursing care documented by personnel type (nurses vs. nursing assistants?)) was answered by using parametric (MANOVA and multinomial regression) and non-parametric (Chi-squared test) tests. In general, missed nursing care is identified at a greater rate by self-reports (MISSCARE survey) of nursing staff than by the findings of a medical audit report. Kalisch's research team (2009) reported that nurses reported more missed nursing care than nursing assistants. This study supports that finding for all variables examined, that nurses reported more missed nursing care. The chi-squared test indicated that more missed nursing care was reported using the MISSCARE survey.

Research Question #4. Research question number four (Can the presence of a pressure ulcer be predicted from knowing the rate of missed nursing care (self-reported versus documented?)) was not answerable. This question like research question number one is unanswerable due to the identification of only one pressure ulcer.

Research Question #5. Research question number five (Which missed nursing care predictor variables are key factors in the prediction of pressure ulcer status?) was not answerable. This question like research question number one and four is unanswerable due to the identification of only one pressure ulcer. With the loss of pressure ulcer as a dependent variable, additional analysis using the BRA score as the dependent variable was conducted. The BRA served as a proxy for the potential occurrence of a pressure ulcer. The BRA showed that only ambulation at the 51% -75% missed rate predicted a

high risk score on the BRA tool. All other variables were deemed to be insignificant. Also, the variables were not clinically significant at $p = 0.10$.

Additional Statistical Analyses

In secondary analysis of data, the researcher is limited by the questions in the original study and the actual data collected. This researcher was not able to link the findings of the MISSCARE survey (nurse level) with the findings of the medical record audit (patient level). The only link between the two data sets was the time period that the data was collected (June 1, 2010 – July 9, 2010). Use of the same time period supported the comparison of the two data sets' findings. The datasets were explored further to determine: (a) if there were differences amongst the three nursing units in regards to the reporting of missed nursing care, (b) if there were similarities between this study's findings and Kalisch's (2009) findings, and (c) if there were similarities between this study's two identification methods.

The examination amongst the three nursing units found that one nursing unit (unit three) reported more MNC than another nursing unit (Unit One). Unit Three also have more MNC reported for turning than Unit One. Unit Two had more MNC for bathing than either Unit One or Three. The other types of MNC were not significant. This examination was performed using a MANOVA technique. It should be noted that the nursing units were de-identified due to the institution's IRB requirements.

The six selected care variables (ambulation, turning, bathing, shift assessment, focused assessment and wound/skin care) are conceptual contributors to the occurrence of pressure ulcers. The rates of occurrences were calculated for each variable. The

results of the MISSCARE survey for the six care variables showed ambulation and turning as missed more often than the other variables (by self-reported and by medical record audit). The shift and focused assessment variables were the least missed (by self-reported and audit). The bathing variable showed close to half of the baths were not provided (self-reported), and wound/skin care was similar to the bathing results (self-reported). Interestingly, when comparing the MISSCARE survey results to the medical record audit, the findings showed the medical record audit results to be lower than the MISSCARE survey results with less missed nursing care. Ambulation and turning results were similar. The bathing result was double in volume of missed nursing care in the medical record audit. This is believed to be a function of poor documentation and missed nursing care. The only variable higher than the MISSCARE survey result was the wound/skin care variable.

Overall, this study's results were lower than the Kalisch team's findings (2009). Comparing Kalisch's (2009) study one and two revealed that ambulation, turning and focused assessment are significantly different at the 1-tailed confidence level and were not significantly different at the 2-tailed confidence level. Bathing is not significantly different from each other at both levels. The wound/skin care variable is not reported in these studies.

However, the trends were the same between Kalisch's two studies and the two identification methods used in this study. Ambulation and turning were the most missed nursing care, followed by bathing, then focused assessments, with shift assessment experiencing the least amount of missed nursing care. The lower results from the

documentation review were unexpected, because documentation is expected to be accurate and to represent the ethical and legal care provided to the patient. The documentation results were not supported by the self-reporting of the nursing staff. The self-reported results identified in this study support the findings of other studies.

As of 2009, Kalisch (2009) reported that 252 hospitals had used the MISSCARE survey. All results were returned to the Kalisch team for analysis and creation of a national database which includes medical/surgical units as well as specialty units (2009). No published study has been retrieved that examines alternative identification methods for identifying missed nursing care. The influences of time of day and personnel type have not been presented in nursing literature. The introduction of these topics may lead to further research questions and leadership responses.

The hypothesized relationship that was expected to occur was based on the work of several researchers (Kalisch & Williams, 2009; Lake, 2006; Lucerno et al., 2009; Thomas-Hawkins, et al., 2008). The similarities of the study's results with those of other researchers reinforce the validity and reliability of the items in the survey. Comparing to the other identification method, medical audit review shows the need for additional investigation to examine the differences between these identification methods for missed nursing care.

A z-test for two proportions was used to compare the results of the MNC and MRA. These results follow.

1. Ambulation, turning and wound/skin care variables from each identification method were not significantly different (i.e., MNC: ambulation compared to MRA: ambulations were not significantly different from each other).
2. Shift assessment was not significantly different at the two-tailed confidence level.
3. All of the other variables were significantly different at the one- and two-tailed confidence level (bathing, focused assessment at both levels and shift assessment at the one-tailed confidence level).

Seven of the 12 significance levels showed no difference between the two identification methods. While the remaining five significance levels achieved significance.

Limitations and Conclusions

As in all research projects, there are limitations. The limitations identified in this study were concerned with the two data sets, the data collection timing and generalizability. The conclusions address the comparison of the two data sets, the MNC findings for each of the six care variables and the research questions that were answerable.

Limitations

Data Sets. The two data sets used were not linked by any connecting variables. The only connection was the time period that the data from both data sets were collected. The time period was June 1, 2010 – July 9, 2010. Other MNC researchers have commented on the feasibility of using the medical record for the recovery of data to identify MNC (Kalisch & Williams, 2009; Lucero, et al., 2009). The current thinking advises that the documentation in the medical records is accurate and reflects the care

administered. The other consideration noted is the difficulty in obtaining the data from the medical record. The ease of asking staff about MNC is deemed preferable than performing a medical record audit.

Data Collection Timing

1. The use of June 1, 2010 – July 9, 2010 as the medical record audit time period which corresponded with the data collection of the MISSCARE survey may have created biases in the nursing staff by elevating their awareness of missed nursing care which could have altered their practice habits or their documentation practice. To determine if this is a true limitation, the study would need to be repeated with the documentation data collection coming from a time period prior to the collection of the MISSCARE survey.
2. Another consideration about the time frame for the documentation data collection is the reduced number of pressure ulcers identified. The dates used represented five weeks. Collecting medical record audit data prior to the start of the MISSCARE survey would permit a longer time period for data collection thus increasing the potential for additional pressure ulcers to be identified.
3. There are two potential limitations to consider when comparing the study hospital's medical record audit with the self-reported results: (1) the data collection process may have been flawed, and (2) the accuracy of the nursing staff's reporting may have been flawed. Additional study and different methodology would be needed to understand what is occurring in these situations.

