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Assessing Quality of Pain Management of Older Adults in Emergency Care

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ASSESSING QUALITY OF PAIN MANAGEMENT OF OLDER ADULTS IN EMERGENCY CARE

by

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ABSTRACT

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Pain care of older adults in a complex system such as the emergency department (ED) is challenging and deserves further investigation. Both acute and chronic pain is common among older adults. Typically, retrospective univariate design studies evaluate independent factors related to the quality of pain treatment across all age groups. While physicians have conducted most ED pain management studies research concerning older adult pain management is under-studied especially in the nursing literature. This is important because pain is prevalent among ED patients especially those over age 65. The purpose of this study was to examine the effects of selected predictors (i.e., age, gender, and crowding) on quality of pain management for older adults (i.e., age $\geq$ 65 years of age) in an urban, academic Emergency Department in the mid-east United States. In a sample of 143 patients, 40% did not receive analgesia in the ED. Of those not receiving analgesia, 53.6% were 65 years or older. Of those who did receive analgesia, the average wait from time seen by a provider to medication administration was 1.2 hours (69.9 minutes). The average length of the ED visit was 5.3 hours (317 minutes) and the average number of pain reassessments during a visit was one (1). ED crowding was not a statistically significant factor contributing to delayed initiation of pain care. Gender and

age were not statistically significant factors in the number of pain reassessments or delays in administering analgesia. Potentially inappropriate medication (PIM) prescribing was evaluated and fewer older adults received NSAIDs. More research is needed to evaluate structure, process and outcomes variables that influence pain care of older adults in the ED.

To

Bob and Lance

&

Kellie Smith, EdD, RN

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Chapter 1

Introduction

Over the last decade, demand for care in American hospital emergency departments (EDs) has increased dramatically. Overburdened, overcrowded EDs are in crisis because of increasing demand and the escalating acuity of chronically ill patients (IOM, 2007). Some researchers attribute the overcrowding of EDs to non-emergent or convenient utilization by uninsured Americans combined with fewer EDs in some communities and lack of available after-hour care by primary providers (http://www.nehi.net/writable/publication_files/file/nehi_ed_overuse_issue_brief_032610finaledits.pdf, IOM, 2007). Others argue that the root cause relates to crowded hospitals. In this situation, when ED patients are admitted, they wait in the ED for an available hospital bed. Often this may take days (Liu, Chang, Weissman, Griffey, Thomas, Nergui, et al; IOM, 2007). The root cause may vary, but when the system is over-burdened, patients and organizations are at risk because of the potential for medical errors, long waits and sub-optimal quality of care (Freund, Yordanov, Vincent-Cassy, Riou, & Ray, 2012; Hwang, 2010).

Increasing number of insured under the Affordable Care Act (ACA) will increase demand for emergency services (http://kaiserhealthnews.org/news/with-health-law-er-still-packed/). Insured patients utilize emergency services more than uninsured (NCHS 2010; Tang 2010) and Medicaid patients have the highest annual rate of ED visits (Hsai 2011). However, recent research has found that younger adult utilization of EDs for non-urgent visits have decreased since the ACA (Antwi, Morya, Simon, Sommers, 2015).

However, for adults without stable established primary care, ED visits remain high (Janke, Brody, Overbeek, Bedford, Welch & Levy, 2015). Moreover, the ACA includes specific provisions for removal of barriers to access of emergency care. Health plans cannot charge higher co-payments for out-of-network emergency care under the ACA. In addition, health plans must reimburse out-of-network providers rendering emergency care (McClelland, Asplin, Epstein, Kocher, Pilgrim, Pines et al., 2014. In summary, demand for ED services continues to grow placing more demand on a system that already needs improvement in processes to manage the complex health needs of older adults (http://www.epijournal.com/articles/100/new-age-why-the-world-needs-geriatric-emergency-medicine).

Emergency department visits by older adults have been increasing. Between 1993 and 2003, ED visits by people over the age of 65 increased by 34% (IOM, 2008). Adults age 65 and over now comprise the largest and fastest-growing group utilizing ED care in the country today. As of 2008 (IOM), this age group accounts for a disproportionate share of emergency visits. Older adults accounted for approximately 150 million ED visits in the United States from 2001 to 2009 (Pines, Mullins, Cooper, Feng, & Roth, 2012). Those over the age of 75 have an even higher utilization rate than all other age groups (Terrell et al., 2009) . The over-75 age group has a much higher incidence of age-related and potentially painful diseases, including cardiovascular disorders, diabetes, cancer, osteoporosis and degenerative joint disease (Bruckenthal, Reid, & Reisner, 2009).

Older adults with comorbid diseases present greater challenges to ED providers because they have more severe medical conditions and tend to consume more diagnostic testing and staff time (IOM, 2008). Because they are sicker, they have an increased risk

of ED return visits, hospital admission and death. Of particular concern is that they come in with atypical presentations of symptoms and complex co-morbidities. Providers are thus more likely to misdiagnose and discharge seniors with unrecognized and untreated problems. Providers are particularly likely to overlook pain in seniors. (IOM, 2007, 2008, 2011).

Whether pain prevalence increases with age remains uncertain (Deane & Smith, 2008). Studies have shown that pain prevalence increases with age but declines again in later years. Other research shows no difference among older adults (Jakobsson, Klevsgård, Westergren, & Hallberg, 2003). Moreover, researchers have not studied the over 75 age group as often as younger ages with regard to pain prevalence so there is little known about pain prevalence in this age group (Deane et al, 2008).

Pain is the most common complaint for all ED patients. Pain can be a symptom of an underlying disease or it can be the disease itself. It is common for older adults to seek care in EDs for post-surgical pain, osteoarthritis flares, trauma or injury, acute low back pain, acute neck pain, herpes zoster, or other painful conditions, such as abdominal pain (Gruneir et al, 2011). It is also common for older adults to under-report their pain. According to the American Geriatrics Society, "older patients themselves may make accurate pain assessment difficult. They may be reluctant to report pain despite substantial physical and psychological impairment. Many older people expect pain with aging and do not believe that treatment will alleviate it. Some patients accept pain and suffering as atonement for past actions." (AGS, 2002)

Pain is highly subjective and deeply personal, yet its management necessitates an objective standard of care. Poorly managed pain can have numerous deleterious effects

such as difficulty concentrating, lack of energy, lost productivity, decreased quality of life and inability to complete everyday tasks (Hwang, Richardson, Harris, & Morrison, 2010). Untreated pain in older adults decreases physical function and increases risk of deadly falls and injuries (Platts-Mills, Esserman, Brown, Bortsov, Sloan and McLean, 2011).

The International Association for the Study of Pain (IASP) defines pain as, "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Retrieved from http://www.iasp-pain.org/Content/NavigationMenu/GeneralResourceLinks/PainDefinitions/default.htm). Pain is always subjective. Pain is acute, chronic or malignant in nature, and its properties are both physical and psychological (IOM 2011).

Both injury and illness, combined with an acute or chronic condition, likely increases a person's pain. The onset of acute pain is often what prompts an ED visit and in older adults, this pain often accompanies an injury. Falls are the main cause for ED visits in the 65 and older population. An estimated 15% to 30% of ED visits in this age group are attributed to falls (Wajnberg, Hwang, Torres, Yang, 2007). A fall may be the chief complaint upon arrival or may be the chief symptom of other pathologies, including myocardial infarction (MI), sepsis, medication toxicity, acute abdominal pain and elder abuse (Hwang & Morrison, 2007; Samaras, Chevalley, Samara, & Gold, 2010). In this population, an estimated 4% to 6% of falls results in fractures, which are associated with the need for acute pain management.

Researchers have linked chronic pain with decreased mobility and functional decline, depression, and a host of other physical problems including sleep disturbances,

ambulatory dysfunction, malnutrition, impaired immune function and increased mortality (Bruckenthal, Reid, & Risner, 2009). Chronic musculoskeletal pain in seniors is an identified independent risk factor for falls (Levielle, Jones, Kiely, Hausdorff, Sherling, Grualniik, et al, 2009). Often, providers are concerned about treating pain in older adults because of comorbidities and polypharmacy. Tragically, failure to treat pain increases the risk of falls. One reason pain causes falls is that pain interferes with functional ability and the ability to perform activities of daily living. A greater risk of falls in older adults is linked with higher morbidity and mortality (Levielle, et al, 2009). Falls rank among the top 10 causes of death in older adults (Gruneir, et al 2011). This is important because of the significant role EDs play in treating older adults with acute injury and providing a pathway for admission to the hospital (http://www.cdc.gov/nchs/data/databriefs/db130.htm).

Statement of the Problem

In 2008, The Institute of Medicine (IOM) published a report on retooling the American healthcare system to meet the demands of older adults who have increased co-morbidities. By 2030, the number of adults aged 65 or older will more than double to reach 71 million (CDC, 2011). The report concluded that EDs are not prepared to meet the growing demand.

EDs are not conducive to the complex healthcare needs of older adults. Evaluating patients in hectic, crowded EDs, sometimes in hallways on stretchers, with limited access to geriatric specialists, may compromise care (IOM, 2008). Moreover, EDs are criticized for under-recognizing and under-treating pain, especially in seniors (Cinar, Ernst, Fosnocht, Carey, Rogers, Carey et al, 2012). This is particularly problematic for

seniors who suffer pain because of conditions such as osteoarthritis, diabetes and injuries. Evidence of optimal treatment of acute pain in older persons in the ED is scarce. Since the landmark 2008 IOM report, little evidence suggests that ED providers are more skilled at addressing neither the care needs of older adults nor that seniors receive adequate pain treatment (IOM, 2011).

Conceptual Framework

Quality care is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (IOM, 1990). In this study quality is defined as timeliness of pain treatment and prescribing appropriate pain medications for older adults.

Donabedian's Quality Framework (DQF) guides the exploration of the relationships among patients, providers and EDs in this study. In 1966, Advedis Donabedian first devised a replicable formula for evaluating the quality of medical care. It remains relevant and commonly used in the evaluation of quality of care across healthcare settings (Herald, Alexander, Fraser, & Jiang, 2008). The Agency for Healthcare Research and Quality (AHRQ) and the World Health Organization (WHO) consistently use this framework. It is applicable to the evaluation of ED care (Rhee, Donabedian & Burney, 1987).

The DQF focuses on the interrelationship of factors under the control of the medical professions and effects on patient outcomes. It purposely does not account for patient, economic or social factors outside of the care delivery system. In his seminal 1966 paper, republished in 2005, Donabedian states:

> "This is justified by the assumption that one is interested in whether what is now known to be good medical care has been applied. Judgments are based on considerations such as the appropriateness, completeness and redundancy of information obtained through clinical history, physical examination and diagnostic tests; justification of diagnosis and therapy; technical competence in the performance of diagnostic and therapeutic procedures, including surgery; evidence of preventive management in health and illness; coordination and continuity of care; acceptability of care to the recipient and so on" (Donabedian, 1966).

In evaluating care delivery, one must include the structure, process and outcome of that care (Donabedian, 1966, 1980, 1985,). The basic features of structure are that it is stable, that it functions to deliver care or is a feature of the environment of care, and that it impacts the care that is provided (Donabedian, 1980). Further, structure refers to the relatively stable characteristics of the patient and providers. It includes age, gender and race as well as measurable characteristics such as pain assessment, chief complaint, comorbid illness and daily medications. See Table 1.

The DQF three-variable concept, structure-process-outcome, pivots on the relationships and interactions among variables. Donabedian proposed this useful way of assessing and evaluating patient care. He (1988) recommended that quality researchers approach assessment according to the needs and opportunity of the situation. He suggested that researchers derive information from all three variables, adding confidence to the analysis. In this pain management study, the PI will use all three approaches.

Structure also includes the number, distribution and qualifications of healthcare providers and the physical and organizational setting of care delivery. Providers of care in EDs with the ability to diagnose and treat include physicians, advanced practice registered nurses (APRNs) and physician assistants (PAs). Registered nurses (RNs) and emergency medical technicians (EMTs) also play a role in assessing pain. The concept of structure also includes physical and financial resources, both formal and informal. The study did not evaluate these variables because they were not amenable to chart review and the measurement of the quality indicators used (timeliness and type of medication prescribed). ED patients are often seen across multiple shifts and may have multiple providers during a visit.

Donabedian (1968) defined process as the "set of activities that go on within and between practitioners and patients." The process of care involves the promotion, preservation and restoration of health (Donabedian, 1985). Donabedian believed in delivering care in a way that is acceptable, pleasing, even rewarding, to patients, in settings that address their desires and needs.

In defining the process of care, Donabedian distinguished two components: technical care and interpersonal care. The technical process includes the specific skills and services used and the way in which encounters are managed, including the continuity of care and its coordination (Donabedian, 1980). The interpersonal process involves the values and rules that govern relationships among people, specifically the way a healthcare provider relates to a patient. The interpersonal process of care encompasses: friendliness, courtesy, respect, sensitivity, patient participation in decision making regarding treatment, and the overall level of communication. The process is believed to

contribute to the individual's welfare. (Donabedian 1980, 1985). An important interpersonal processes variable is wait time. This affects patients in terms of service satisfaction and respect of their well-being.

The study of outcomes is the third method used to evaluate aspects of care delivery. Outcome implies a change in a patient's current or future health that is attributed to the care received (Donabedian, 1980, 1985, 1988). The World Health Organization (WHO) defines health as a "state of complete physical, mental and social well-being and not merely the absence of disease." Donabedian's definition of health encompassed the WHO's components of health. Donabedian (1980) extended the definition to include patient attitudes, health related knowledge acquired by the patient, and health related behavioral change. The outcomes of care that are monitored and evaluated could encompass an almost infinite set of phenomena that correspond to aspects of physical, psychological, physical and social health. The significance of outcomes is also influenced by relevance of the chosen measures to the goal of care. For example, mortality rates should not be used to assess care when the purpose of the care is only to reduce pain.

Donabedian (1982) specified outcomes as either disease-specific outcomes or general health outcomes. Disease-specific outcomes relate to a particular pathological condition and indicate a change in actual health. Disease-specific outcomes relate to changes in the patient's biochemistry, physiology, or microbiology or the patient's symptoms or signs. These outcomes represent a physical change in the patient and can be measured using a change in the patients pain rating.

Donabedian concluded that outcomes reflect all the contributions of the providers involved in caring for the patient. This would involve the assessment of pain and the treatment of pain. Interpersonal process of care influences outcomes. Researchers can obtain a more direct assessment of the patient-provider relationship by incorporating the patient's perception of care. According to Donabedian (1980, 1985), the patient is fundamentally interested in outcomes; the patient can understand the significance of outcomes when expressed in functional terms. Moderate to severe pain is a concern that warrants staff response. The patient is left hanging while they wait for pain care after evaluation by the ED provider.

Figure 1. Relationship of patients in pain, ED interventions, patient outcomes

Structure, Process & Outcome Variables of the Study

This study focused on the following structure variables.