Generalizability. While the developers of the MISSCARE survey generalize their research findings to the population of nursing staff in the United States, the results of this study are limited to the sample of medical/surgical nurses and patients from the study hospital.

The limitations addressed reflect the difficulty of conducting a medical record audit and using multiple databases to understand a concept.

Conclusions

The following conclusions and implications were determined based upon the findings of the study.

1. There was no clear determination of which identification method was better at identifying missed nursing care.
2. There was a relationship between time of day that nursing care was expected to be provided and missed nursing care. The nursing care missed rate was higher during the peak hours of Monday, 0700-1859. The off-peak hours (Monday-Friday, 1900-0659 and Saturday, 1900-0659 and Sunday, 1900-Monday 0659) missed nursing care rates were below that of the peak hours.
3. The personnel type showed a relationship with nurses experiencing a higher overall rate of missed nursing care. This may be due to the practice of nurses performing the majority of the charting. Also, there are a greater number of nurses on the nursing units.
4. For each of the independent variables the following conclusions were offered when comparing the self-reported results to the medical record audit results.

- a. Ambulation is missed more during the peak hours and is documented most often by nurses, and therefore missed more by nurses.
- b. Turning is missed more during the peak hours and is documented and missed most often by nurses.
- c. Bathing is not documented. Nursing staff reported a 40% missed care rate while the medical record audit rate was 90%. This is not supported by the increased expenditures for linens and bathing products.
- d. Shift assessment revealed no significant results when comparing the two identification methods.
- e. Focused assessment has greater odds of being missed during the peak hours. Both shift and focused assessments are nurse only functions. However there were several nursing assistants who rated these variables based on their perceptions of missed nursing care.
- f. Wound/skin care is primarily performed during the peak hours and is provided by nurses. There was no pattern of missed nursing care.

While it is naive to conclude that missed nursing care can only be identified by the self-reporting of nursing staff, it is crucial that other methods be accurate and not part of the missed nursing care. While this study is limited in its findings, the marginal gain achieved in partial understanding of another identification method for missed nursing care supports continued research in this area. The lack of any significant result prohibits conclusions to be drawn regarding how missed nursing care may be identified besides the self-reporting of nursing staff. The identification method tested in this study was nursing

staff documentation. Documentation is at risk of being missed nursing care. While efforts were made to control for that during the review, it remains a limitation.

Implications for Nursing Practice

Greater attention should be given to monitoring and tracking missed nursing care on a daily basis. The knowledge gleaned from this study could be used by nurses, nursing leadership and other healthcare providers to develop creative strategies and preventative actions for care interventions that are at-risk for not being delivered. The response should be three prong and address clinical, educational and research components.

Clinical strategies may address the need to inform nursing staff of the concept of missed nursing care, how to prevent or reduce its occurrence. Additionally, staff should understand how to manage MNC when it does occur. This will require a transparent and non-punitive work environment. Such a work environment is developed and maintained by nursing and hospital leadership. Accepting and acknowledging the existence of MNC, begins the journey to removing MNC from the environment.

Educational strategies are two-fold. The first strategy addresses the educational needs of the hospital's nursing staff about the occurrence of MNC, its prevention and management. The educational component should be associated with the performance improvement process to ensure the evaluation of the new processes. The second strategy includes education of the larger nursing community. The developing new nurse should be exposed to the concept of missed nursing care. The concept may be presented as part of an ethics thread and reinforced in each clinical experience. The nursing community

should begin a dialogue about MNC. The dialogue should incorporate the concept into a national initiative that addresses the acknowledgement, reduction and prevention of MNC. From this a new research platform may be defined.

Further research about MNC may focus on additional identification methods, other types of nursing care that is missed (especially in specialty areas). A finding of this study was the issue of documentation. There was inconsistency about who performed the documentation. It was learned that the care provider frequently was not the staff member performing the documentation. Gaining an understanding of how and why this occurs may provide further insight into missed nursing care. It may be that the staff member providing the documentation for the care provided by another staff member did not capture all of the care, thus creating an artificial picture of the nursing care provided. Another research agenda is the impact of missed nursing care on patient outcomes. The role of system factors would benefit from an investigation such as which types of healthcare providers failed to provide the expected care, and when and where care was not provided. Another component would be to incorporate the patient/family partnership into the identification of missed nursing care. These individuals frequently are aware of MNC occurrences.

Conclusions and Implications for the MISSCARE Survey

The MISSCARE survey was developed to quantify the findings discovered during a qualitative study of nursing staff. The survey also allows for an understanding of the rationale behind the occurrence of MNC (Kalisch, Landstrom, & Williams, 2009). This

study contributes to the body of knowledge created by Kalisch's (2009), Lucero's (2009), Thomas-Hawkin's teams (2008) and Lake (2006).

In general, the purpose of this study complied with the purpose of the MISSCARE survey. It is expected that this study may influence the practice behaviors of nursing staff. The research study was limited in the findings due to the lack of occurrence of pressure ulcers, the dependent variable. The framework of this study could be replicated using other variables from the MISSCARE survey and patient outcomes. The results of this study may contradict the limitations noted by the Kalisch and Lucero teams, that the use of documentation to identify missed nursing care was not productive. These judgments were made without testing the use of documentation to identify missed nursing care. These previous researchers emphasized the importance and influence of teamwork (or lack of) in the occurrence of MNC.

Recommendations for Further Studies

The results of this study demonstrate that this complex concept requires further investigation. The following recommendations for further study are suggested.

1. Further investigate the population of medical/surgical nursing staff by identifying other outcomes and selecting variables used from the MISSCARE survey that support the selected outcomes. For example, maintaining weight could be assessed by monitoring the feeding variables in the MISSCARE survey and from a medical record audit. Suggested variables include: (a) feeding, (b) meal preparation, (c) monitoring intake and output, (d) patient teaching, (e) emotional

support, and (f) discharge planning/teaching. A suggestion is to use all or part of the variables to assess the impact on selected patient outcomes.

2. Further investigate the role played by time of day by examining smaller segments of time. For example, determine what care and missed nursing care looks like in six hour blocks to evaluate how it is influenced by the workflow of the unit.
3. Further investigate the role played by personnel type who provide care, and for which interventions and who performs the documentation. For this study it was projected that nursing assistants performed the majority of ambulation and turning care. That was not the case in that at the least documentation was by the nurse. Understanding who the care provider is for an intervention would permit a targeted action plan when improvement is needed. Consider expanding to other disciplines such as respiratory and physical therapy.
4. As of this time there is no literature about the effect MNC has on patient outcomes. Further investigation could focus on selected missed care interventions and their potential impact on a patient outcome. For example, an examination of the item, as needed (PRN) administration of medication within 15 minutes of request, could be assessed as it relates to pain management by reviewing pain scores.
5. Additional research is needed to identify other mechanisms that may identify MNC. Besides this study no published research as been conducted to regarding alternative identification methods. Initial literature (Kalisch et al., 2009; Lake, 2006; Lucero, et al., 2009; Thomas-Hawkins, et al., 2008) shows that MNC is

present in all hospitals and units studied. It would be beneficial to develop an observational study that measures missed nursing care. Previous researchers deemed this as a risky and biased approach. However, this researcher has personal experience with observational techniques that measure behaviors and performance on nursing units. Proper training of the observer and presentation to the nursing may result in a successful observation for missed nursing care. These techniques are successfully used in the nuclear industry, the United State Navy and selected healthcare systems (Admiral Kindley, personal communication, January 15, 2004).