- Age
- Gender
- Numeric Rating Scale (NRS)

In 1996 Jones and colleagues proposed that age influences delivery of adequate analgesia

in the ED (Jones, Johnson & McNinch, 1996). Additionally, the same study found that older adults waited longer to receive analgesia and the analgesia was under-dosed . Gender bias may also affect adequate pain management (Motov & Khan, 2009).

Cognition can influence a patient's perception and report of pain and those who have a documented history of dementia. This study excludes subjects that do not have the ability to self- report moderate to severe pain. Often, older adults under-report pain for multiple reasons that are discussed in Chapter Two (AGS, 2001). This study focused only on adults who reported moderate to severe pain in triage.

In addition, comorbidity and polypharmacy are patient-related variables that were not evaluated in the study as influencers of quality pain care. These are important concerns in the older adult population and may influence provider decision-making but do not directly link to quality indicators used in this study (Hwang, et al 2010).

The Numeric Rating Scale (NRS) is the most commonly used method to assess pain as the 5th vital sign in triage and for routine pain assessments that meet the Joint Commission (JC) standard for pain management. A more complete description of this measure will be included in

Chapter 2. See Figure 2.

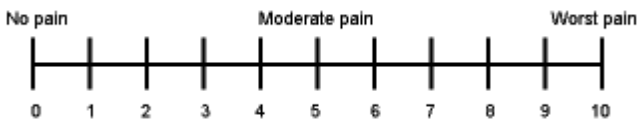

Figure 2**:** Numeric Rating Scale (NRS)

Several process features unique to emergency care exists. Patients come into the ED and report a chief complaint (reason why they are there). The triage RN then assesses the patient and assigns an Emergency Services Index Score (ESI Score) that alerts providers to the severity of the patient's condition. See Figure 3. Once assigned an ESI score, patients either wait or receive immediate treatment. Patients with an ESI score of 1 or 2 have life threatening emergencies and receive immediate lifesaving care. Those with ESI scores of 3, 4 and 5 wait for the next available bed and provider. It is important to note that the ESI score can be changed if the patient's condition warrants it before or after being seen by the ED provider. After ED providers initially assess patients, patients can experience delays in receiving care. Process factors such as ED crowding, diagnostic testing, provider and staff –related delays in initiating treatments and procedures contribute to possible delays (IOM, 2008)

While not an exhaustive list, for this study, the focus is on the following process variables because these involve both the technical and interpersonal aspects of ED care and are common to all ED patients:

- Triage Score
- Wait time to initiation of pain treatment
- Joint Commission standard compliance
- Crowding

While multiple, complex processes interact simultaneously in the ED during a patient visit, it is not feasible to study all of them simultaneously. These complex processes may influence the outcome of the study, however, the processes

selected for this study are feasible to study because they are consistent across EDs, they are measurable and they are linked to quality care in the ED.

Historically, the technical process of care has received a great deal of attention. In contrast, the interpersonal processes of care tend to be ignored partly because the usual sources of data give little information about the patient-provider relationship (Donabedian, Wheeler, & Wyszewianski, 1982). Today, patient satisfaction is an important indicator of quality with regard to prolonged waits in the ED. According to Donabedian (1980), patients know very little about the details of technical care, though they are expected to grasp its importance in situations that pose clear threat to their health and well-being. Usually providers and organizations are more concerned with the technical care and the outcomes that are derived from the care. Conversely, patients are the ultimate authority on evaluation the interpersonal process of care (Donabedian, Wheeler, & Wyszewianski, 1982).

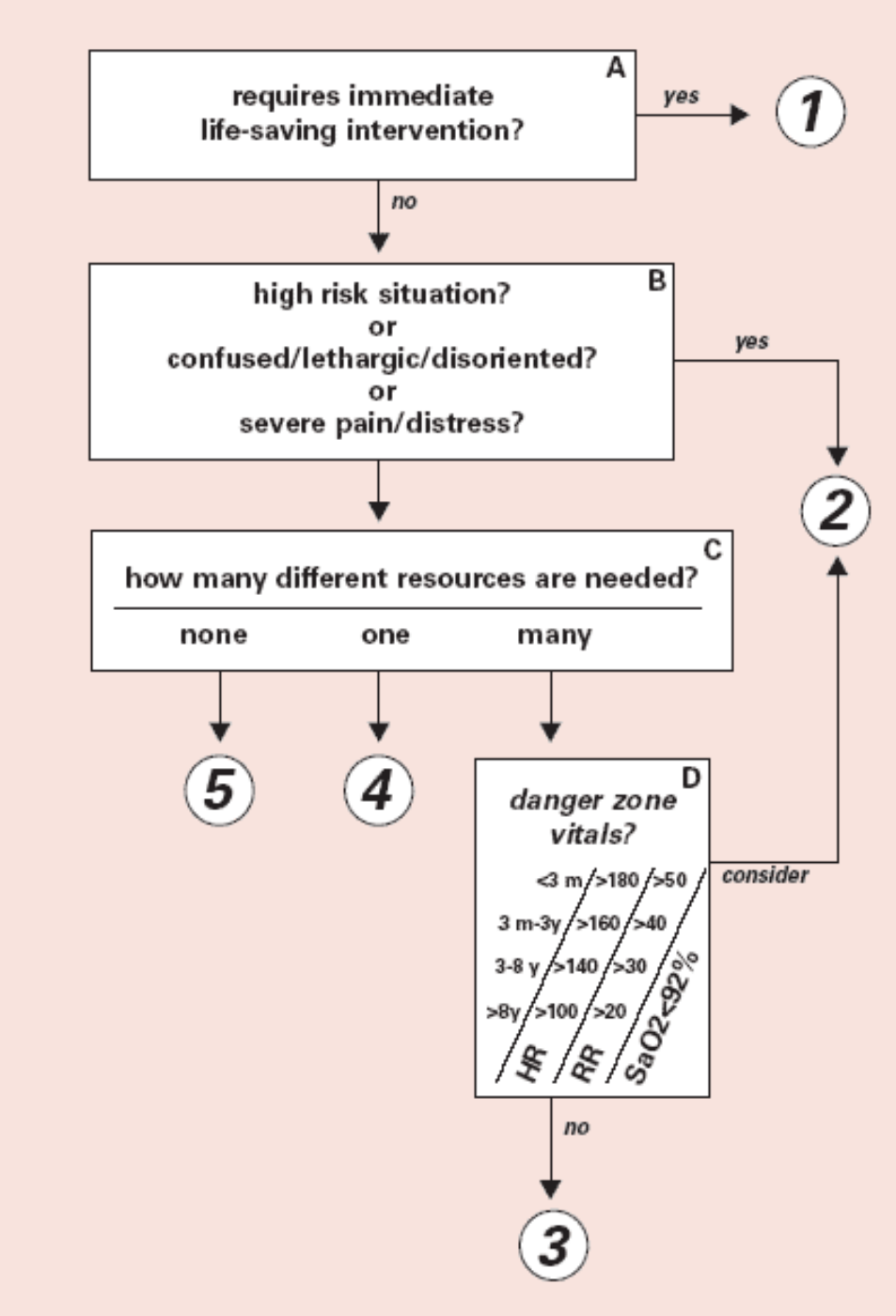

Figure 3. Emergency Severity Index (ESI) Algorithm

Notes:

A. Immediate life-saving intervention required: airway, emergency medications, or other hemodynamic interventions (IV, supplemental O2, monitor, ECG or labs DO NOT count); and/or any of the following clinical conditions: intubated, apneic, pulseless, severe respiratory distress, SPO_2<90, acute mental status changes, or unresponsive.

Unresponsiveness is defined as a patient that is either:
(1) nonverbal and not following commands (acutely); or
(2) requires noxious stimulus (P or U on AVPU) scale.

B. High risk situation is a patient you would put in your last open bed.

Severe pain/distress is determined by clinical observation and/or patient rating of greater than or equal to 7 on 0-10 pain scale.

C. Resources: Count the number of different types of resources, not the individual tests or x-rays (examples: CBC, electrolytes and coags equals one resource; CBC plus chest x-ray equals two resources).

Resources	*Not Resources*
• Labs (blood, urine) • ECG, X-rays • CT-MRI-ultrasound-angiography	• History & physical (including pelvic) • Point-of-care testing
• IV fluids (hydration)	• Saline or heplock
• IV or IM or nebulized medications	• PO medications • Tetanus immunization • Prescription refills
• Specialty consultation	• Phone call to PCP
• Simple procedure =1 (lac repair, foley cath) • Complex procedure =2 (conscious sedation)	• Simple wound care (dressings, recheck) • Crutches, splints, slings

D. Danger Zone Vital Signs
Consider uptriage to ESI 2 if any vital sign criterion is exceeded.

Pediatric Fever Considerations
1 to 28 days of age: assign at least ESI 2 if temp >38.0 C (100.4F)
1-3 months of age: consider assigning ESI 2 if temp >38.0 C (100.4F)
3 months to 3 yrs of age: consider assigning ESI 3 if: temp >39.0 C (102.2 F), or incomplete immunizations, or no obvious source of fever

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ED crowding is also a process of the ED that impacts quality (Hwang, 2010). When EDs reach capacity and patients experience long waits, quality of care may be impacted. This study will evaluate the impact of crowding using the National Emergency Department Overcrowding Score (NEDOCS) on the timeliness of pain treatment. The tool is discussed further in Chapter Two and a sample of the tool is available in Chapter Three.

The American College of Emergency Physicians (ACEP) defines crowding as the situation when the demand for emergency services exceeds available resources in the ED, hospital, or both. Crowding is due to both increasing acuity, as well as the increasing number of patients coming to the ED for treatment of acute illness and injury as well as chronic illnesses. Over the past several years, the complexity of the cases presenting to the ED have increased. Patients often present with higher severity of illness, and have more comorbidities and chronic diseases (Pines, Garson, Baxt, Rhodes, Shofer, & Hollander, 2007). These patients present a burden to an already over-burdened system requiring time-consuming evaluations and treatments and consultations (IOM, 2007).

The causes of crowding are numerous, diverse and often involve complex systemic factors. The outcomes of crowding are considered to lower quality and be potentially harmful to patients (Hoot, LeBlanc, Jones, Levin, Zhou, Gadd & Aronsky, 2009). The effects of crowding on certain populations and its influence on complex problems such as pain, remains uncertain. Researchers have suggested that minority populations are more adversely impacted by crowding (Hsai, Asch, Weiss, Zigmond, Liang, Han, et al, 2012). Moreover, researchers have found that in severe pain cases, quality of care is lacking with regard to treating pain and the timeliness of the treatment (Pines et al, 2007).

This study focused on the following outcomes variables:

- Pain reassessments
- Time to initial pain treatment
- Prescribing of Potentially Inappropriate Medications (PIMS) for older adults as described in the Beers Criteria

Time to initiation of pain treatment and pain reassessments are outcome measures in the study. Staff responsiveness is a measure of patient satisfaction (Bhakta & Marco, 2012). Patient satisfaction with pain management does not correlate with perception of pain relief in previously published studies. Rather, satisfaction is associated with the response of the ED staff to the patients' report of pain (Bhakta & Marco, 2012).

Prescribing of Potentially Inappropriate Medications (PIMS) for older adults is used to describe medications that have no evidence-based indication and carry a substantial risk of adverse reaction. The most widely cited criteria for PIMs are the Beers criteria that were recently revised in 2012. It should be noted that approximately 13 sets of explicit criteria for PIMS exist however some of them such as the Assessing Care of Vulnerable Elders (ACOVE) quality indicators, Zhan Criteria and Health Plan Employer Data and Information Set (HEDIS) criteria are reclassifications of the original (1997) and revised (2003) Beers Criteria. This study uses the PIMS list from the Beers criteria to identify PIMs prescribing in the ED sample.

Older adults are at risk for medication-induced morbidity and mortality (Nixdorff, et al, 2008). In spite of a growing body of evidence to support safer prescribing since the first Beers criteria was published in 1997, PIMS medication prescribing continues. One of the earliest studies using the 2003 revised Beers criteria (2003) for PIMS use found that 29% of older adults were taking a PIM upon arrival to the ED and 5.6% were prescribed a PIM upon discharge form the ED (Nixdorff, et al, 2008). In addition, Hall and Owings (2002) found that 12.6% of elderly ED patients were discharged with a PIM prescription.

NSAIDs, muscle relaxants and anti-anxiety medications on the PIMS list are of particular concern for pain treatment. Older adults require careful medication prescribing because of adverse effects of pain medications and drug-drug interactions. These factors contribute to the lack of prescribing of opioid medications for the elderly. Opioid analgesics may be administered via oral, intramuscular or intravenous routes and they include morphine, hydromorphone, acetaminophen with oxycodone, acetaminophen with codeine among those commonly prescribed in the ED.

In summary, patient characteristics, technical aspects of ED care, timeliness of pain treatment and PIMs prescribing are structure, process and outcome measures selected for this study. These variables are summarized in Table 1.

Table 1. Summary of the variables in the study.

Structure	Process	Outcomes
Patient characteristics age gender	**Technical process of care** Triage Pain-management guidelines	Achieve pain reduction- pain assessments
pain scale (NRS) Chief complaint Comorbities Polypharmacy Cognition	Patient flow/ wait times	Following guidelines Beers Criteria PIMs prescribing
Organizational characteristics- available RN staff to triage, initially assess patient, facilitate patient flow	Crowding	Time to initial pain treatment

Purpose of the Study

The purpose of this study was to evaluate quality of pain care older adults receive when they are admitted to the ED with self-reported moderate to severe pain. This study evaluated the timeliness of initiation of pain treatment and the reassessment of pain during the ED stay. A secondary aim was to evaluate the influence of age, gender and ED crowding on the quality of pain care.

Significance of the Study

Pain remains a worldwide public health epidemic in spite of years of dedicated research. Pain negatively affects physical, psychological, social and financial well-being yet is not adequately recognized and treated by healthcare providers (IOM, 2011). Unrelieved pain interferes with sleep and increases anxiety, depression, morbidity and mortality (Leveilee, et al 2009).

Some older adults think of pain as unavoidable. Still others think their pain is punishment for past sins (Deane et al, 2008). Nevertheless, every patient has the right to have his/her pain addressed by a healthcare provider. Patients and providers must be aware that there is a moral, ethical and legal obligation to addressing a patient in pain (IOM, 2011). The American Nurses Association (ANA) Code of Ethics provides the standards for ethical nursing practice (ANA, 2015).

Patients often wait long hours in EDs to see emergency providers and receive treatment. Between 1993 and 2003, ED visits increased 26%, from 90.3 million to 113.9 million (IOM 2007). During the same time, many hospitals closed their EDs, adding burden to those that remain open. As a result, fewer hospital EDs handle the increasing demand for ED services and due to the lack of primary care providers the demand for routine care (IOM, 2007).

Pain management of older adults has been identified as an issue for quality improvement in American EDs (Hwang, et al, 2010) . Recent studies evaluating the effect of ED crowding on pain management across all age groups have found that crowding delays the administration of pain medication. For older adults, such delays may put them

at greater risk of misdiagnosis and adverse events (Platts-Mills, Esserman, Brown, Bortsov, Sloane & McLean, 2012).

Assumptions

The investigator made the following assumptions in this study:

1. Older adults experience pain but may under-report pain when screened for it.
2. ED crowding increases the time to pain treatment and may negatively effects overall quality of pain care.
3. ED providers prescribe PIMS for older adults.
4. EDs comply with the JC pain standard.

Research Questions

1. What is the frequency of PIMs prescribing in the emergency department?
2. Do young, middle age, and older adults differ in the number of pain reassessments received in the ED after initial pain medication administration?
3. Does age influence wait time to initiation of pain treatment?
4. Does gender influence wait time to initiation of pain treatment?
5. Controlling for age and gender, does ED crowding predict time to initiation of pain treatment?

Summary

A multidimensional systems framework is necessary to evaluate the quality of older adult pain management in EDs. Understanding the impact of unique structure, process and outcomes on pain management of older adults in this setting has clear implications for clinical practice and subsequent clinical research.

Chapter 2

Review of the Literature

Overview

Pain care of the elderly is an aspect of ED care that is challenging and requires further investigation (Todd, Ducharme, Choiniere, Crandall, Fosnocht, Homel, and colleagues, 2007). Pain is difficult to measure because it is subjective and because, researchers have found, multiple influences play a role in pain assessment and subsequent treatment (Kitsch & Smith, 2008). Both acute and chronic pain are common among the elderly, each requiring different assessments and treatments (Curtis & Morrell, 2006). Typically, factors related to the quality of pain treatment have been studied independently across all age groups with retrospective univariate designs (Todd and colleagues, 2007, Samara, Chevalley, Samara, & Gold, 2010). ED pain management studies have focused on physician practices rather than on all ED providers. Research is limited on multi-factorial influences, interprofessional and Advanced Practice Registered Nurse (APRN) contributions to ED pain care of older adults.

Pain management is a quality indicator in emergency care. Pain assessment and treatment of older adults are documented indicators in need of improvement published by RAND researchers in 2000 in The Assessing Care of Vulnerable Elders (ACOVE) project (Terrell, Hustey, Hwang, Gerson, Wenger, Miller, and colleagues, 2009). Hospital-based EDs, like other areas of healthcare, are concerned about patient satisfaction and outcomes. Hospital administrators have attempted to decrease crowding

in EDs and improve patient satisfaction and quality of care. Patient satisfaction with pain treatment and timeliness of pain care are principal outcomes evaluated for quality (Quattrini & Swan, 2011, Blank, Mader, Wolfe, Keyes, Kirschner & Provost, 2001). No published studies have examined older adults' satisfaction with pain care.

To investigate these concerns, this study used an integrative framework to examine the relationship among patient, provider and ED characteristics, process of pain care and outcomes. This critical review of articles published primarily between 2005 and 2014 examined pain management practices, timeliness of treatment of pain, appropriateness of analgesia and adherence to pain assessment guidelines. Donabedian's framework of structure, process and outcomes, along with a review of related literature, framed this analysis.

Structure

Patient Characteristics

In the 2010 Census, people aged 65 and older accounted for 39.6 million or 12.9% of the US population. The Administration on Aging of the U.S. Department of Health and Human Services reports that one in every eight Americans is over the age of 65. By 2030 there will be 72 million older adults, and by 2050, when the final phase of the Baby Boomers reach 65, seniors will account for approximately 79 million, about one in five Americans (US Department of Health, 2010). The oldest population (those 85 years and over) is expected to increase to 17.7 million in 2050, accounting for about 5% of the population.

Older adults use EDs more and are more prone to adverse events than other age groups (Gruneir, Silver, Rochon, 2011). In spite of the rising number of older adults

receiving emergency care, seniors continue to receive suboptimal pain treatment in EDs (Hwang, Richardson, Harris & Morris, 2010).Older adults visit EDs for problems such as cardiac, respiratory, and cerebrovascular-related conditions and for fall-related injuries. Downing & Wilson (2005) report injuries account for 33.1% of ED visits among the elderly. Falls caused 71% of injuries in older patients but only 28% in younger ones. In the 85 and over age group, falls accounted for 83% of injuries. In all seniors, contusions and fractures were the most frequently reported injuries related to falls (Downing & Wilson, 2005).

Chronic diseases such as heart disease, hypertension, diabetes, arthritis and cancer are prevalent among those 65 and older (Shah & Hajjar, 2012) Prevalence statistics for persistent pain in older adults range from 25% to 80% (Bruckenthal, 2009). Helme and Gibson (2001) found that 29%-86% of people aged 75-84 and 40%-79% of people 85 older suffer from pain. No available studies address the number of older adults who visit EDs for chronic pain management or those who visit for acute pain with underlying chronic pain.

Pain is a common complaint among all ED patients and is thought to be more common among older adults (Helmes & Gibson, 2001). On the other hand, Jakobson and colleagues (2003) report that few investigators have studied this theory for people over age 75. Most studies suggest that pain is common and tends to increase with age. ED pain studies rarely include people over age 85. Race and ethnicity (Todd, 2001; Heins, Homel Safdar & Todd, 2009; Anderson, Green, & Payne, 2009) and co-morbidity and polypharmacy (AGS, 2002, 2012; Bruckenthal, Reid, & Reisner, 2009) are variables that

influence pain management. Because they were not recorded in the patients' chart, they could not e measured for this study. This is a limitation of the research.

Age. Researchers have suggested that advanced age negatively affects pain treatment (Platts-Mills, Esserman, Brown, Bortsov, Sloane, & McLean, 2012; Hwang et al, 2010, Cinar et al, 2012). Older adults over age 65 experience suboptimal pain care and the risk seems to go up with advancing age. Seniors over age 75 with multiple chronic conditions are at greatest risk for having pain under-assessed and under-treated (Platts-Mills et al 2011). Recently, Cinar et al., (2012) found that age did not influence quality of pain treatment. These researchers suggest that EDs need to evaluate pain care for all rather than focus specifically on older adults. It is important to determine if age remains a factor related to suboptimal pain treatment.

The older a patient is, the less likely she or he is to have pain adequately treated by ED providers. Age has been a risk factor for under-treating pain in emergency care for more than a decade (Jones, 1996, Rupp 2004, Hwang, Richardson, Harris & Morrison, 2010). Under-assessment and failure to recognize pain leads to inadequate treatment. In spite of years of acknowledging this problem, it persists.

Jones and colleagues (1994) studied whether older patients with isolated long-bone fractures were less likely to receive analgesia in the ED than a similar cohort of younger patients. The study concluded that analgesia use was more likely in younger than elderly patients (80% versus 66%, P =.02). This study also found that younger patients received more narcotic medications (98% versus 89%, P=.03) for pain treatment of long-bone fractures (Jones, Johnson & McNinch, 1994).

Hwang and colleagues (2010) similarly found a difference in pain care between younger and older adults. Older adults, aged 65-84, reporting moderate to severe pain were less likely than 18 to -64-year-olds to receive opioids (odds ratio = 0.44, 95% confidence interval = 0.22-0.88). Platts-Mills and colleagues (2012) found that patients 75 and older who visited EDs for pain-related conditions were less likely than patients 35 to 54 years to receive analgesia (49% versus 68.3%) or opioids (34.8% versus 49.3%). The differences in rates of analgesic and opioid administration persisted after adjustment for sex, race/ethnicity, pain severity and other factors and multiple imputations of missing pain-severity data. Patients 75 years of age and older were 19.6% (95% CI 17.8% to 21.4%) less likely than patients 35 to 54 to receive analgesia and 14.6% (95% CI 12.8% to 16.4%) less likely to receive opioids (Platts-Mills, Esserman, Brown, Bortsov, Sloane, McLean, 2012). This study showed that patient characteristics had a significant effect on under-treatment of pain in older adults. It provides the basis upon which to evaluate age, gender and pain severity in this study.

Other researchers have found that ED patients may decline pain care. Singer and colleagues (2008) concluded that nearly half of ED patients experiencing pain did not want analgesia. Those who wanted medications did receive them. In 392 patients reporting pain, 51% (n=199, CI 46% to 56%) desired analgesics while in the ED. Reasons for not desiring pain medications included already taking a medication prior to coming to the ED and 47% of participants said their pain was tolerable and declined medication. The mean age of participants was 39 years old. No studies have evaluated the desire for pain care among older adults.

Research on pain management cannot ignore the harmful impact of addiction and drug diversion on patients and providers. Kirsh & Smith (2008) said that abuse and addiction are no longer limited to the young. Prescription drug abuse at all ages is increasing nation-wide. Older adults with a history of past substance abuse, combined with current pain issues, need careful assessment. Moreover, adequate pain control is more difficult to obtain and maintain when patients are abusing substances including alcohol. Estimates of substance abuse in the general population range from 6% to 15%. Opioid-dependent people have a different response to painful conditions and may require higher doses of medication than those who are non-dependent (Curtis & Morell, 2006).

Some elderly patients may fear addiction to opioid drugs and intentionally withhold a report of pain. Others may seek drugs as a way to make ends meet for themselves or their families. Diversion of prescription drugs provide patients and their families with needed income. Often opioid medications prescribed for pain are sold (Gianutsos, 2009). This situation makes prescribers skeptical of patient reports of pain and leads to unwillingness to prescribe opioids even to those who are deemed in need of this class of medications (Kirsh & Smith, 2008). In personal conversations with ED prescribers, they report having "personal rules" of never providing opioid medications for patients in pain. These attitudes prevail as more "doctor shopping" to obtain narcotic medications occur across the county (McDonald & Carlson, 2013).

In this study, age is an important variable evaluated for its effect on overall quality measured by wait times. Age may influence wait times and clinical decision making behavior including prescribing as well as pain reassessment.

Gender. Gender is relevant in this study because previous studies show that it is a variable that may impact quality pain care. Raftery and colleagues (1995) found that female patients reported more pain and were perceived by providers to have more pain than male patients in the ED. Female patients also received more and stronger analgesia than males (Raftery, Smith-Coggins, Chen, 1995). In a small, mulit-center, prospective observational study in 19 EDs across the U. S and Canada, Safdar and colleagues found that female patients received more analgesia than men (74% vs. 64%). However, there was no difference between genders and frequency of pain assessments or in the amount of intravenous analgesia (Safdar, Choiniere, Crandell, 2006).

Race & Ethnicity. An extensive body of evidence documents racial and ethnic disparities in health care in the US. Studies have shown that members of minority racial and ethnic groups experience more barriers to accessing health care and often receive lower quality of care than white Americans (IOM, 2009). In spite of this knowledge, health care systems have not consistently captured data necessary for evaluation related to specific health concerns along racial and ethnic categories. In 1997 the Federal Office of Management and Budget (OMB) issued a set of standards for gathering racial and ethnic data in all federal data collection. However there has remained an inconsistency in health care data collection. See Table 2.

Table 2. The OMB classification of data is based on the following categories.

1. Ethnicity
    - Hispanic or Latino
    - Not Hispanic or Latino

2. When race and ethnicity information is collected separately the following minimum choices offered for race
    - American Indian or Alaska Native
    - Asian
    - Black or African American
    - Native Hawaiian or Other Pacific Islander
    - White

To address this concern and acknowledge the challenges of accurately collecting data on ethnicity and race, The Institute of Medicine (IOM) formed a subcommittee and subsequently published *Race, Ethnicity and Language Data: Standardization for health Care Quality Improvement* (IOM,2009) . In the report, the subcommittee recommends collection of more than ethnicity and race to include language, sex and disability. The IOM specifically calls on health care agencies to collect data that will allow for analysis of quality data to reduce or eliminate disparities.

How racial and ethnicity data is collected is an essential part of ensuring accurate and meaningful data. Race, ethnicity along with sex, preferred language and disability are all data elements that must be collected. It is recommended that patients are provided with a rationale for collecting this data and that correct wording is used (IOM, 2009):

"We want to make sure that all our patients get the best care possible. We would like you to tell us your racial/ethnic background so that we can review the treatment that all patients receive and make sure that everyone gets the highest quality of care."

The OMB recommends asking ethnicity before race and asking which category of race best describes the person. One or more categories of race may be checked. The option to decline to answer race and ethnicity is also recommended. Checking M or F without asking "What is your sex" may seem useless but is in fact necessary for consistent, accurate data collection. Along those lines, asking the preferred language the person would like to use when he/she is communicating with the ED staff along with the need for an interpreter is essential. Finally asking about disability with five (5) separate questions is part of the IOM recommendation.

Based on the findings in the literature, it is acknowledged that race and ethnicity may have an influence on pain care, however, the data is not accurately collected in the current EHR used in the study. Race is checked off by the registration staff without asking the patient to identify race and ethnicity. Therefore, race and ethnicity data is not collected and is discussed as a known limitation of the study.

Comorbidities and polypharmacy. Older adults bear a greater disease burden than younger people. Chronic disease develops and accumulates with advancing age (Working Group on Health Outcomes for Older Persons with Multiple Chronic Conditions, 2012). Both comorbidity and polypharmacy have been linked to factors that influence quality care. Older adults are at increased risk for medication-induced morbidity and mortality (AGS, 2002, 2012). Comorbid disease can affect drug metabolism (Fowler, Durham, Planton & Edlund, 2014). There is limited data on the scope of adverse drug events in older people treated in EDs.

Many older adults are frail, have more than one chronic disease and receive multiple medications. In the US, 60% of older adults receive five or more drugs and approximately 20% take 10 or more. Approximately one in three older adults who are living in the community and taking at least five medications will experience an adverse drug reaction annually. Serious adverse drug reactions cause up to 17% of hospital admissions (Scott, Gray, Martin, Mitchell, 2012).

Polypharmacy increases the likelihood that older adults will receive potentially inappropriate medications (PIMs). The 1997 Beers Consensus Criteria for inappropriate medications found that 10.6% of older adults were taking a PIM upon arrival in EDs, and 5.6% were prescribed a PIM upon discharge (Nixdorff, Hustey, Brady, Vaji, Leonard, Messinger-Rapport, 2007). A later study found that 12.6% of older adults received PIM prescriptions (Hastings, Sloane, Goldberg, Oddone & Schmader, 2007). More recently, Chen and colleagues found that approximately a third of seniors were taking PIMs when they presented to the ED (Chen, Hwang, Lai, Chen, Li Chen, 2009) They found that between 2001 and 2004, PIM-prescribing occurred in 19.1% of 202 million ambulatory care visits among Taiwanese older adults. Data suggest that in general approximately 20% of adults over age 65 use prescription NSAIDs and this number increases when over the counter NSAIDs factor in (Fowler, Durham, Planton, & Edlund, 2014).