Summary

The hidden concept of MNC has been identified and given a label that has generated attention from the nursing profession, public and healthcare community. The ethical and legal implications of MNC are real and sensitive for each organization who acknowledges its presence. How to further objectively identify MNC remains to be determined. Properly identifying MNC is the precursor to understanding the rationale for MNC and its effects on patient outcomes and subsequently its effect on healthcare expenses and agency reimbursements. This study has contributed to the further identification of MNC.

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Appendix A

National Inpatient Quality Measures (2010)

Appendix A

National Inpatient Quality Measures (2010):

AMI - Acute Myocardial Infarction

HF - Heart Failure

PN – Pneumonia

SCIP - Surgical Care Improvement Project

CAC – Children’s Asthma Care

HOP – Hospital Outpatient Department

HBIPS - Hospital-Based Inpatient Psychiatric Services

STK – Stroke

VTE - Venous Thromboembolism

PC – Perinatal Care

Appendix B

Missed Nursing Care Identified by Study

Appendix B

Missed Nursing Care identified by study

Study	Hygiene	Feeding	Turning	Skin Care	Routine Vital Signs	Frequent Vital Signs	Ambulation	Oral Care	Patient Education	Discharge Planning	Emotional Supprt	Handwashing	Intake/Output Monitoring/Documentation	Surveillance	Documentation	IV Care	Focused Assessment	Bedside Glucose Monitoring	Shift Assessment	Medication assessment	PRN Meds within 5"	Medications given on time	Toileting	Call response time appropriate	Nurse Care Plans Developed/Updated	Dialysis Hypotention	Dialysis: Shorternd Tx	Dialysis: Skpped TX	Patient Compliant	Wound Care
Bitner & Gravin, 2009	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kalisch, 2006	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kalisch, 2009: RN	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kalisch, 2009: NA	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Kalisch, Landstrom & Williams, 2009	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lucero, Lake & Aiken, 2009	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Thomas-Hawkins, Flynn & Clark, 2008	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sochalski, 2004	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓: denotes no MNC identified, some studies only inquired about a limited number of MNC
 ✓: denotes MNC identified

Appendix C

Missed Nursing Care (The MISSCARE Survey)

Appendix C

MISSED Nursing Care (The MISSCARE Survey)

This survey is an *anonymous* survey about MISSED CARE for bedside nurses. Please answer all questions honestly. Thank you for participating in this anonymous survey.

Name the type of unit you work on.

I spend the majority of my working time on this unit:

- Yes
- No

Highest education level:

- Grade School
- High School Graduate (or GED)
- Associate degree graduate
- Bachelor's degree graduate
- Graduate degree

If you are a nurse, what is the highest degree:

- LVN
- RN Diploma
- Associate degree in nursing (ADN)
- Bachelor's degree in nursing (BSN)
- Bachelor's degree outside of nursing
- Master's degree (MSN) or higher in nursing
- Master's degree or higher outside of nursing

Gender:

- Female
- Male

Age:

- Under 25 years old (<25)
- 25 to 34 years old (25-34)
- 35 to 44 years old (35-44)
- 45 to 54 years old (45-54)
- 55 to 64 years old (55-64)
- Over 65 years old (65+)

Job Title/Role:

- Staff Nurse (RN)
- Staff Nurse (LVN)
- Nursing Assistant (e.g., nurse aides/tech)
- Nurse Manager, assistant manager (e.g. administrators on the unit)
- Other

Please Specify:

Number of hours usually worked per week (check only one)

- Less than 32 hours per week
- 32 hours or more per week

Work hours (check the one that is most descriptive of the hours you work)

- Days (8 or 12 hour shift)
- Evenings (8 or 12 hour shift)
- Nights (8 or 12 hour shift)
- Rotates between days, nights or evenings

	Up to 6 months	Greater than 6 months to 2 years	Greater than 2 years to 5 years	Greater than 5 years to 10 years	Greater than 10 years
Experience in your role:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Experience on your current patient care unit:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Which shift do you most often work?

- 8 hour shift
- 10 hour shift
- 12 hour shift
- 8 hour and 12 hour rotating shift
- Other

Please specify:

In the past three months, how many hours of overtime did you work?

- None
- 1-12 hours

More than 12 hours

In the past 3 months, how many days or shifts did you miss work due to illness, injury, extra rest etc. (exclusive of approved days off)?

- None
- 1 day or shift
- 2-3 days or shifts
- 4-6 days or shifts
- over 6 days or shifts

Do you plan to leave your current position?

- in the next 6 months
- in the next year
- no plans to leave

How often do you feel the unit staffing is adequate?

- 100% of the time
- 75% of the time
- 50% of the time
- 25% of the time
- 0% of the time

On the current or last shift you worked, how many patients did you care for?

How many patient admissions did you have (i.e. includes transfers into the unit)?

How many patient discharges did you have (i.e. includes transfers out of the unit)?

Please check one response for each question.

	Very satisfied	Satisfied	Neutral	Dissatisfied	Very dissatisfied
How satisfied are you in your current position?	<input type="radio"/>				
Independent of your current job, how satisfied are you with being a nurse or a nurse assistant?	<input type="radio"/>				
How satisfied are you with the level of teamwork on this unit?	<input type="radio"/>				

Section-A Missed Nursing Care

Nurses frequently encounter multiple demands on their time, requiring them to reset priorities, and not accomplish all the care needed by their patients. To the best of your knowledge, how frequently are the following elements of nursing care *MISSED* by the nursing staff (including you) on your unit? Check only one box for each item.

	Always missed	Frequently missed	Occasionally missed	Rarely missed	Never missed
Ambulation three times per day or as ordered	<input type="radio"/>				
Turning patient every 2 hours	<input type="radio"/>				
Feeding patient when the food is still warm	<input type="radio"/>				
Setting up meals for patient who feeds themselves	<input type="radio"/>				
Medications administered within 30 minutes before or after scheduled time	<input type="radio"/>				
Vital signs assessed as ordered	<input type="radio"/>				
Monitoring intake/output	<input type="radio"/>				
Full documentation of all necessary data	<input type="radio"/>				
Patient teaching about illness, tests, and diagnostic studies	<input type="radio"/>				
Emotional support to patient and/or family	<input type="radio"/>				
Patient bathing/skin care	<input type="radio"/>				
Mouth care	<input type="radio"/>				
Hand washing	<input type="radio"/>				
Patient discharge planning and teaching	<input type="radio"/>				
Bedside glucose monitoring as ordered	<input type="radio"/>				
Patient total assessments performed each shift	<input type="radio"/>				
Focused reassessments according to patient condition	<input type="radio"/>				

IV/central line site care and assessments according to hospital policy	<input type="radio"/>				
Responses to call light is initiated within 6 minutes	<input type="radio"/>				
PRN medication requests acted on within 15 minutes	<input type="radio"/>				
Assess effectiveness of medications	<input type="radio"/>				
Attend interdisciplinary care conferences when held	<input type="radio"/>				
Assist with toileting needs within 5 minutes of request	<input type="radio"/>				
Skin/Wound care	<input type="radio"/>				

Section B-Reasons for Missed nursing Care

Thinking about the missed nursing care on your unit by all of the staff (as you indicated on Part 1 of this survey), indicate the *REASONS nursing care is MISSED* on your unit. Check only one box for each item.