While comorbidity and polypharmacy both can affect quality care of older adults, this study does not specifically evaluate them as independent variables linked to under-treatment, PIMs prescribing, and under-assessment of pain. This study acknowledged the impact of these variables as possible contributory factors but their specific analysis was deferred in order to isolate patient characteristics of age and gender.

Pain Assessment. The personal experience of pain is often difficult to describe, and the words that describe pain rarely capture all the nuances of pain (IOM, 2011). Older adults may be reluctant to report pain despite substantial physical or psychological symptoms (Deane & Smith, 2008). Many older adults expect pain with aging and do not believe that their pain can be alleviated. Some people accept pain and suffering as atonement for past actions (AGS, 2002). While self-reports of pain remain the ideal way for ED personnel to evaluate pain, it is advisable for providers to ask relatives and other caregivers of older adults about pain and its effect on daily living (Deane & Smith, 2008, AGS, 2002) . This is important because older adults may be reluctant to report pain out of fear of medications or further diagnostic work ups (AGS, 2002).

Inadequate pain assessment is one of the major factors of under-treatment of pain (Singer, Garra, Chohan, Dalmedo, Thode, 2008). In spite of the complex nature of pain comprised of sensory, emotional and psychological factors, screening for pain with a 0–10 pain intensity numeric rating scale (NRS) is the accepted standard in emergency care. Pain screening is used to improve the quality of pain management by systematically identifying patients with pain and evaluating the effects of pain treatment (Herr,2011).

Assessment of pain is a general principal of evidence-based pain management guidelines (AGS, 1998, 2002). According to the American Geriatric Society Panel on Persistent Pain in the Elderly (2002), the goal of pain assessment is to provide successful pain management through pharmacologic and non-pharmacologic means. Bruckenthal (2008) further summarized the four goals of pain assessment as:

1. Determine the presence and cause of pain.

2. Identify exacerbating comorbidities.

3. Review beliefs, attitudes and expectations regarding pain.

4. Gather information that assists and influences an individualized pain treatment plan.

The inaccurate assessment or lack of assessment of pain is a major predictor of insufficient pain treatment (Decosterd, Hugli, Tamches, Blance, Mouhsine, Givel, and colleagues, 2007). Decosterd and colleagues (2007) found that with a dedicated pain guideline in use in the ED, pain was more frequently assessed and analgesia administration increased from 40% to 60 % in patients with a report of pain (difference 23%; 95% CI 13% to 32%). Herr & Titler (2009) found that pain assessments improved in patients with hip fractures when the Joint Commission (JC) implemented the standard for pain assessment (n=1395), however 54.8% (n=764) of patients had no documented pain assessments.

Cognitively intact and impaired older adults require different approaches and tools for pain assessment. For both, self-report of pain remains the standard (Herr, 2011). The American Geriatrics Society principles of pain assessment in older adults includes the statement, "the most accurate and reliable evidence of the existence to pain and its intensity is the patient's report. Even patients with mild to moderate cognitive impairment can be assessed with simple questions and screening tools" (AGS, 2002). Pain is a subjective and multidimensional phenomenon. The subjective nature of pain leads to difficulties in measurement. Pain assessment instruments used in the clinical setting transform subjective information into measurable data.

In the mid-1990s, pain intensity became the fifth "vital sign" (Chisholm, Weaver, Whenmouth, Giles, Brizendine, 2008). Unlike other vital signs, pain is self-reported. Most often, a patient is asked to verbally rate pain on a scale of 0-to-10. Frequently, nurses and other providers look for changes in the other vital signs (temperature, heart rate, respirations and blood pressure) to validate the physiologic basis of pain. The absence of these findings does not necessarily coincide with low pain-intensity ratings, but may influence the level of severity assigned at triage and the subsequent management of pain.

Pain intensity is the only feature assessed using the single-dimensional NRS tool. The NRS is quick and easy to administer. It is a self-report tool with "0" being no pain to "10" being the worse pain ever experienced. Pain in the 1-3 range is considered mild pain, 4-6 indicates moderate pain and 7-10 is the highest level or severe pain. A change of 2 points on the NRS after treatment with analgesia is clinically significant (Cinar et al, 2012). See Figure 2.

The NRS is widely used across most practice settings, including primary care, urgent care and emergency care in the US (IOM, 2011) It is the accepted assessment tool used for the JC Pain Standard. No one scale is suitable for all patients but the NRS has become the universal screening tool. It has become the standard for pain screening across healthcare settings for adults of all ages, languages and cultures.

Three self-report tools have been researched by Herr & Mobily (1993), Taylor & Herr (2003) and Kahl & Cleland (2005) and recommended for use across practice settings.

- The numeric rating scale (NRS), which has become the scale of choice for most practices, including the ED.

- The visual analogue scale (VAS).
- The Faces Pain Scale - Revised (FPS-R).

The NRS asks patients to rate their pain by assigning a numerical value to pain with zero(0) being “no pain” and ten (10) being “pain as bad as it could be.” (Herr, 2011). Among these three scales, several researchers have demonstrated concurrent validity between 0.56 and 0.90 with the lowest correlation found between the FPS-R and the other scales, suggesting that the FPSR may be measuring a broader construct incorporating pain. Test-retest reliability was demonstrated with coefficients ranging from 0.75- 0.89 ((Taylor & Herr, 2003; Taylor, Harris, Epps & Herr, 2005; Ware, Epps, Herr & Packard, 2006).

Since there is no gold standard or criterion test measure, criterion validity has not been established for the NRS. However, when correlated with the VAS, the NRS is determined to have 0.79 to 0.95 convergent validity. Despite the ease of administration and scoring of the NRS, individuals with cognitive deficits may have difficulties interpreting the numbers and words on the scale (Kahl, Joshua & Cleland, 2005).

In addition to a pain intensity rating the American Geriatric Society (AGS) recommends a pain history that includes pain characteristics, location, aggravating and alleviating factors, and associated signs and symptoms. It is also important to assess the impact of pain on the older adults’ performance of activities of daily living (ADLs). In contrast to the NRS, VAS and FPS-R, the McGill Pain Questionnaire (MPQ) extends beyond measuring pain intensity to measuring pain as a multidimensional variable.

The MPQ measures three primary dimensions of pain: sensory, affective and evaluative. The original version of the questionnaire, developed in 1975, took between 10

and 15 minutes to administer. In 1987, a revised version was published which takes about two minutes to administer. EDs do not utilize the MPQ where rapid assessment is needed. Since the MPQ has high validity and reliability and can provide both qualitative and quantitative data, ED providers may find the MPQ short form useful in the assessment of older adults with chief complaints of pain.

The short form of the MPQ contains 15 sensory and affective descriptors of pain. It has high correlations with the original version with correlation coefficients varying from 0.67 to 0.90. It has sufficient sensitive in its ability to demonstrate changes after treatment. The short form of the MPQ does not replace the original but is an alternative when time of administration is a concern (Kahl & Cleland, 2005).

In summary, patient characteristics of age and gender (which are influenced by comorbidity, frailty, and polypharmacy) in addition to the elderly's perceptions of pain may contribute to inadequate pain care in the ED. Moreover, inadequate assessment of pain using only a single dimensional scale measuring intensity may contribute to poor pain treatment. This study will focus on patient characteristics of age and gender on pain care of older adults reporting moderate to severe pain on the NRS at time of triage.

Provider Characteristics

Despite efforts by the Joint Commission (JC) to assure better pain management, under-treating pain is an epidemic in America (IOM, 2011). This tragic phenomenon begins with the priority and response to pain by healthcare providers. The under-treatment of pain was first identified by two psychiatrists in a landmark study published in 1973 (Marks, Sacher, 1973).While health care providers have a moral imperative to address pain, they are subject to bias, knowledge deficits and differences in the systems

in which they work (IOM, 2011). They may lack a comprehensive perspective on pain. The committee on Advancing Pain Research, Care and Education recognized the need for new tools to define, diagnose and monitor pain and its consequences, as well as for new approaches to treating and preventing pain (IOM, 2011).

Specific to the ED, in 1989 Wilson and Pendleton first studied what they called "oligoanalgesia," or the lack of treatment for pain. They retrospectively analyzed the charts of 198 patients. Fifty-six present did not receive analgesic medications while waiting in EDs. Sixty nine percent waited for more than an hour before receiving analgesia, and 42% waited for more than two hours. Of those receiving analgesia, 32 % received less-than-optimal doses (Wilson & Pendleton, 1989). In 1994, Lewis and colleagues found similar results. In patients with acute fractures in eight EDs, only 30% of 121 patients studied received analgesia during the visit. This was the first study to acknowledge a "failure to acknowledge pain" among ED providers (Lewis, Lasater, & Brody, 1994). The problem persists.

Many myths about older adult pain, insufficient knowledge about pain management and inadequate application of knowledge contribute to the lack of effective pain management in EDs. Providers fail to acknowledge pain when they (Motov & Khan, 2009):

- Do not adequately assess pain
- Do not use pain management guidelines
- Do not document pain
- Do not reassess treatment adequacy
- Do not understand patient expectations about pain management.

Advanced Practice Registered Nurses (APRNs) and Physician Assistants (PAs) are among the ED providers who treat pain. These providers have increased in numbers in EDs in recent years. Researchers have focused on the APRN role in increasing quality of care related to decreased wait times (Quattrini & Swan, 2011) however APRN practice patterns related to outcomes such as quality pain management have yet been evaluated.

Nurses may underestimate pain levels because of professional detachment, a protective mechanism they have developed as a way of dealing with other people's pain (Bourgault, Lavoie, Paul-Savoie, Gregoire, Gosselin and Johnston, 2015). Also, psychological distress among ED personnel may influence empathy and the ability to deliver high quality pain care. While nurses are thought to be the health profession with the highest empathy levels, recent studies suggest this may not be the case. In fact, ED nurses demonstrate poorer mental health, higher levels of distress and decreased empathy (Bourgault, et. al, 2015) compared with the general population and other nursing cohorts. These characteristics may impact their ability to effectively address pain in the ED and warrant further investigation.

Prescribers of ED Pain Treatments. APRNs began practicing in the EDs in the 1970s (McGee & Kaplan, 2007). In order to improve efficiency, EDs hired NPs to streamline care for non-emergent situations (McGee & Kaplan, 2007). The majority of those NPs work in fast track and urgent-care centers.

APRNS in the ED, along with MDs and PAs, have the authority to diagnose and treat pain by prescribing analgesics. To date, ED pain studies have focused on physicians and their potential associated biases affecting quality of pain care.

In a qualitative exploratory study of four hospitals in southwestern Washington State, McGee & Kaplan (2007) studied NPs in EDs. All four ED managers said that the hospital contracted with outside physician groups who ultimately employed the NPs. Therefore, the decision about hiring NPs was the purview of the physicians, not management. All four said they faced overcrowding, with between 27,000 and 65,000 visits a year, 25-40% of which were triaged as non-emergent using a 5-tier triage system (see Figure 6 below). One ED manager called these non-emergent visits "Visits for problems that can be handled by an NP – chronic pain patients, lacerations, sprains, strains, more minor kinds of things" (McGee & Kaplan, 2007).

The goal in utilizing APRNs in the ED is teamwork to provide the right care to the right patient in the right time. Most research to date on the APRN care of ED patients has focused on the NP role and their ability to perform at the level of MD providers (Abbott, Schepp, Zierler & Ward, 2010; Abbott & Zierler, 2010; Campo, McNulty, Sabatini & Fitzpatrick, 2008). Other research has focused on the cost savings associated with hiring APRNs versus physician providers (Carter & Chochinov, 2007; Tsai, Sullivan, Ginde & Camargo, 2010). There are no current studies to evaluate APRN contributions to patient outcomes such as effective pain management among older adults.

Researchers agree that the upswing in utilization of APRNs in the ED have had positive effects on cost and the ability to more efficiently manage minor illness and injuries. (Quattrini & Swan, 2011). There is a need for more studies that evaluate APRN practice as ED providers to important care aspects such as pain management. No studies evaluate APRN knowledge and perception of pain care in the elderly or the delivery of pain care in the EDs. Furthermore, few studies evaluate specific APRN contributions to

quality outcomes including patient satisfaction and improved wait times (Tsai, Sullivan, Ginde, & Camargo, 2010)

In summary, it is acknowledged in this study that provider characteristics such as types and staffing levels in the ED may affect the quality of care especially related to wait times. These variables, however, are not included in this study as much emphasis on patient flow and staffing have been addressed through research and ongoing initiatives such as the Robert Wood Johnson Foundation's Urgent Matters Initiative (Quattrini & Swan, 2011). Rather, this study will focus on patient- related factors specific to pain which prior published studies acknowledge need further investigation (Hwang et al, 2006; Hwang et al, 2008, Platts-Mills et al, 2012).

Process

Triage

EDs rely on a triage system to provide the right care in the right time. It has become increasingly necessary for triage providers to include reassessments of patients after the initial triage for changes in status when wait times are long. Moreover, reassessments are necessary to comply with the JC standard. The current, widely used five-level system of triage, known as the Emergency Severity Index (ESI) is designed to best serve acutely ill and injured patients (Gilboy, Travers, & Rosneau, 2011). The ESI algorithm yields rapid, reproducible and clinically relevant stratification of patients into five groups, starting with the most severe (Level 1). The ESI has been shown to be valid and reliable for the general ED population. Although EDs use the ESI for all patients, its validity and reliability remains in question for older adults. Platts-Mills et al, 2010 evaluated the accuracy of ESI to identify older adults requiring a life-saving intervention.

In this study of 782 patients over the age of 65 specificity was high (99%) but sensitivity was low (42%).

All patients presenting to the ED are triaged by a registered nurse (RN) and assigned an ESI score. The ESI requires a pain assessment in the second tier of the assessment (see Figure 3). If severe pain or distress exists, the decision can be made to increase the triage severity level. The latest version of the ESI Implementation Handbook (Gilboy, Tanabe, Travers, & Rosenau, 2011) devotes considerable time to discussing the evaluation of pain and the decision to move a patient up in the severity index to be seen sooner. All patients with a pain assessment of "severe" (pain score of greater or equal to seven on the NRS) should be considered for assigning an ESI score of two which means they should be seen sooner than someone with an ESI score of three, four or five. This may or may not happen because of the subjective nature of pain.

ED triage RNs provides the first pain assessment for a presenting patient. With increased demand on EDs, long wait times and the phenomena of crowding, decision-making around moderate to severe pain in older adults remains unclear. The clinical judgment of the triage RN prevails in determining whether the level of pain presents a high-risk situation (Gilboy et al 2011).

According to the ESI handbook (2012), patient reports of pain ratings of 7 to 10 (severe pain) on the NRS may be triaged as a level two "but the triage nurse is not required to assign a level-2 rating." The triage RN asks the patient upon arrival if he or she has pain. A positive response to this question triggers the nurse use the NRS to assign a pain intensity score. Triage nurses are instructed to observe for physical signs of pain such as grimacing, crying, diaphoresis, body posture and changes in vital signs. The RN

then asks, “Would I give my last open bed to this patient?” If the answer is yes, then the patient meets the criteria for a level two on the ESI.

Initial pain assessment is critical to the pain care the patient will receive while in the ED. Triage happens very rapidly, perhaps too rapidly to acquire information about a person’s pain. A few studies have evaluated the ESI with an older adult population. Platts-Mills and colleagues (2010) evaluated 782 patients over the age of 65 years and found the ESI accurately identified elderly patients requiring a life-saving intervention. While specificity was high (99%), sensitivity was poor (42%). This suggested the need for further evaluation of the performance of ESI in elderly patients.

ED Crowding

The phenomena of ED crowding first received attention in the US in the late 1980s. At that time sporadic reports of ambulance diversions due to ED closures appeared in the media. Since then, crowding in EDs has been a significantly increasing problem. Ten percent to 30% of hospitals in almost every state report daily crowding. More than 90% of hospital administrators report crowding results in patients in hallways, maximum capacity of ED beds, and long waits by patients. (Olshaker, 2009).

ED crowding has been linked with negative patient outcomes (Dickinson, 1989; Gallagher & Lynn, 1990). The American College of Emergency Physicians says that crowding occurs when the identified need for emergency services exceeds available resources. (ACEP, 2006). Bottlenecks within the healthcare system – rather than the number of patients seeking care – are the primary causes of crowding.(GOA, 2003; IOM, 2006; Hoot & Aronsky, 2008). Moreover, ED crowding delays analgesic therapy for

patients with severe pain (Pines & Hollander, 2008; Hwang, Richardson, Sonuyi, & Morrison, 2006; Hwang, Richarson, Livote, Harris, Spenser & Morrison, 2008).

Pines and Hollander (2008) found that during times of higher ED occupancy analgesia might not occur before one hour from triage. Hwang and colleagues (2006) found that in crowded EDs, patients 50 and older with hip fractures were less likely to receive analgesia than during quieter times. Another study by Hwang and colleagues (2007) found more than one-hour delays from arrival to physician pain-assessment, analgesia ordering and administration of analgesia during periods of high ED census. No further studies have examined the adverse effects of crowding on older adults reporting moderate to severe pain.

A consistent approach to defining and measuring ED crowding was needed once the problem began to be more widely studied. A consistent approach to defining ED crowding helps to distinguish among causes, characteristics and outcomes. There was no standardization and generalizable definition of crowding across ED settings. As crowding began to be studied, a method to quantify the problem was needed (Weis, Ernst, Richards & Nick, 2002). Between 2003 and 2004, Weiss et al evaluated the National Emergency Department Overcrowding Score (NEDOCS), a statistical calculation and the ED Work Index (EDWIN), a formula-based calculation.

NEDOCS consistently performs high on reliability testing (Weis, Ernst, Todd & Nick, 2006) and has been widely accepted by many academic medical center EDs. The Federal Emergency Management System (FEMA) has also adopted NEDOCS. Weiss and colleagues (2006) compared the NEDOCS and EDWIN scales to an overcrowding

measure that was a composite of physicians' and charge nurses' expert opinions on crowding. They measured crowding on a 100 mm visual analogue scale (VAS).

Crowding was measured at the midpoint of 50 mm (≥50mm = crowded; <50 mm=not crowded). These researchers completed 130 sampling times over ten days. The over-crowding measure indicated that the ED was crowded 62% of the time. The area under the curve for the NEDOCS was 0.83 (95% CI=0.75 to 0.90) and the area under the curve for the EDWIN was 0.890 (95^ CI= 0/73 to 0.88). The NEDOCS score accounts for 97% of the prognostic information provided by combining all variables used in each model into one combined model. The EDWIN score accounts for only 86% (x^2 test for difference, p=0.02). The study concluded that both scales correlated well with each other and showed good discrimination for predicting ED overcrowding. The preferred scale by ED administrators was the NEDOC (Weiss, Ernst, Todd & Nick, 2006).

The significance of triage and crowding are important ED processes evaluated in this study. Triage begins the enrollment of the subjects and the ED visit. It is the process during which the initial pain score is documented and begins the start point for time to initiation of pain treatment. ED crowding has the potential to impact wait times and delays for patients from the beginning to the end of the ED visit. The study will calculate the NEDOCS for each patient enrolled in the study during triage.

Outcomes

A critical factor of managing pain in the ED is meeting patients' needs and satisfying their expectations (Soremekun, Takayesu, & Bohan, 2011). ED patients have higher expectations of pain relief than those with postoperative pain. Fosnocht and colleagues (2004) found that ED patients expect a mean pain relief of 72%. ED patients

also expect pain relief as soon as possible – 23 minutes, in fact – after arrival, while the actual time is 78 minutes (Fosnocht, Heaps & Swanson, 2004). Blank and colleagues (2001) showed that 60% of patients went home from the ED fast track (a separate process in the ED where patients with less severity are treated) with more pain than upon arrival. In this study more pain was defined as "more than willing to accept" and this was linked to an initial expectation of pain relief. In this study, 51% of patients were offered pain medications; yet only half reported adequate pain relief which may be attributed to their expectations (Blank et al, 200).

Standards and Guidelines

Pain Relief Ladder. The World Health Organization (WHO) Pain Ladder was developed in 1986 as a conceptual model to guide the management of cancer pain. There is now a worldwide consensus promoting its use for the medical management of all pain. This three-step approach of administering the right drug in the right dose at the right time is the foundation of pain management (Vargas-Shaffer, 2010). Step one addresses mild pain with the recommended use of over the counter medications such as acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDS). Step two moves to opioid medications to relieve moderate pain and step three addresses severe pain with stronger opioid medications. See Figure 4.

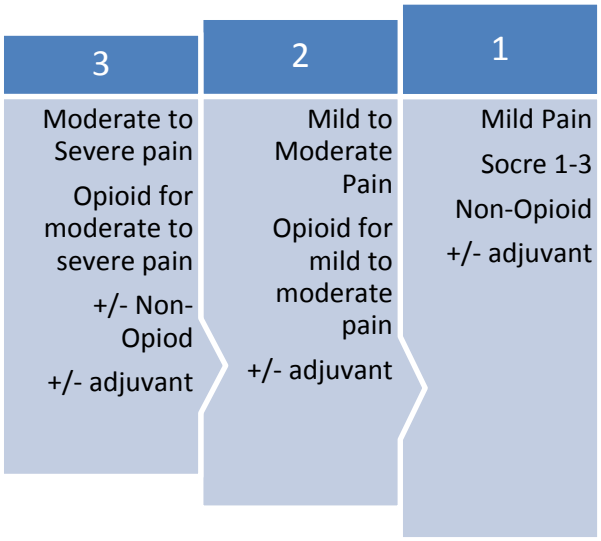


Figure 4. WHO Pain Relief Ladder

Older adults are commonly prescribed NSAIDS but these medications can cause complications and adverse events (AGS, 2012). The treatment of moderate to severe pain may require the use of opioid medications. There are some complications associated with the use of opioid medications in older adults such as constipation but often prescribers are reluctant to use these medications because of fears of falls and other adverse outcomes (Buckenridge, Huang, Kelome, Reidel, Verma & Winslade et al 2010). See Table 3 for commonly prescribed opioid medications.

Table 3. Commonly prescribed opioid medications (adapted from Thomas Jefferson University Hospital Adult Pain Management Guidelines).

	Medication	Usual Route	Adult Dose	Comments
Opioids for Mild to Moderate Pain	Codeine	PO or Injection	30-60 mg q 4-6 hours	Considered weak analgesic
	Tylenol #3	PO	30-60 mg q 4-6 hours	
	Hydrocodone	PO	5-15 mg of hydrocodone q 4-6 hours	Considered less potent and shorter duration of action than morphine
	Tramadol (Ultram)	PO	50-100 mg q 4-6 ours	Contraindicated with seizure risk
Opioids for Moderate to Severe Pain	Hydromorphone (Dilaudid)	PO, IV, PR	PO 1-2 mg q 3-4 hours IV: 0.5-1 mg q 3-4 hours PR: 3 mg q 6-8 hours	Slightly shorter duration of action than morphine
	Morphine	PO, IV, PR	PO: 10-30 mg q 3-4 hours IV: 2-5 mg q 2-4 hours PR: 5-10 mg q 4-6 hours	Caution in renal failure-metabolites may accumulate leading to increased sedation, confusion, respiratory depression, pruritus
	Oxycodone (Percocet)	PO	5-10 mg q 3-4 hours	

The Joint Commission Pain standard. The JC Pain Standard has been in effect since 2001. The pain management standard addresses the assessment and management of pain in accredited institutions. The pain management standards require that patients be asked about pain. EDs screen every patient for pain in triage. Researchers have questioned the providers' appreciation of pain versus the desire to comply with recordkeeping (Chisholm, Wenmouth & Brizendine, 2008). It is unclear how the JC standard is met in EDs. Registered nurses administer analgesia and record pain responses. While this meets the expectation of the JC standard, it is unclear if patients are satisfied with the pain care they receive or if providers fully assess older adult pain and adequately treat it (Terrell et al 2009).

The development of national pain assessment and management standards implemented by the JC in 2001 exerted a major impact on healthcare settings in the US. The standards require accredited health care facilities

- To recognize the rights of patients to appropriate assessment and management of pain (Standard R1.2.10).
- To assess pain in all patients (Standard PC.8/10).
- To record the assessment in a way that facilitates regular reassessment and follow-up.
- To educate patients, families and providers (Standard PC.6.10).
- To establish policies that support appropriate prescription or ordering of analgesia (Standard MM3.20).
- To collect data to monitor the appropriateness and effectiveness of pain management (Standard P1.1.10) (The Joint Commission, 2008).

In 2014 the JC published an update to the pain standard that affects ambulatory care. It clarifies pain management as an important component of patient-centered care. Effective January 1, 2015 Standard PC.01.02.07 states that the organization assesses and manages the patient's pain and patients can expect that their health care provider to involve them in the assessment and management of their pain. (http://www.jointcommission.org/issues/article.aspx?Article=5jrML%2FbvKl4ATIYK2naEubuQGABzkaljf6n8eP%2BdPuQ%3D) A new element of performance (EP) has also been added to the standard and states that the organization either treats the patient's pain or refers the patient for treatment. The standard also recognizes pharmacologic (non-opioid, opioid, and adjuvant analgesia) and non-pharmacologic interventions. Another important revision of the standard is that the JC added that strategies to address a patient's pain should reflect a patient-centered approach and consider the patient's current presentation, the health care providers' clinical judgment, and the risks and benefits associated with the strategies, including potential risk of dependency, addiction, and abuse.

A study by Curtis and colleagues (2007) investigated the effect of a protocol-driven pain-management program on time to initiation of analgesia among trauma patients. The results showed that utilizing the protocol resulted in a decrease in the time from 53.61 minutes to 27.94 minutes ($p=0.001$). The percentage of patients receiving analgesia within the first 30 minutes increased from 44.4% to 74.6% ($p<0.001$).

Regardless of the JC standards, EDs may continue to under-assess and under-treat pain. Todd and colleagues (2007) reported that in 17 EDs in the US and Canada, initial pain assessments improved but reassessment of pain intensity did not. Only 60% of

patients who reported moderate to severe pain received analgesics, and 74% of patients were discharged in moderate to severe pain (n=2841).

Decosterd and colleagues (2007) found that in patients evaluated pre- and post-pain intervention, only 61% of nurses' notes and 76% of physicians' notes documented pain pre-intervention. Post-intervention documentation was slightly higher, with 78% to 85% (difference 17%; 95% CI, 8% to 26%/2% to 17% respectively).

Healthcare Effectiveness Data and Information Set (HEDIS). HEDIS is a standardized set of performance measurements developed by the National Committee for Quality Assurance (NCQA, www.ncqa.org) to evaluate consumer health care. There was an update in 2014 to the measure for Care for Older Adults (COA). The change aligns the measure with guidelines that all older adults should be assessed for any current or new pain, regardless of a current pain treatment plan. Moreover, the guideline changes the language from pain screening to pain assessment indicating that pain needs more than a quick screening with initial evaluation.

HEDIS is a set of nationally recognized performance measures developed and maintained by the National Committee for Quality Assurance (NCQA). HEDIS is used by over 90% of US health plans to measure quality of care, access to care, and satisfaction with care. Surveys of patients evaluate their overall satisfaction with pain management. In addition, HEDIS has a published list of Potentially Harmful Drug-Disease Interactions in the Elderly that align closely with medications on the Beers list and can be used by clinicians in ambulatory care settings.

HEDIS measures address a broad range of important health care issues including care of older adults and medication management. HEDIS is the most widely used quality-measurement system and focus primarily on process measures. Only one could be described as an outcome measure: specifically, the count of prescribed medications among elderly patients that appear on the high-risk medication list (National Committee for Quality Assurance, 2011).

Beers Criteria. In 1991 Mark Beers, MD, a geriatrician first published the Beers Criteria, which focused on nursing home residents, identifying medications that posed risks that outweighed potential benefits. The criteria have been the most consulted source of information about the safety of prescribing medications to older adults (Resnick & Pacala, 2012). They are not prescriptive lists of medications and not meant to replace clinical judgment when prescribing. Rather, the criteria aims to alert providers of potential risks.

Practicing clinicians in all ambulatory and institutional settings caring for older adults should use the Beers Criteria. An eleven member interdisciplinary expert panel used an extensive review of the literature to update the new 2012 criteria (AGS, 2012). Using the updated literature, the experts developed the following lists (See Appendix A for complete revised Beers Criteria published by AGS, 2012):

- PIMS- 34 medications that are "potentially inappropriate" for the elderly. Prescribers should avoid these drugs.
- Medications used for 14 common health problems that are potentially inappropriate- they may make existing conditions worse.

- Fourteen types of drugs that are potentially inappropriate and should be used only with caution in older adults- these cause medication-related problems.

Since adverse drug events are common in the elderly, it is important to evaluate how analgesia choices affect their risk. The Beers criteria are useful in evaluating potentially inappropriate medications prescribed to the older adult population. Many studies have shown an association between prescribing potentially inappropriate medication and adverse outcomes in older patients (Terrell et al 2006). The criteria provide an efficient way of targeting patterns of prescribing for which safer alternatives might be available. The Beers criteria has not been widely accepted in EDs.

Potentially inappropriate medications (PIMs) continue to be prescribed and used as first-line treatments for older adults in spite of evidence of poor outcomes. The 2012 American Geriatric Society (AGS) Beers Criteria are intended for use in all ambulatory and institutional settings of care for populations aged 65 and older in the United States. The updated Beers criteria contain 53 medications or medication classes that are inappropriate for use in older adults. Forty percent of older adults received one or more medications on the PIMs list (AGS, 2012).