	Significant reason	Moderate reason	Minor reason	NOT a reason for missed care
Inadequate number of staff	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Urgent patient situations (e.g. a patient's condition worsening)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unexpected rise in patient volume and/or acuity on the unit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate number of assistive and/or clerical personnel (e.g. nursing assistants, techs, unit secretaries etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unbalanced patient assignments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medications were not available when needed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inadequate hand-off from previous shift or sending unit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other departments did not provide the care needed (e.g. physical therapy did not ambulate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Supplies/equipment not available when needed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supplies/equipment not functioning properly when needed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of back up support from team members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tension or communication breakdowns with other ANCILLARY/SUPPORT DEPARTMENTS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tension or communication breakdowns within the NURSING TEAM	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tension or communication breakdowns with the MEDICAL STAFF	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nursing assistant did not communicate that care was not provided	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Caregiver off unit or unavailable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Heavy admission and discharge activity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please click the "submit" button to register your survey.
THANK YOU FOR PARTICIPATING!

Reset

Submit

Appendix D

MISSCARE Survey Calculation Table

MISSCARE Survey Calculation Table.

Interventions:	Always	Frequently	Occasionally	Missed Care (N)	Rarely (not counted)	Never	Missed Care (N)	Denominator	Rate
Ambulation	5	3	2	10	0	0	0	10	1.0
Turning	2	5	2	9	1	0	1	10	.90
Hygiene	8	2	0	10	0	0	0	10	1.0
Shift	0	0	2	2	5	3	8	10	.20
Assessment	2	2	3	7	1	2	3	10	.70
Focused	0	0	5	5	3	2	5	10	.50
Assessment				43			17	60	.72
Wound/skin care									
Total Rate									

Clinical Guideline for Pressure Ulcer and Incontinence Skin Care Management

Appendix E

Clinical Guideline for Pressure Ulcer and Incontinence Skin Care Management

1.0 POLICY:

It is the goal of Hospital A to prevent hospital acquired pressure ulcers and to effectively manage pressure ulcers which are identified on admission.

Pressure ulcers present a significant health care threat to patients with restricted mobility or chronic disease and to older patients. Facility-acquired pressure ulcers add to the patient's length of stay, delay the patient's recuperation, and increase the patient's risk for developing complications.

2.0 PURPOSE:

To reduce the incidence of hospital acquired pressure ulcers.

To communicate the expected minimum clinical practice in the prevention and management of pressure ulcers.

To outline the aspects of pressure ulcer management which apply system-wide and those processes and tools which are suited for entity specific development and implementation.

3.0 SCOPE:

This Clinical Guideline applies to all nursing staff at Hospital A.

4.0 DEFINITIONS:

- 4.1. **Pressure Ulcer:** a pressure ulcer is localized injury to skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear and/or friction.
- 4.2. **Hospital/Facility-Acquired Pressure Ulcers:** pressure ulcers which develop or are identified in a hospitalized patient after the first 48 hours from admission.
- 4.3. **Present on Admission Pressure Ulcers:** pressure ulcers which are assessed on admission and documented in the medical record and physicians progress notes within 48 hours of admission. Also known as community acquired.

- 4.4. **Wound Care Specialist:** A physician, nurse, physical therapist or other caregiver with advanced certification or credentialing or specialty specific to wound and who is being consulted for management of the pressure ulcer.
- 4.5. **Stage I Pressure Ulcer:** Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. **Further Description:** The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Stage 1 may be difficult to detect in individuals with dark skin tones. May indicate “at risk” persons (a heralding sign of risk).
- 4.6. **Stage II Pressure Ulcer:** Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled blister. **Further Description:** Presents as a shiny or dry shallow ulcer without slough or bruising. This stage should not be used to describe skin tears, tape burns, perineal dermatitis, maceration or excoriation.
- 4.7. **Stage III Pressure Ulcer:** Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle is not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling. **Further Description:** The depth of a Stage 3 pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and Stage 3 ulcer can be shallow. In contrast, areas of significant adiposity can develop extremely deep Stage 3 pressure ulcers. Bone/tendon is not visible or directly palpable.
- 4.8. **Stage IV Pressure Ulcer:** Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present on some parts of the wound bed. Often include undermining and tunneling. **Further Description:** The depth of a Stage 4 pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have subcutaneous tissue and these ulcers can be shallow. Stage 4 ulcers can extend into muscle and/or supporting structures) e.g., fascia, tendon or joint capsule) making osteomyelitis possible. Exposed bone/tendon is visible or directly palpable.
- 4.9. **Unstageable Pressure Ulcer:** Full thickness tissue loss in which the base of the ulcer is covered by slough (yellow, tan, gray, green or brown)

and/or eschar (tan, brown or black) in the wound bed. Further Description: Until enough slough and/or eschar is removed to expose the base of the wound, the true depth, and therefore stage, cannot be determined. Stable (dry, adherent, intact without erythema or fluctuance) eschar on the heels serves as “the body’s natural (biological) cover” and should not be removed.

- 4.10. **Deep Tissue Injury (DTI):** Purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue. Further Description: Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment.
- 4.11. **Pressure Relief Surface:** A surface that provides complete relief at bony prominences and over the larger surface area of the entire body.
- 4.12. **Friction:** The force of two surfaces moving across one another, such as the mechanical force exerted when skin is dragged across a coarse surface such as bed linens.
- 4.13. **Shear:** The mechanical force that is parallel rather than perpendicular to an area. Shear may play a role in triangularly shaped or tunneled sacral pressure ulcers. Force per unit magnitude of the area acting parallel to the surface of the body. This parameter is affected by pressure, the coefficient of friction between the materials contacting each other, and how much the body interlocks with the support surface.
- 4.14. **Pressure Points:** The areas over the body where bony prominences exist that are susceptible to increased pressure.
- 4.15. **Prealbumin:** A plasma protein with a short half-life (2 days). Prealbumin decreases quickly when protein or calorie intake is decreased. Prealbumin is an excellent measure of nutritional status because it reflects not only what has been ingested but also what has been able to be absorbed, digested, and metabolized.
- 4.16. **Multipodous splint:** A positioning device for the lower extremity that promotes proper alignment of the ankle, knee and hip, to prevent and treat foot drop, ankle contractures, and heel ulcers.