Inadequate documentation of pain is a contributor to poor pain management (Iyer, 2010). Failure to assess pain limits the ability of providers to treat pain. However, the correlation between pain documentation and lower pain levels has not been studied. Iyer (2010) found that pain scores were documented for older adults only 75% of the time (n=5661). The study showed that the older patients were less likely to have their pain

documented. Patients in the age group of 65-70 years were 1.55 times more likely to have pain documented than older patients (OR 1.55; 95% CI:1.30, 1.84).

Evaluation of Pain Care

Adherence to JC Guidelines are important criteria to ensure that minimum pain assessments occur during an ED visit. All patients should receive an initial pain score in triage; however, Iyer (2010) found that only 75% of ED patients had pain intensity scores documented. Which providers are documenting pain assessment and why is an important evaluation. A breech in a standard of care occurs when the RN documents pain and no pain treatment follows (Constantino & Zalon, 2008). Moreover, both prescriber and nurse caring for the patient should document reassessment after pain treatment per the JC standard.

Previous studies have linked patient satisfaction in the ED with timeliness of care and pain management. Quality and satisfaction are interrelated and satisfaction with care is an important tool in evaluating quality of care in the ED (Soremekun, et al, 2011). This study specifically observed timeliness of initiation of pain treatment as a quality measure. Most studies on ED satisfaction and timeliness of pain care have not focused on the older adult and few ED pain care studies include those over age 75 (Hwang et al, 2008, 2012)

In summary, evidence based pain assessment, treatment and the timeliness of pain treatment in EDs are quality measures that require improvement (Wenger, Roth, Shekelle & the ACOVE Investigators, 2007). Patients with moderate to severe pain routinely experience long waits to be evaluated and receive analgesia (Hwang and colleagues 2008, Pines et al 2008, Hwang et al 2007). Current ED triage protocols do not prioritize pain for older adults even if they report severe pain in the absence of chest pain.

Summary

Many studies suggest that generally EDs poorly manage pain in all age groups but older adults require more specialized pain care but tend to receive less treatment in the ED. Researchers that specifically evaluate pain treatment for the elderly in the ED have found similar results. Older adults, even when they report moderate to severe pain, wait in excess of an hour to receive treatment. Additional research on ED crowding and its negative effect on timeliness of pain treatment is needed. Finally, the Beers Criteria is useful as a guideline for PIMs prescribing for the elderly, including pain medication, but it has not been widely adopted by ED providers.

This review of the literature has identified several gaps in knowledge:

1. The impact of crowding on delays specific to pain treatment needs further clarification.
2. Older adult satisfaction with ED pain care requires further study.
3. Prospective studies on pain management of older adults are not available.
4. EDs have not embraced the use of the Beers Criteria and therefore there are no large-scale studies to evaluate current PIM prescribing or adherence to evidence based guidelines.

This study prospectively assesses overall quality of pain care older adults receive in the ED. Moreover, the impact of crowding on timeliness of initiation of pain care was evaluated

Chapter 3

Methodology

This chapter explains the research methods that were used to study the quality of pain management of older adults in the emergency department. It details the research design, sample, setting, and procedures for sample recruitment. Data collection, human rights protection and data analyses used in the study are described.

Purpose of the Study

The purpose of the study was to:

1) Describe the quality of pain management older adults receive in the emergency department compared to younger adults when they report moderate to severe pain.
2) Evaluate the timeliness and type of pain treatment that older adults receive when they report moderate to severe pain in the ED.
3) Evaluate the relationship of age, gender and crowding on the time to initiation of pain treatment.

Hypotheses

The specific hypotheses in the study were:

- Potentially inappropriate medications (PIMs), as described in the Beers Criteria, are frequently prescribed to older adults in the ED.
- Age does not affect wait times to initiation of pain treatment after triage.
- Age does not affect the number of pain assessments in the ED.
- ED Crowding correlates with longer wait times for initiation of pain treatment for older adults.

- Gender does not affect wait times to initiation of pain treatment after triage.

Research Design

This study used a quantitative, non-experimental, descriptive correlational design. This design was chosen to explore the relationships among structure, process and outcome variables that have been linked to quality pain care in the ED (Polit & Beck, 2012). To describe and analyze these variables and their influence on quality pain care. The effect of crowding on wait times for treatment was explored. Using prospective chart reviews, the investigator examined demographic and visit data on patients enrolled in the study. The research questions required a correlational design to explore the effects of the variables (age, gender, and ED crowding) on quality indicators (time to treatment and number of pain assessments).

The study was conducted to answer these five research questions:

1. What is the frequency of PIMs prescribing in the emergency department?
    a. Do young (21-40 years old), middle aged (41-64 year old), and older adults (65 years and older) differ in the frequency of PIMS prescribing.
2. Do young, middle age, and older adults differ in the number of pain reassessments received in the ED after initial pain medication administration?
    a. Does gender affect the number of pain assessments received by young, middle aged and older adults in the ED after initial pain medication administration.
3. Does age influence wait time to initiation of pain treatment between?
4. Does gender influence wait time to initiation of pain treatment?
5. Controlling for age and gender, does crowding predict time to initiation of pain treatment?

Sample

The study was conducted using a convenience sample within an urban, academic medical center emergency department in central Philadelphia. Thomas Jefferson University Hospital is a 717 bed tertiary and quaternary care hospital with annual ED census of 65,000 visits. While it is acknowledged that this convenience sample may be atypical of the older adult population with regard to pain, the sample will allow for critical variables specific to the ED population to be analyzed (Polit & Beck, 2012).

A power analysis to determine the sample size for a hierarchical regression analysis was done to avoid Type II error and misleading regression coefficients. Using a sample size estimate to test the null hypotheses that R^2 =.13, power=.80 and alpha =.05 with three independent variables the sample size estimate is 77 participants (Polit & Beck, 2012). A general rule applied to the ANOVA testing recommends a minimum of 30 participants in each group (http://drr.lib.athabascau.ca/files/hadm/499/Vanvoorhis%202001%20Statistical.pdf). Therefore, the sample size for this study given the number of groups was set at 120 subjects.

A screening tool was used to identify and enroll subjects after triage. See Table 3.

Inclusion/Exclusion Criteria

Over a six (6) month period (May 2014 to September 2014) adult patients who self-reported their pain as being between four (4) and 10 using the NRS were enrolled. Patients with life threatening emergencies were excluded because they are triaged to receive immediate emergency care.

Specific inclusion criteria were:

- Age 21 and over
- Self-reporting four or greater on the initial pain Numeric Rating Scale (NRS) (0-10 scale) indicating moderate to severe pain (≥4 on 0-10 scale).
- Triage score of three, four or five (3,4, or 5) on the Emergency Severity Index (ESI) triage score, indicating a non-life-threatening admission to the emergency department.

Specific exclusion criteria were:

- Chest pain or stroke symptoms (ex. weakness/ decreased level of consciousness).
- Sickle cell crisis
- Score of one or two on the ESI, indicating a life-threatening emergency needing immediate intervention.
- Non-verbal or unresponsive /unable to self-report pain with a Glascow Coma Scale less than 15.
- History of cognitive impairment such as dementia-documented in past medical history in triage.
- A prior visit to the ED during the study period
- Self-reporting 3 or less on the NRS indicating mild to no pain.

Chest pain and stroke have their own pathways in the ED. Patients presenting with moderate to severe pain complaints indicative of these conditions follow a designated protocol in the ED for further evaluation and were excluded from this study. Similarly, this ED sees a large number of patients with sickle cell anemia who present in crisis.

These patients usually have a specific pain protocol that is followed in the ED and if not, the patient's hematologist is contacted for a definitive treatment plan. Patients who receive a triage ESI score of one or two (1 or 2) are excluded because this indicates the need for immediate intervention in the emergency department. Typically these patients may have severe pain but because of the severity of their illness/injury would not wait to be evaluated for a life threatening condition. In addition, adults with a self-report of 0-3 on the NRS for pain were excluded because this indicates the nonexistence of pain or mild pain that does not require specific intervention. Adults who are non-verbal or who have an impairment that prevents them from self-reporting pain were excluded. Non-English speaking patients and those for whom English is a second language were deliberately not excluded. The Emergency Department follows the *The National Standards for Culturally and Linguistically Appropriate Services in Health and Health Care* (the *National CLAS Standards*). ED policy requires that patients are provided either a live translator in the emergency department or translation using the translator phone which allows for a live translator of any language to be called within seconds 24 hours a day.

Table 4. Enrollment Screening Tool

Subject ID #	Prior Visit During study period Y/N	Age ≥21 Record Age	History of Dementia Y/N	NRS >4 Record Score	Triage Score 3,4,or 5	GCS 15 Y/N	Enroll Y/N

Abbreviations Used:
NRS Numeric Rating Scale for pain
GCS Glascow Coma Scale

Study Variables

The selected variables to evaluate quality of pain care using structure, process and outcome indicators found in the literature were evaluated within the population of adult ED patients. These variables are detailed in Table 4 with their corresponding research questions.

Table 5. Study Variables

Donabedian Quality Framework (DQF)	Variable	Question
Structure	Age Gender	#1, #2, #4, #5 #3
Process	Medications listed as PIMs and medications not listed as PIMs Crowding	#1 #5
Outcome	Number of Pain Assessments after initiation of treatment Time to initiation of pain treatment	#2, #3, #4

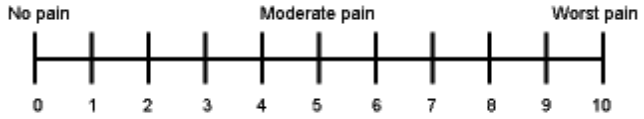
Measurements

The following is a list of the instruments used in this study:

1) Numeric Rating Scale (NRS)
2) Emergency Severity Index (ESI)
3) National Emergency Department Overcrowding Score (NEDOCS)

Numeric Rating Scale: Pain is measured in triage using the Numeric Rating Scale (NRS). Subsequent pain re-assessments use the same scale. See Figure 3.

Figure 5. Numeric Rating Scale



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The NRS has demonstrated good internal consistency with other analogy scales to measure pain intensity with Cronbach's α coefficients of 0.85 to 0.89. Test-retest reliability for each ranged from 0.57 to 0.83 for the NRS, from 0.52 to 0.83 for the Verbal Descriptor Scale,

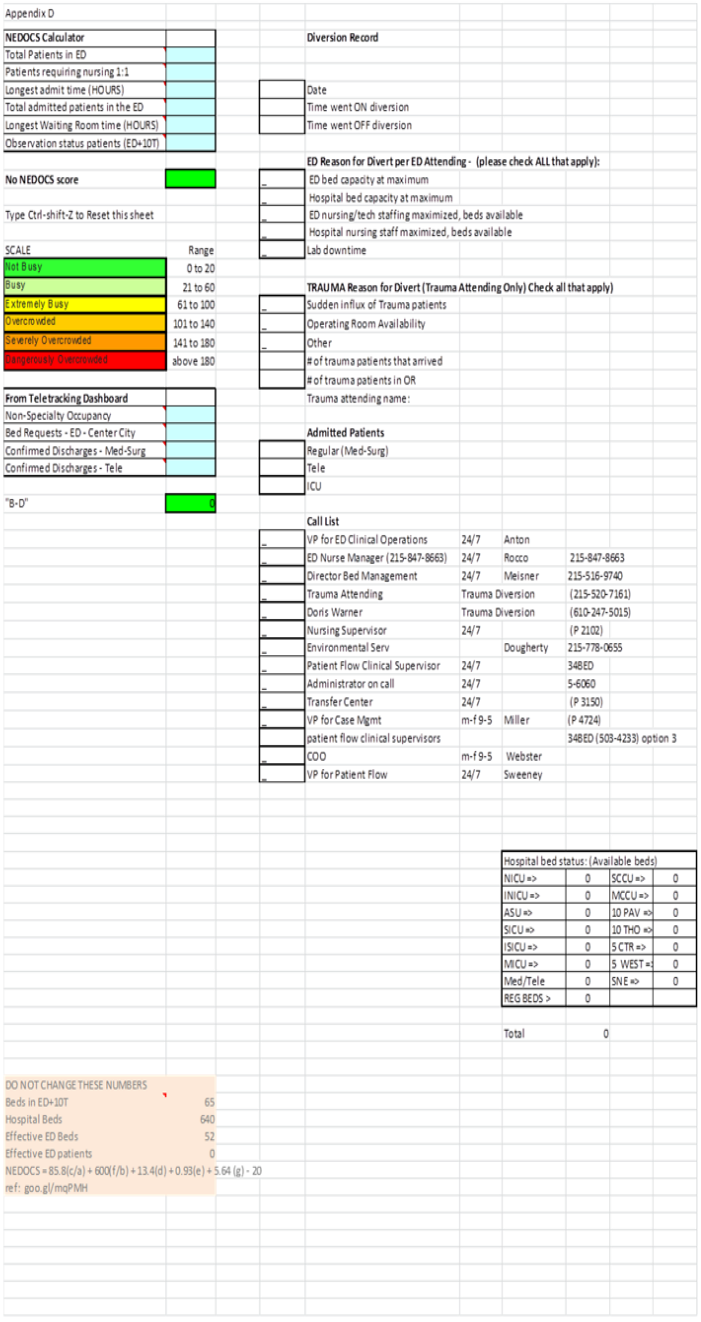
and from 0.44 to 0.94 for the Faces Pain Scale-Revised (FPS-R). A factor analysis found that all three scales were valid, although the FPS-R was the weakest (Herr, Spratt, Mobily, & Richardson, 2004).

Emergency Severity Index (ESI): The Emergency Severity Index, used to determine patient acuity is both reliable and valid. Triage by the ESI instrument can reproducibly stratify adult patients into five groups with distinct clinical resource and hospitalization needs. Tanabe and colleagues (2004) reported inter-rater reliability between RN ESI level and the true ESI level was kappa = 0.89; Pearson r = 0.83 ($p < 0.001$). The study also showed hospital admissions by ESI levels as follows: 1(80%), 2 (73%), 3 51%, 4 (6%), and 5 (5%). Supporting the reliability of the ESI score determining acuity, a higher percentage of ESI level one (40%) and two (12%) were admitted to the intensive care unit than SI levels between three and five.

National Emergency Department Overcrowding Score (NEDOCS): The NEDOCS is the crowding tool used in the ED where this study took place. Typically the NEDOCS is calculated by a designated person every two to four hours in the ED depending on the hospital's policy to monitor for crowding. It is used as an early warning tool for ambulance diversion. EDs are forced to divert patients when crowding scores are too high. Typically when the score reaches $\geq$ 100 the ED may need to divert patients

meaning ambulances would be redirected to other EDs in the city. In this study the NEDOCS was calculated at the beginning of each of the subject's visit to determine the impact of crowding.