- 4.17. **Bowel Management tube:** A temporary containment device, indicated for bedridden or immobilized, incontinent patients with liquid or semi-liquid stool designed to safely and effectively divert fecal matter, protect patients' wounds from fecal contamination and reduce both the risk of skin breakdown and spread of infection. It consists of a silicone catheter, syringe, and collection bag. At one end, the soft silicone catheter has a retention balloon that is inserted into the rectum. At the opposite end, the catheter has a connector for attaching the collection bag.

5.0 RESPONSIBILITY:

The unit director/manager is responsible for ensuring nursing personnel are familiar with and provide care consistent with this policy.

6.0 PROCEDURE:

6.1. Administrative Oversight

- 6.1.1. Hospital A's pressure ulcer management program includes an interdisciplinary committee for wound and skin care with physician involvement. Responsibilities of the committee includes:

- a. Collaboration with physicians who provide wound care, WOCN departments, physical medicine departments, wound care clinics and any other disciplines or wound care specialists actively involved in the management of wounds and skin care.
- b. Evaluation of cost-effective, quality wound care products in conjunction with the Hospital A's Pressure Ulcer Prevention Initiative Committee.
- c. Evaluation and implementation of protocols and order sets related to pressure ulcer and wound management.
- d. Oversight of the implementation and education of the policy.

6.2. Identification of Risk for Pressure Ulcers

- 6.2.1. Hospital A uses the evidence-based Braden Scale for Predicting Pressure Ulcer Risk to identify a patient's risk for developing pressure ulcers. (see "Attachment A")[©]

- a. Pressure ulcer risk should be assessed by nursing staff on admission; at least once per day; and as condition changes.
- b. Based on the patient's risk, preventive and management measures are to be implemented by the nursing staff.

6.3. Prevention and Management of Pressure Ulcers

- 6.3.1. THHEB will include evidenced-based measures to prevent and manage pressure ulcers. The first line in prevention includes management of skin issues related to urinary and fecal incontinence.
- 6.3.2. Specialty beds for reduction of pressure ulcers (pressure relief surfaces) will be utilized as indicated.
- 6.3.3. Heel protection methods may be utilized for higher risk prevention.
- 6.3.4. Skin care measures and products for the management of urinary and fecal incontinence will be available.
- 6.3.5. Advanced wound care products will be determined, and utilized by consulting with the Wound, Ostomy and Continence Nurse (WOCN).

6.4. Implementation of Pressure Ulcer and Incontinence Management Protocols

- 6.4.1. Hospital A has a nursing based protocol for the implementation of preventive measures and first line wound care. See Attachment "B".
- 6.4.2. Consultation of specialists will occur, such as the WOCN; Physical Therapist, Physician specialist depending on the physician orders and nature of the wound.
- 6.4.3. Protocols developed by the Hospital A's Pressure Ulcer Prevention Initiative Committee and reviewed by the Wound/Skin Care Committee will be collaborative and approved by the medical staff committee structure for implementation by

the hospital nursing staff in an effort to prevent and/or expedite the care for pressure ulcers.

6.5. Documentation of Wound Progress

- 6.5.1. The wound assessment, measurements and progress should be documented at least weekly or more often by the wound care specialist. The nursing assessment will be done every shift in the medical record, under the wound assessment flow sheet.
- 6.5.2. Photographs may be utilized as additional documentation of pressure ulcers on admission and to monitor progress and wound healing.

6.6. Education

- 6.6.1. All patients and family will be educated regarding the pressure ulcer prevention measures being implemented for the patient.
- 6.6.2. Staff will receive routine education on the prevention and management of pressure ulcers via instructor-led courses, in-services, web-based education, newsletters, seminars and other methods.

6.7 Medical Staff Members

The physicians on the medical staffs of Hospital A are independent practitioners who are engaged in the private practice of medicine or are licensed practitioners participating in the care of patients as part of a post-graduate medical education program. Except for physicians who are taking part in a graduate medical program of an entity, they are not agents, servants or employees of the entity. The incorporation of their actions in these guidelines is not intended to control, influence or warrant their medical judgment or professional actions.

7.0 REFERENCES:

- 7.1. Guideline for Prevention and Management of Pressure Ulcers, WOCN Clinical Practice Guideline Series, Wound Ostomy and Continence Nurses Society, Copyright 2003.
- 7.2. Maklebust, JoAnn; Sieggreen, Mary: Pressure Ulcers, Guidelines for

- 7.3. Bryant, Ruth; Acute and Chronic Wounds, Nursing Management, Second Edition, Mosby Inc., 2000
- 7.4. AHCPR Panel for the Prediction and Prevention of Pressure Ulcers in Adults: *Pressure ulcers in adults: prediction and prevention*. Clinical practice guideline No. 3, Pub No. 92-0047, Rockville, MD, 1992, Public Health Service, U.S. Department of Health and Human Services
- 7.5. AHCPR Panel for the Treatment of Pressure Ulcers in Adults: *Treatment of pressure ulcers*. Clinical practice guideline No. 15, Pub No. 95-0653, Rockville, MD, 1994, Public Health Service, U.S. Department of Health and Human Services.

8.0 GUIDELINES: none

9.0 ATTACHMENTS:

- 9.1. "Attachment A" Braden Scale for Predicting Pressure Sore Risk©
- 9.2. "Attachment B" THHEB Wound Care and Incontinence Protocol

“Attachment A”
Braden Scale for Predicting Pressure Sore Risk©

19-23 = no risk, 15-18 = low risk, 13-14 + moderate risk, 10-12 = high risk, <9 = very high risk

<p>Sensory/ Perception Ability to respond meaningfully to pressure related discomfort</p>	<p>1. Completely limited: Unresponsive to painful stimuli, due to diminished level of consciousness or sedation OR Limited ability to feel pain over most of body surface.</p>	<p>1. Very limited: Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR Has a sensory impairment which limits the ability to feel pain or discomfort over 1/2 of body</p>	<p>1. Slight-limited: Responds to verbal commands but cannot always communicate discomfort or need to be turned OR Has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.</p>	<p>1. No Impairment: Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort</p>
<p>Moisture Degree to which skin is exposed to moisture</p>	<p>1. Constantly moist: Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.</p>	<p>1. Moist: Skin is often but not always moist. Linen must be changed at least once a shift.</p>	<p>1. Occasionally moist: Skin is occasionally moist, requiring an extra linen change ~1x/day</p>	<p>1. Rarely moist: Skin is usually dry; linens require change only routinely.</p>
<p>Activity Degree of physical activity</p>	<p>1. Bedfast: Confined to bed.</p>	<p>1. Chairfast: Ability to walk severely limited or nonexistent. Cannot bear own weight and/or must be assisted into chair or wheelchair.</p>	<p>1. Walks occasionally: Walks during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.</p>	<p>1. Walks frequently: Walks outside the room at least twice a day and inside room once q2hrs while awake.</p>
<p>Mobility Ability to change and control body position</p>	<p>1. Completely immobile: Does not make even slight changes in body or extremity position without assistance.</p>	<p>1. Very limited: Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently</p>	<p>1. Slightly limited: Makes frequent though slight changes in body or extremity position independently.</p>	<p>1. No limitations: Makes major and frequent changes in position without assistance.</p>
<p>Nutrition Usual food intake pattern</p>	<p>1. Very poor: Never eats a complete meal. Rarely eats >1/3 of food offered. Eats 2 servings or less of protein per day. Takes fluids poorly. Does not take supplement OR is NPO, clear liquids or IV for >5 days.</p>	<p>1. Probably Inadequate: Rarely eats a complete meal and generally eats only about 1/2 of any food offered. Protein intake includes only 3 servings of meat or dairy per day. Occasionally takes a dietary supplement OR Receives less than optimum amount of liquid diet or tube feeding.</p>	<p>1. Adequate: eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy) each day. Occasionally will refuse a meal, but will usually take a supplement if offered. OR Is on a tube feeding or TPN which probably meets most of nutritional needs.</p>	<p>1. Excellent: Eats most of every meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.</p>
<p>Friction and Shear</p>	<p>1. Problem: Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance.</p>	<p>1. Potential problem: Moves feebly or requires minimum assistance. During move skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.</p>	<p>1. No apparent problem: Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair at all times.</p>	

“Attachment B”

THR Clinical Protocol for Pressure Ulcer and Incontinence Skin Care Management

The Hospital A's Medical Board has approved the following protocol for implementation by the hospital nursing staff in an effort to prevent and/or expedite the care for pressure ulcers. The nurse will implement the interventions in the following protocol based on the patient's clinical condition and in the nurse's best judgment. *Placement of this form in the “Physician's Order” section of the Medical Record is intended to serve as official notification to the physician(s) involved in the patients' care that the protocol has been implemented.*

A. Pressure Ulcer Prevention Protocol; If Braden Score is less than 18 or patient has a Stage 1, implement the following:

1. Turn every 2 hours, (30 degree angle when positioned to side).
2. Moisturize pressure points and all dry skin areas twice a day without massage (ex: Skin Repair Cream, Aquaphor).
3. Place patient on pressure relief bed surface for lying and sitting positions unless on hospital mattress with air.
4. Seat on Waffle chair cushion when out of bed.
5. Obtain an order for a pre-albumin initially if not previously ordered in the past seven days and then weekly thereafter.
6. Check skin integrity around tubes, splints and devices (ex, TED's, SCD's, C-collar, Halo vest, multipodus boots) every shift and PRN.
7. Head of bed no higher than 30 degrees in appropriate clinical situation.
8. Off load heels with pillows lengthwise on all surfaces except Air Fluidized Therapy.
9. Minimize friction and shear with the following as needed: overhead trapeze and/or protect boney prominence areas with foam dressing (ex: Mepilex), no sting barrier spray or transparent film (ex: Bioclusive) or barrier cream (ex: Nutrashield).
10. Educate patient and/or family on appropriate pressure relieving interventions.
11. If patient is non-ambulatory or mobility limited due to paralysis or lower extremity orthopedic procedure, place bilateral Spenco foot pillow heel protectors along with A7.
12. **If Braden <13 or patient has existing heel pressure ulcer and/or foot drop risk:**
 - [] Non-ambulatory or impaired circulation place Prevalon Heel Protector to affected extremity and A7.
 - [] Ambulatory or potential for ambulation with need for offloading heel(s) with gait/mobility place RCAI Multi-Podus Splint to affected extremity(s). Consult Wound Care Specialist for appropriate sizing.

If Braden Score <13 or patient has existing breakdown, then add:

13. Reposition with frequent small adjustments in position.

14. Provide occipital pressure relief with pressure relief device as needed.

B. Stage 2, Implement A1-14 and:

15. Consult Dietitian to evaluate for vitamin/mineral supplementation.

16. Check appropriate measure (based on wound appearance).

17. [] **Intact Blister, Pressure Ulcer Only:** Leave open or protect with foam dressing (ex: Mepilex), secured with skin friendly tape (ex: Medipore), change daily.

[] **Open shallow crater wound with minimal to moderate drainage:** Cleanse with Normal Saline or wound cleanser and apply foam dressing (ex, Mepilex) change every 4 days or PRN dislodgement.

[] **Open shallow crater wound with excessive drainage:** Cleanse with Normal Saline or wound cleanser and apply hydrofiber (ex, Aquacel) trimmed to fit wound. Cover with foam (ex, Mepilex); change every 4 days or PRN dislodgement.

[] **Open shallow crater wound with inability to apply dressing:** Clean with Normal Saline or wound cleanser and apply hydrophilic paste (ex: Triad paste). Apply thick layer like cake frosting twice a day and PRN.

C. Stage 3 and 4 Protocol: Implement A1-14, B 15 and:

18. Wound Care Specialist consult.

19. Cleanse wound with Normal Saline or wound cleanser and apply Normal Saline moistened gauze to wound bed. Cover with dry dressing, secure with soft cloth surgical tape (ex: Medipore tape) and change twice a day.

D. Unstageable: Implement A1-14 and B 15 and C 18 and C19:

20. Exception: Unstageable heel ulcers- paint with betadine daily unless allergic. See A 10 and A 11 for heel interventions.

E. Deep Tissue Injury (Purple/Maroon Ulcer): Implement A1-13 and B 15 and C18 and:

21. Obtain an order for Xenaderm ointment or equivalent ointment, and apply to DTI twice a day.

Incontinence Skin Care: Implement Pressure Ulcer Prevention Protocol according to Braden Score and:

F. Skin Clear/Incontinent of Urine and Stool:

- 22. Individualize bathing schedule, avoid diapers unless out of bed and use breathable underpads.
- 23. Use moisture barrier wipe (ex, Comfort Shield) after each incontinent episode. Add no sting barrier spray daily or moisture barrier paste (ex: Calazime) if episodes frequent or continuous.
- 24. For fecal incontinence, apply rectal pouch and change as needed.
- 25. If excessive fecal incontinence, insert bowel management tube and change every 30 days.
- 26. For male urinary incontinence apply an external catheter and change every 24 hours or as needed.

G. Skin Reddened or Broken from Incontinence:

- 27. Cleanse with perineal spray cleanser and/or moisture barrier wipe; apply moisture barrier paste or no sting barrier spray.
- 28. For broken areas apply pain-reducing moisture barrier paste (ex. Calmoseptine Ointment) as thick layer, like cake frosting twice a day and PRN.
- 29. If Candida rash is present, apply antifungal powder twice a day and PRN.