Most academic medical centers as well as government agencies have adopted the NEDOCs as the preferred crowding tool. The NEDOCS was designed on the basis of expert input from eight ED sites nationwide and was developed statistically by reducing a 20-question model to the best 5 questions (Weiss, Ernst & Nick, 2006). Several studies were conducted to determine the validity and reliability of the NEDOCS tool. One study compared the NEDOCS to the Emergency Department Work Index. Both correlated well and showed good discrimination in predicting ED crowding. See Figure 4 for the NEDOCS instrument (Weis, et al, 2004, 2006)



Appendix D

NEDOCS Calculator	
Total Patients in ED	
Patients requiring nursing 1:1	
Longest admit time (HOURS)	
Total admitted patients in the ED	
Longest Waiting Room time (HOURS)	
Observation status patients (ED+10T)	
No NEDOCS score	
Type Ctrl-shift-Z to Reset this sheet	
SCALE	Range
Not Busy	0 to 20
Busy	21 to 60
Extremely Busy	61 to 100
Overcrowded	101 to 140
Severely Overcrowded	141 to 180
Dangerously Overcrowded	above 180
From Teletracking Dashboard	
Non-Specialty Occupancy	
Bed Requests - ED - Center City	
Confirmed Discharges - Med-Surg	
Confirmed Discharges - Tele	
"B-D"	0

Diversion Record

	Date
	Time went ON diversion
	Time went OFF diversion

ED Reason for Divert per ED Attending - (please check ALL that apply):

_	ED bed capacity at maximum
_	Hospital bed capacity at maximum
_	ED nursing/tech staffing maximized, beds available
_	Hospital nursing staff maximized, beds available
_	Lab downtime

TRAUMA Reason for Divert (Trauma Attending Only) Check all that apply)

_	Sudden influx of Trauma patients
_	Operating Room Availability
_	Other
	# of trauma patients that arrived
	# of trauma patients in OR
	Trauma attending name:

Admitted Patients

	Regular (Med-Surg)
	Tele
	ICU

Call List

_	VP for ED Clinical Operations	24/7	Anton	
_	ED Nurse Manager (215-847-8663)	24/7	Rocco	215-847-8663
_	Director Bed Management	24/7	Meisner	215-516-9740
_	Trauma Attending	Trauma Diversion		(215-520-7161)
_	Doris Warner	Trauma Diversion		(610-247-5015)
_	Nursing Supervisor	24/7		(P 2102)
_	Environmental Serv		Dougherty	215-778-0655
_	Patient Flow Clinical Supervisor	24/7		34BED
_	Administrator on call	24/7		5-6060
_	Transfer Center	24/7		(P 3150)
_	VP for Case Mgmt	m-f 9-5	Miller	(P 4724)
_	patient flow clinical supervisors			34BED (503-4233) option 3
_	COO	m-f 9-5	Webster	
_	VP for Patient Flow	24/7	Sweeney	

Hospital bed status: (Available beds)			
NICU =>	0	SCCU =>	0
INICU =>	0	MCCU =>	0
ASU =>	0	10 PAV =>	0
SICU =>	0	10 THO =>	0
ISICU =>	0	5 CTR =>	0
MICU =>	0	5 WEST =>	0
Med/Tele	0	SNE =>	0
REG BEDS >	0		
Total	0		

DO NOT CHANGE THESE NUMBERS	
Beds in ED+10T	65
Hospital Beds	640
Effective ED Beds	52
Effective ED patients	0

NEDOCS = 85.8(c/a) + 600(f/b) + 13.4(d) + 0.93(e) + 5.64 (g) - 20

ref: goo.gl/mqPMH

Figure 6. The NEDOCS instrument

Data Collection

Data Collection Tool: Spreadsheet used to gather data from the ED encounter for each enrolled subject. See Table 6.

Table 6. Data Collection Tool

Pt. #	
Age	
M/F	
NRS	
NEDOS	
Triage time	
ESI	
CC	
Time of 1st analgesia	
Time of pain reassessment	
Another analgesia	
Time	
Time of reassessment	
Total # assessments	

Abbreviations Used:

NRS	Numeric Rating Scale for pain
NEDOCS	National Emergency Department Overcrowding Score
ESI	Emergency Severity Index (Triage Score)

A potentially inappropriate medication (PIM) is defined using the Beers Criteria.

See Table 5 for the Beer Criteria list of potentially inappropriate medications (PIMS)

Table 7. Potentially Inappropriate Medications - List of Top 10 Medications Older Adults Should Avoid (Beers Criteria, 2013)

Medication	Rationale
Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)	Can increase risk of gastrointestinal bleeding Can increase blood pressure, and can make kidney function and heart failure worse
Digoxin (Lanoxin)in doses greater than 0.125 mg	Can be toxic inolder adults who have deminished kidney function
Glyburide and chlorpropamide	Can cause severe hypoglycemia
Flexeril and Soma –Muscle Relaxants	Can cause confusion, increased risk of falls, dry mougth and problesm urinating
Valium, Xanax, Librium, Sonata and Ambien- Sleeping medications/ Anti-anxiety medicaitons	Can cause confusion, increased risk of falls
Anticholinergics- Elavil, Ditropan	Can cause confusion, constipation, problems urinating, blurry vision and low blood pressure
Benadryl (diphenhydramine)	Can cause confusion, blurred vision, constipation, dry mouth and problems urinating
Antipsychotics (Haldol, Risperdal, Seroquel)	Can increase risk of stroke and death Can increase risk of falls Can cause tremors
Demerol	Can increse risk of seizures and cause confusion
Estrogen pills and patches	Can increase risk of breast cancer, blood clots and dementia

The clinicians were blinded to the study hypotheses. ED providers including emergency department faculty physicians, residents, nurse practitioners, physician assistants, and registered nurses made clinical decisions about pain care during the study period without regard to participation in the study.

Enrollment

The emergency department's electronic health record (EHR), Wellsoft®, was used to enroll subjects because it contains accurate information for screening potential subjects and abstracting the variables needed for analysis. The record was screened at the following times by the study investigator for recruitment of subjects: 4 a.m., 9 a.m, 4 p.m., 9 p.m on each day of the week. These times were chosen to avoid change of shift times, include day and night shifts, and each day of the week. In addition, the ED is typically busiest between 9 a.m. and 11 p.m. so more frequent observations during these hours was deemed necessary.

Enrollment of 143 subjects occurred over a 24 hour period each day of the week selected during the study period. Two weeks per month were randomly selected for data collection using a role of dice. Each patient over the age of 20 were screened by the investigator for inclusion in the study. Once inclusion criteria were met, the patient was enrolled and a crowding calculation using NEDOCS was obtained and recorded per the data collection tool. Each subject had a unique identification number assigned at the time of enrollment and no personal identifying information was obtained.

Data Collection

The study investigator used the emergency department EHR for data collection. The subject's age, gender, time of triage, ESI score, and initial numeric rating scale (0-10) for pain intensity was documented on the data collection tool. The following procedure was followed:

1. Identify an adult over age 21 awaiting triage on the Wellsoft© tracking screen
2. Check triage vital sign documentation for patient- if NRS pain score $\geq$ 4 check ESI score.
3. If ESI score 3,4, or 5 then evaluate inclusion/exclusion criteria.
4. If meets inclusion criteria, assign a subject number.
5. Calculate NEDOC score.
6. Record demographics and documented triage time.
7. Observe times and interventions during the visit.
8. Record time of documented initial pain medication administration (time received analgesia).
9. Record type of analgesia (NSAID, opioid, acetaminophen) received.
10. Record wait time to see a provider (time to provider).
11. Calculate and record difference between time to see provider and time received analgesia.
12. Record time of first pain re-assessment.
13. Record time (s) of subsequent pain reassessments.
14. Record follow- up analgesia administration times and reassessment.
15. Document time of disposition

16. Calculate total time of ED visit
17. Document type of analgesia prescription given at the time of discharge. If admitted, omit this step.
18. Check box if a PIMs prescription was provided.

Data Analysis

Following the data collection procedure the data were saved to a Microsoft Excel file and this was uploaded into a statistical program. The PI visually inspected all data for outliers and irregularities.

The Statistical Package for the Social Science® (SPSS Version 19, Chicago, IL) statistical program was used for all statistical analyses. All data was examined for missing values and analyzed for outliers. A conventional alpha level of .05 was adopted as the standard for all two-tailed significance testing (Polit & Beck, 2012). See Table 6 for a summary of statistics used for each question.

Descriptive Analysis

The sample was described using means, standard deviations (SDs), and frequency. Question 1 was analyzed using means, standard deviations and ranges. Medications were classified as 1= opioids, 2=NSAIDs, 3=Acetaminophen, as they were prescribed in the EHR for each subject.

Analysis of Variance (ANOVA)

Mean differences among the age groups of young, middle aged and older adults were compared related to the independent variables on PIMs prescribing, time to initial pain treatment and number of pain assessments. Sub-question 1 was answered using a one-way ANOVA to compare PIMs prescribing across the three age groups.

Two-way ANOVA was used to answer sub-question 2, and questions, 3 & 4. Two-way ANOVA allowed consideration of interaction effects with two factors. It also allowed a more accurate representation of how the response variable depends on the two factors (Polit & Beck, 2012).

Hierarchical Regression Analysis

Hierarchical multiple regression analyses was used to answer question 5. This multivariate statistical analysis was chosen to better understand the relationship between the dependent variable of wait time to initial pain treatment and the independent variables of age and gender. To control for confounding variables, age and gender were controlled in the sequence of the analysis to determine if crowding alone predicted longer wait times to initial pain treatment.

Multicollinearity is a consideration when multiple variables are included in the regression model (Polit & Beck, 2012). Multicollinearity occurs when variables are too highly correlated. Including highly correlated variables in the model raises the critical value of F required to reject the null hypothesis, tends to produce unstable results and can create misleading results (Polit & Beck, 2012). This study model included two control variables, age and gender. To avoid including highly correlated variables in the model (those at .85 or higher) visual inspection of the tolerance for each variable were performed. Variables with correlations of .85 or higher were not used in the analysis.

Table 8. Summary of Questions and Statistics

Question	Variables	Level	Statistics
What is the frequency of PIMs prescribing in the emergency department? Is there a difference in the frequency of PIMS prescribing between young, middle aged, and older adults?	Medications listed as PIMS and Medications not listed as PIMS Age groups: 20-40, 41-64, 65 & older	Categorical Categorical One-way ANOVA	Descriptive frequency counts and percentages
Is there a difference in the number of pain assessments received by young, middle aged, and older adults in the emergency department after initial pain medication administration? Is the difference in the number of pain assessments received by young, middle aged, and older adults in the emergency department after initial pain medication administration dependent on gender?	Age groups: 20- 40, 41-64, 65 & older # of pain assessments after initiation of pain treatment	Categorical Interval	One- way ANOVA 2-way ANOVA
Is there a difference in the wait time to initiation of pain treatment between young, middle aged, and older adults?	Age groups: 20- 40, 41-64, 65 & older Wait time to initiation of pain treatment	Categorical Interval	Two- way ANOVA
Is the difference in wait time to initiation of pain treatment dependent on gender?	Age groups: 20- 40, 41-64, 65& older Gender Wait time to initiation of pain treatment	Categorical Categorical Interval	Two-way ANOVA
Controlling for age and gender, does crowding predict time to initiation of pain treatment?	Age Gender Crowding Wait time to initiation of pain treatment	Interval Categorical Interval Interval	Hierarchical Linear Regression

Human Rights Protection

Study approval was sought from the Human Subjects Protection Program at the University of Wisconsin-Milwaukee and the Office of Human Research at Thomas Jefferson University, in compliance with institutional ethical standards and federal regulations (IRB approvals are included in Appendix B & C).

The principal investigator (PI) assigned a study identification number to each subject, eliminating names and all personal identifying information. The PI collected data using the data entry form then entered the data into an Excel spreadsheet that was stored on a password protected laptop that remained locked in an office filing cabinet when not in use. Data were then entered into The Statistical Package for Social Sciences® (SPSS) software, version 19. No one other than the PI had access to the data or the patients' identities. The data were stored on the laptop and kept secured in the PI's private office. The data were only accessed by the PI throughout the study.

Limitations

Study Design

This study design was non-experimental and therefore causal relationships cannot be made. This study is limited in its ability to determine all potential structure, process and outcome predictors of wait time for the initiation of pain treatment and pain prescribing in the ED.

Sample

Another limitation of this study is that a convenience sample of patients from one academic medical center's ED was evaluated. All of the sampling occurred over a short period of time. This sample of ED patients limits the generalizability of the results. The study excluded older adults with documented cognitive impairment; however, this is an important cohort of older adults who access emergency care and who may experience less than optimal pain care. Moreover, race and ethnicity data were not collected and is a major limitation of the study.

Data Collection

Due to the reliance on the emergency department's EHR for data collection, a major limitation of this study is that only a partial number of structure, process and outcome variables are included. The exclusion variables including race and ethnicity is an unavoidable but unfortunate limitation given the reliance on the EHR and the lack of available data. Racial disparities have been identified in prior studies of ED pain and would provide insightful information in this study. Variables that were excluded are : race/ethnicity, comorbidity, polypharmacy, and provider characteristics. All of these variables affect quality of pain management.

Measurement

Because pain is highly subjective the intensity and associated suffering and disability is difficult to quantify using the NRS. Self-report of pain is influenced by multiple factors including culture, mood and trust of the health care system (Mortov & Khan, 2009). Relying on one scale of self-reported pain during an ED visit, as this study did, may not capture a true picture of a person's pain care needs. Pain assessments may

not be accurate and this may have led to under-assessment of older adults and subsequent under-treatment of their pain.

Summary

This chapter presents the descriptive correlational design used to explore the relationships among ED variables and quality of pain management of older adults. Sample characteristics, setting, sample recruitment, and data collection procedures, including human rights protection, were discussed. The chapter also explained the procedures used to analyze the data.

Chapter 4

Study Findings

Introduction

Research focused on improving pain care of older adults is an important aspect of emergency care yet little has been published on the quality of pain management this population receives during an emergency visit.

The purpose of this study was to determine:

1. The quality of pain management older adults receive in the emergency department compared to younger adults when they report moderate to severe pain.
2. The timeliness and type of pain treatment that older adults receive when they report moderate to severe pain upon arrival to the ED.
3. The relationship of age, gender, and crowding on the time to initiation of pain treatment.

Given the multidimensional aspects of pain and pain care delivery in the emergency department, this study was designed to evaluate a conceptualized multivariate model

of factors influencing pain care in older adults reporting moderate to severe pain. The study purposes were specifically evaluated to determine if there was 1.) a difference in PIMs prescribing between three age groups of subjects 20-40 years old (young); 41-64 years old (middle aged); and 65 years and older (older adults). 2.) how older and younger adults were compare to see if age influenced the number of pain assessments and wait

time to initiation of pain treatment; and 3.) the relationship of gender with the the number of pain assessments and wait time. Age, gender, and crowding were examined as potential factors contributing to longer wait times to receive pain medication.