H. If not responding to above interventions, consider Wound Care Specialist consult.

Protocol Implemented by:

RN Signature: _____ Date/Time:

Braden Score _____

Appendix F

Braden Risk Assessment Tool

Appendix F

Braden Risk Assessment Tool

		Affix patient identification label in this box		
		Date of Assessment		
CATEGORY	DESCRIPTOR	S C O R E	S C O R E	S C O R E
Sensory Perception Ability to respond meaningfully to pressure related discomfort	Completely Limited: Unresponsive (does not moan, flinch or grasp) to painful stimuli due to diminished level of consciousness or sedation. OR , limited ability to feel pain over most of body surface. Very Limited: Responds to only painful stimuli. Cannot communicate discomfort except by moaning or restlessness; OR has sensory impairment that limits the ability to feel pain or discomfort over half of body. Slightly Limited: Responds to verbal commands, but cannot always communicate discomfort or need to be turned; OR , has sensory impairment that limits the ability to feel pain or discomfort in one or two extremities. No Impairment: Responds to verbal commands. Has no sensory deficit that would limit ability to feel or communicate pain or discomfort.	1 2 3 4	1 2 3 4	1 2 3 4
Mobility Ability to change and maintain own position	Completely immobile: Does not make even slight changes in body or extremity position without assistance. Very limited: Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently. Slightly limited: Makes frequent though slight changes in body or extremity position independently No limitations: makes major and frequent changes in position without assistance.	1 2 3 4	1 2 3 4	1 2 3 4
Activity Degree of physical activity	Bedfast: confined to bed (can't sit at all). Chairfast: Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair. Walks occasionally: walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair. Walks frequently: Walks outside the room at least twice a day and inside room at least once every 2 hours during waking hours.	1 2 3 4	1 2 3 4	1 2 3 4
Moisture Degree to which skin is exposed to moisture	Constantly moist: skin is kept moist almost constantly by perspiration, urine, drainage etc. Dampness is detected every time patient is moved or turned. Very moist: Skin is often, but not always, moist. Linen must be changed at least every 8 hours. Dry 2-3 hours at a time Occasionally moist: Skin is occasionally moist, requiring linen change every 12 hours Rarely moist: Skin is usually dry, linen only requires changing every 24 hours.	1 2 3 4	1 2 3 4	1 2 3 4

Friction Shear	<p>Problem: Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. spasticity, contractures, itching or agitation leads to almost constant friction</p> <p>Potential problem: Moves feebly or requires minimum assistance. During a move, skin probably slides to some extent against sheets, chair, restraint or other devices. Maintains relative good position in chair or bed most of the time but occasionally slides down.</p> <p>No apparent problem: Able to completely lift patient during a position change, moves in bed and in chair independently and has sufficient muscle strength to lift completely during move. Maintains good position in bed or chair at all times.</p>	1 2 3	1 2 3	1 2 3
Nutrition	<p>Very poor: NPO and/or maintained on clear fluids, or IVs for more than 5 days OR never eats a complete meal. Rarely eats more than 1/3 of any food offered. Protein intake includes only 2 servings of meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement.</p> <p>Inadequate: Is on a liquid diet or tube feedings/TPN, which provide inadequate calories and minerals for age OR rarely eats a complete meal and generally eats only half of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement</p> <p>Adequate: Is on tube feedings OR eats over half of most meals. Eats a total of 4 servings of protein each day. Occasionally eats between meals. Does not require supplementation.</p> <p>Excellent: Is on TPN, which provides adequate calories and minerals for age OR Is on a normal diet providing adequate calories for age. For example, eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.</p>	1 2 3 4	1 2 3 4	1 2 3 4
	mild risk- 18-15 moderate risk - 14-13 SCORE high risk - 12-10 severe risk - ≤9	TOTAL		

Appendix G

MNC Worksheet #1: MISSCARE Survey Results

Appendix G

MNC Worksheet #1: MISSCARE Survey Results								
Position	Shift	Unit	Ambulation	Turn q 2h	Bathing Skin care	Shift Assmt	Focused Assmt	Wound_ skin care
RN	1	6	1	1	1	1	1	1
RN	2	6	1	1	1	1	1	1
RN	2	6	1	1	1	1	1	1
NA	2	6	1	1	1	1		
NA	1	6	1	0	1	1		
NA	1	6	1	0	1	1		
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	0	0
RN	1	6	1	0	0	1	0	1
*Blank cells indicate position does not perform these duties								

MNC Worksheet #2: MISSCARE Survey Results by Proportion

Position	Shift	Unit	Ambulation	Turn q 2h	Bathing_Skin_care	Shift Assmt	Focused Assmt	Wound_skin care
RN	1	6	1	1	1	1	1	1
RN	2	6	1	1	1	1	1	1
RN	2	6	1	1	1	1	1	1
NA	2	6	1	1	1	1		
NA	1	6	1	0	1	1		
NA	1	6	1	0	1	1		
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	0	0
RN	1	6	1	0	0	1	0	1
Total by Intervention			10	4	6	10	5	4
Proportion by Intervention			0.5	0.4	0.6	1	0.7	0.6
Denominator by Intervention								

*Blank cells indicate position does not perform these duties

MNC Worksheet #3: MISSCARE Survey Results by Shift

Position	Shift	Unit	Ambulation	Turn q 2h	Bathing_Skin care	Shift Assmt	Focused Assmt	Wound_skin care
NA	1	6	1	0	1	0		
NA	1	6	1	0	1	0		
RN	1	6	1	1	1	0	1	1
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	1	0
RN	1	6	1	0	0	1	0	0
RN	1	6	1	0	0	1	1	1
Total by Intervention			7	1	3	4	4	2
Proportion by Intervention			1	0.1	0.4	0.8	0.8	0.4
Denominator by Intervention			7	7	7	5	5	5
NA	2	6	1	1	1			
RN	2	6	1	1	1	1	1	1
RN	2	6	1	1	1	1	1	1
Total by Intervention			3	3.0	3.0	2.0	2.0	2.0
Proportion by Intervention			1	1	1	1	0.3	0.3
Denominator by Intervention			3	3	3	2	7	7

*Blank cells indicate position does not perform these duties

MNC Worksheet #4: MISSCARE Survey Results by Position

Position	Position Code	Shift	Unit	Ambulation	Turn q 2h	Bathing_Skin care	Shift Assmt	Focused Assmt	Wound_skin care
NA	2	2	6	1	1	1			
NA	2	1	6	1	0	1			
NA	2	1	6	1	0	1			
Total by Intervention		4		3	1	3			
Proportion by Intervention				1	0.3	1			
Denominator by Intervention				3	3	3			
RN	1	1	6	1	1	1	1	1	1
RN	1	2	6	1	1	1	1	1	1
RN	1	2	6	1	1	1	1	1	1
RN	1	1	6	1	0	0	1	1	0
RN	1	1	6	1	0	0	1	1	0
RN	1	1	6	1	0	0	1	0	0
RN	1	1	6	1	0	0	1	0	1
Total by Intervention				7	3	3	7	5	4
Proportion by Intervention				1.0	0.4	0.4	1.0	0.7	0.6
Denominator by Intervention				7	7	7	7	7	7
*Blank cells indicate position does not perform these duties									

Appendix H

Missed Nursing Care: Medical Record Audit Database

Appendix H

Missed Nursing Care: Medical Record Audit Database

Definitions of Data Elements for Audit Worksheet 1

Variable: Data tool count	Variable: Formal Count	Variable Description
		1 assigned to each patient, permits summing for total count
dt_pty	Day of Stay, Time of Day and Personnel Type	3 variables merged into one number
dos	Day of Stay	Identify the day of stay
shift	Shift	1 = Peak hours, MF, 0700-1859 2= Off Peak hours, MF, 1900-0659 3= Saturday 0700 through Monday 0659
ptype	Personnel Type	1=RN/LVN 2=Nursing Assistant
los	Length of Stay	Number of day of stay minus: admit/dc day not used
am_num	Actual Ambulation count	Number of ambulations completed/that day
am_den	Ambulation Denominator	Number of ambulations ordered/day
tu_num	Turns numerator	Actual Turns counted
tu_den	Turns Denominator	Number of turns ordered/day
bs_num	Bath/skin care numerator	Actual bath/skin care events counted
bs_den	Bath/skin care Denominator	Number of bath/skin care ordered/day
sa_num	Shift Assessment numerator	Actual shift assessments counted
sa_den	Shift Assessment Denominator	Number of shift assessments ordered/day
fa_num	Focused Assessments numerator	Actual focused assessments counted
fa_den	Focused Assessments Denominator	Number of focused assessments ordered/day
wsc_num	Wound/Skin Care Treatment numerator	Actual wound/skin care treatments counted
wsc_den	Wound/Skin Care Treatment Denominator	Number of wound/skin care treatments ordered/day

ptnum	Patient total Numerator	Number of instances of care given for all six interventions
ptden	Patient Total Denominator	Number of all expected instances in which care should be given for six interventions
mcrat	Missed Care Rate by Patient	Missed Care Rate calculated for each Patient
pus_1	PUS stage1	Red area: count
pul_1	PULocation1	List
pus_2	PUS stage2	Blister: count
pul_2	PULocation2	List
pus_3	PUS stage3	Open wound, w drainage: count
pul_3	PULocation3	List
pus_4	PUS stage4	Deep open wound w drainage: count
pul_4	PULocation4	List
pus_5	PUS stage5	Unstageable Ulcers: count
pul_5	PULocation5	List
HSPU	Highest Scored Pressure Ulcer	Most severe ulcer to be used as outcome metric

Missed Nursing Care: Audit Worksheet 1																	
pt	dt_pty	dos	shift	ptype	los	am_num	am_den	tu_num	tu_den	bs_num	bs_den	sa_num	sa_den	fa_num	fa_den	wsc_num	wsc_den
1	111	1	1	1	2	2	3	4	12	0	1	2	2	1	2	0	0
	112	1	1	2		0		0		1							
	121	1	2	1		3	3	4	12		1	2	2	2	2	1	1
	122	1	2	2		0		4		1							
	211	2	1	1	3	0	3	2	12	0	1	2	2	1	2	0	0
	212	2	1	2		0		6		1							
	221	2	2	1		1	3	6	12								
	222	2	2	2		1		4		1	1						
	311	3	1	1	4	0	3	0	12	0	0	2	2	1	2	0	0
	312	3	2	2		2		8		1							
	321	3	2	1		3	3	10	12	0	1	2	1	1	2	1	0
	322	3	2	2		0	3	2		1							
	Total				3	12	21	50	72	6	5	10	9	6	10	2	1

Missed Nursing Care: Overall total scores, Worksheet 2

pt	los	am_num	am_den	tu_num	tu_den	bs_num	bs_den	sa_num	sa_den	fa_num	fa_den	wsc_num	wsc_den	ptnum	ptden	imcrat
1	3	8	8	0	0	0	4	6	6	0	0	0	0	14	18	0.78
2	5	0	0	35	60	2	10	5	10	0	10	5	10	47	100	0.47
3	4	10	12	28	48	10	20	12	16	10	20	0	0	70	116	0.60
4	3	8	8	0	0	0	4	6	6	0	0	0	0	14	18	0.78
5	5	0	0	35	60	2	10	5	10	0	10	5	10	47	100	0.47
6	4	10	12	28	48	10	20	12	16	10	20	0	0	70	116	0.60
7	3	8	8	0	0	0	4	6	6	0	0	0	0	14	18	0.78
8	5	0	0	35	60	2	10	5	10	0	10	5	10	47	100	0.47
9	4	10	12	28	48	10	20	12	16	10	20	0	0	70	116	0.60
10	3	8	8	0	0	0	4	6	6	0	0	0	0	14	18	0.78
total count	39	62	68	189	324	36	106	75	102	30	90	15	30	407	720	0.57
Total Rate			0.912		0.583		0.34		0.735		0.333		0.5			

Missed Nursing Care by Peak Hours

pt	shift	am_num	am_den	tu_num	tu_den	bs_num	bs_den	sa_num	sa_den	fa_num	fa_den	wsc_num	wsc_den
1	1	1	3	4	12	0	1	1	1	2	2	0	1
	1	2	3	6	12	0	1	1	1	1	2	1	1
		3	6	10	24	0	2	2	2	3	4	1	2
			0.50		0.42		0.00		1.00		0.75		0.50

Missed Nursing Care by Off-Peak Hours

	2	1		4		0		1	1	2	2	0	
	2	1		4		1		1	1	2	2	1	1
		2		8		1		2	2	4	4	1	1
			0.33		0.33		0.50		1.00		1.00		1.00

Peak Hours: Monday-Friday, 0700-1859

Off Peak Hours: Monday-Friday, 1900-0659 & Saturday, 0700-Monday, 0659

MRA Worksheet #4: Missed Nursing Care: Personnel Type

pt	ptype	am_num	am_den	tu_num	tu_den	bs_num	bs_den	sa_num	sa_den	fa_num	fa_den	wsc_num	wsc_den
1	1	1	3	4	12	0	1	1	1	2	2	0	1
	2	1		4		1							
	1	2	3	6	12	0	1	1	1	1	2	1	1
	2	1		4		0							
			5	6	18	24	1	2	2	2	3	4	1
			0.83		0.75		0.50		1.00		0.75		0.50

Missed Nursing Care by Personnel Types, Nurses and Nursing Assistants

pt	ptype	am_num	am_den	tu_num	tu_den	bs_num	bs_den	sa_num	sa_den	fa_num	fa_den	wsc_num	wsc_den	
1	1	1	3	4	12	0	1	1	1	2	2	0	1	
	1	2	3	6	12	0	1	1	1	1	2	1	1	
		3	6	10	24	0	2	2	2	3	4	1	2	
				0.50		0.42		0.00		1.00		0.75		0.50
	2	1		4		0								
	2	1		4		1								
		2		8		1								
			0.33		0.33		0.50							

ptype 1: Registered and Licensed Vocational Nurse

ptype 2: Nursing Assistant

Endnotes

¹Permission to use the MISSCARE Survey and any related published models was granted on June 15, 2010 by Dr. Kalisch, PhD., Chair, Nursing Business and Health System and Titus Professor at the University of Michigan, School of Nursing in Ann Arbor, Michigan. Contact information: bkalisch@umich.edu

²Permission to use the Braden Risk Assessment Scale was granted on June 10, 2010 by Jayne Ball, Office Manager at Prevention Plus, LLC, Omaha Nebraska. Contact information: JanyeBall@bradenscale.com