The first section of this chapter provides a description of the study sample using the descriptive statistics frequencies, means, standard deviations, ranges and cross tabulations. The second section presents the results of the analysis of variance (ANOVA) comparing number of pain assessments and time to initiate pain medication followed by a two-way ANOVA examining the influence of gender. Finally, a regression model that addresses the impact of crowding on the initiation of pain treatment was analyzed.

Sample

A total of 143 adult ED patients were evaluated over a six (6) month period (April-September 2014) and met the study inclusion criteria. There were no enrolled subjects dropped from the study. A prospective chart evaluation using the ED's emergency department electronic health record (EHR) was completed for all subjects' visits. The study sample consisted of adult patients age 21 years and older, who were enrolled at the time of triage in the ED. Adults with self-reported pain of $\geq$ 4 on the Numeric rating scale were enrolled. The EHR was used to collect prospective data on each of the enrolled adults' emergency visit including measures of wait time and potentially inappropriate medication (PIMs) prescribing for older adults consistent with the Beers Criteria as defined in the methods section. In addition, the study specifically investigated crowding as measured by the NEDOCS tool as a predictor of longer wait times to initiation of pain treatment.

Descriptive Statistics

The data set consists of 143 adults who presented to the emergency department over a six (6) month period from April through September 2014 and verbally self-reported moderate to severe (4-10) pain on the 0-10 numeric rating scale (NRS) pain scale. Data were analyzed using the Statistical Package for the Social Science® (SPSS) Version 19. Table 7 displays patient demographic variables. Table 8 shows mean ESI scores by age group. The mean patient age in the sample was 49.2 years (SD= 17.38) with a range of 20-92 years. The mean pain score across all age groups using the numeric rating scale (NRS) was 8.09 (SD=1.458) indicating severe pain.

The sample included more women (59.4%, n= 85) than men (40.6%, n=58). Subjects were assigned an emergency severity index of 3, 4, or 5 by the ED triage registered nurse (RN) upon admission. Of the 143 subjects, 66.4% (n=95) were assigned ESI 3, indicating an urgent condition requiring multiple ED resources but the patient is stable at the time of triage. There was a significant difference in ESI rating with those 65 and older being assigned a less severe triage score (Mean 3.14 SD= .356) as compared to the younger two groups ages 20-40 year (Mean 3.45 SD=,541) and 41-64 year (Mean= 3.35 SD=.513) (F= 6.78 df= 2, p=.033) while the percent of the three groups presenting with pain was not any different between the groups. The time from triage to provider was significantly shorter for ESI 4 and 5 (M=78,98 SD= 70.91, p= .044) than ESI 3 which is expected when an emergency department operates a fast-track as the setting for this study did during certain hours of the day every day of the week. Most frequently presenting complaints included abdominal pain, back pain, fall, and leg pain. See Table 9.

Table 9. Demographic Characteristics of Subject (N=143)

Characteristic	n	%
Gender		
Male	85	59.4
Female	58	40.6
Age		
20-40	51	35.7
41-64	63	44.1
65+	29	20.2

Table 10. Emergency Severity Index by Age Group (N=143)

Age	n	ESI %
20-40	3	56.9
	4-5	43.1
41-64	3	66.7
	4-5	33.3
65+	3	85.7
	4-5	14.3

Table 11. Summary of Presenting Complaints (N=143)

Category	n	%
Abdominal Pain	24	16.78
Back Pain	15	10.49
Falls	13	9.09
Other Musculoskeletal/ Trauma	45	31.47
Other/ Illness	46	32.17

A total of 57 patients did not receive analgesia during the ED visit (39.9%). Of those not receiving analgesia, 53.6% were 65 years or older. Of those who did receive pain medications, the average wait time from time seen by a provider to medication administration was 1.2 hours (69.9 minutes). The average length of the ED visit was 5.3 hours (317 minutes) and the average number of pain reassessments during a visit was one (1). All pain reassessments in the patient's chart were documented by RNs.

Presentation of findings

Research question #1: What is the frequency of PIMs prescribing in the ED?

Non-steroidal anti-inflammatory medications (NSAIDs) are considered a potentially inappropriate medication (PIM) for older adults according to the Beers Criteria. In the sample of 143 subjects, NSAIDs were prescribed 18.3% (n=26) of the time to those patients who received analgesia in the ED.

Sub question: Do young (21-40 years old), middle aged (41-64 year old), and older adults (65 years and older) differ in the frequency of PIMS prescribing?

Older adults in the study received fewer non-steroidal anti-inflammatory medications (NSAIDs) than younger adults. Of those patients 65 years and older who did receive pain medications during the ED visit, only 3.6% (n=29) received an NSAID. In comparison 23.5% (n=51) of those age 20-40 (young) received a NSAID and 20.6% (n=63) of those in the 41-64 (middle age) group received a NSAID.

Older adults received less narcotic medications than younger patients. Those 65 and older were prescribed a narcotic medication 28.6% (n=28) versus 37.3 (n=51) percent in young adults and 36.5% (n=63) in the middle aged group. While 53.6% (n=28) of those patients 65 and older did not receive any analgesia during the ED visit, 73.8% (n=114) of young and middle age adults combined did not receive analgesia.. A chi-square test was performed and no relationship was found between those not receiving analgesia and age X^2 (2, N = 142) = 2.625, p =.269. Of those who did receive an analgesia across all age groups, narcotic medications were the most frequently prescribed, 37.3% (n=51) in young adults, 36.5% (n=63) in middle aged adults and 28.6% (n=28) in older adults.

Research question #2

Do young, middle age, and older adults differ in the number of pain reassessments received in the ED after initial pain medication administration? Does gender affect the number of pain assessments received by young, middle aged and older adults in the ED after initial pain medication administration?

A one-way between-groups ANOVA was conducted to explore the impact of age and gender on the number of pain assessments received during the ED visit (Table 10).

Subjects were divided into three groups according to age 20-40 years (n=51), 41-64 years (n=63), 65 years and older (n=28). The Levene's test for homogeneity of variances was 3.8 so the assumption of homogeneity of variance was not violated. There was no significant difference among groups in the mean number of pain reassessments- age 20-40 (M=1.06, SD=1.156), 41-64 (M=.95, SD=.923), and 65 and older (M=1.36, SD=1.393), F (2, 139) = 1.593, p=2.79. See Table 4.Eta squared was calculated using the following formula: eta squared= sum of squares between groups/ total sum of squares= 3.187/175.296=0.018. The resulting eta squared value was .02, which is considered a small effect size using Cohen's interpretation of effect size (Polit & Beck, 2012). Cohen classified effect sizes as small (d = 0.2), medium (d = 0.5), and large (d ≥ 0.8).5 According to Cohen, "a medium effect of .5 is visible to the naked eye of a careful observer. A small effect of .2 is noticeably smaller than medium but not so small as to be trivial" (Sullivan & Fienn, 2012). In a larger sample it is possible that a small effect size may reach statistical significance.

Table 12.

One-Way Analysis of Variance for the Effects of Age and Gender on Pain Re-assessments (N=143)

Variable	df	SS	MS	F (2,)	p	η^2
Between-groups	2	3.187	1.593	1.287	.279	.02
Within-groups	139	172.109	1.238			

Research question #3: Do young, middle aged and older adults differ in wait time to initiation of pain treatment between?

A one way between- groups ANOVA was used to explore the impact of age on wait time to initiation of pain medications. Subjects were divided into three groups according to age (20-40 years, 41-64 years, 65 years and older). The Levene's statistic was 1.065 so the assumption of homogeneity was not violated. There was no significant difference found between groups and the wait time for initiation of pain treatment measured by minutes from provider evaluation to administration of pain medications Sum of Squares 15571410, df 2, F (2, 83)=.325, p=.724. The result of the eta squared calculation was .078.

Research question #4: Does gender affect wait time to initiation of pain treatment?

A two-way between-groups analysis of variance was conducted to explore the impact of gender and age on the wait time to initiation of pain treatment, as measured by minutes form the time seen by the provider until the administration of the first analgesia medication. Subjects were divided into three groups according to age (20-40 years, 41-64 years, 65 years and older). The interaction effect between gender and age group was not statistically significant, F (2, 80)=1.012, p=.368. There was no statistically significant main effect for age F (2, 80)= .297, p=.744: however, the effect size was small (partial eta squared = .007).

Research question 5: Controlling for age and gender, does crowding predict time to initiation of pain treatment?

A two stage hierarchical linear regression was performed to assess the impact of multiple variables on the likelihood that older adults wait longer to receive pain treatment during an emergency department visit. The model contained three independent variables (age, gender, and NEDOCS). The NEDOCS score representing the crowding score of the emergency department at the time of the patient's visit was calculated at the time the subject was enrolled in the study (at time of triage). Age and gender were entered into the model first followed by the NEDOCs score.

Table 11 shows the percent of variability in the dependent variable that can be accounted for by all the predictors together. The change in R^2 is a way to evaluate how much predictive power was added to the model by the addition of the NEDOCs score in step 2. In this case, the percent of variability accounted for by adding NEDOCs went up from 3.4% to 4.9 % (+1.5%).

Neither the first model (demographic variables alone) nor the second model (demographics plus NEDOCS) predicted wait time to the initiation of pain treatment to a statistically significant degree. Model 1 with age and gender explained 3.4% of the variance in wait time to pain treatment, p= .235. The addition of crowding in Model 2 explained an additional 1.5% of the wait time variance, p=.246 for a total of 5.9% explained. In this case, none of the predictors are significant. See Table 12.

Table 13.

Regression analysis of the effect of age and gender on wait time to initiation of pain treatment. (N=143)

Variable	B	SE B	β	t	p
Age	-.807	.954	-.091	-.846	.400
Gender	-51.535	33.664	-.165	-1.531	.130

Not statistically significant p=.022

Table 14.

Hierarchical Regression Analysis of the effect of age, gender and crowding on the initiation of pain treatment. (N=143)

Step & predictor Variable	B	SE B	β	R^2
ΔR^2				
Step 1				
Age	-1.008	.969	-.114	.034
Gender	-48.526	33.716	-156	.034
.034				
Step 3				
NEDOCS	.796	.627	.124	.049
.015				

($F(3,82) = 1.409$, $p = .246$).

Summary

This study did not find a statistically significant difference in the quality of pain care for older adults seeking emergency care compared to younger adults. PIMs medication was prescribed less often for patients 65 years and older. Age and gender were not associated with longer wait times to receive pain medications after seeing an ED

provider. Despite the emphasis placed on ED crowding, this variable did not prove to be a significant predictor of long wait times for initiation of pain treatment in this study.

Pain management is an important aspect of emergency care. In this study 40% of adults presenting to the ED with a self-report of moderate to severe pain did not receive pain treatment. The limitations of the study, implications for practice and recommendations for future research will be discussed in the next chapter, however, it is important to acknowledge here that despite the inability of this study to predict the variables that may impact quality of pain management, large-scale investigations are needed to provide important information about pain care in the older adult ED population in an effort to minimize long waits, unresolved pain and associated poor outcomes.

Chapter 5

Discussion

This chapter provides a summary of the major findings of this study. Implication for practice that facilitates quality of pain care in the older adult population will be discussed. Study limitations and threats to the validity of this study are reviewed. Recommendations to further nursing science to improve pain care for older adults will be presented.

Pain care is a measure of overall quality in emergency care that shows room for improvement in today's busy, high stress and over-burdened EDs. Evidence shows that pain is prevalent among people seeking care in EDs. It is estimated that upwards of 75% of ED patients are in pain during the visit and pain is the primary reason for seeking care (Downey & Zun, 2010). Yet, under- treatment of pain remains a persistent and challenging problem. The purpose of this study was to examine the effects of selected predictors (i.e., age, gender, and crowding) on quality of pain management for older adults (i.e., age > 65 years of age) in an urban Emergency Department in the mid-east United States.

Study Findings

Overview

In order to improve pain care for patients in the ED, a measure of the actual care provided using the DQF framework was used to identify gaps and areas for improvement. Many gaps in the process of pain care along with areas for system improvement with regard to timeliness were identified in this study.

Consistent with prior research this study found that many patients (40%) young and old did not receive pain medications during an ED visit. This was the case even though an initial average pain score was eight (8) on the numeric rating scale (NRS) for pain in triage indicating severe pain. Of those who did not receive pain medications, the majority of them were over age 65 (53.6%). This finding was not statistically significant in the study.

Structure

Pain reassessments are an essential part of pain management because poor assessment often leads to inadequate pain treatment (Herr & Titler, 2009). In this study neither age nor gender made a difference in the number of pain reassessments. The average length of the ED visit was 5.3 hours (317 minutes) and the average number of pain reassessment during a visit was one (1). It should be noted that the hospital-wide Adult Pain Management Guidelines in use at this organization indicates that frequency of pain assessments should occur at a minimum of once every shift, anytime patients report pain, 15-30 minutes after parenteral drug therapy and one (1) hour after oral drug therapy. However, other indicators such as the process-of-care quality indicators identified in the Assessing Care of Vulnerable Elders (ACOVE) set, state that older adults require frequent assessments and monitoring during an ED visit when they report moderate to severe pain (Terrell, et al, 2009). In this study the average pain reassessments were one or a five hour stay.

Age was not found to be a statistically significant factor influencing pain care (wait time to initiation of pain treatment and number of pain reassessments) in this study.

While a large number of adults (n=57) did not receive pain treatment in the ED, the reason for non-treatment after an initial pain assessment remains unclear. Prior studies suggest that age influences pain care but few (including this one) tackle the pressing question of why this occurs.

More women than men were included in this study. However gender was not a statistically significant factor influencing measured outcomes of initiation of pain treatment and number of pain reassessments during the visit. According to new IOM guidelines, sex is a better data element than gender and should be used in future studies (IOM, 2009.

The average self-reported pain scale on the NRS in the study was eight (8). Abdominal pain, back pain and falls were the three most prevalent pain-related conditions in patients in this study. As previously reported in the literature, abdominal pain is the single most common reason for an ED visit and accounts for approximately eight million annually in the US (Mills, Shofer, Chen, Hollander, & Pines, 2009). Abdominal pain was the chief complaint of 17% of the subjects in this study. Historically the use of analgesia for abdominal pain in the ED was thought to mask signs of peritonitis and potentially delay care but several recent studies have shown early analgesia does not lead to adverse outcomes. Today, early use of analgesia in patients with abdominal pain is a standard of care in the ED (Mills, et al, 2009).

In summary, the structural variables evaluated in this study, patient age and gender, were not statistically significant predictors of timeliness of pain treatment. It is acknowledged that other structural variables such as provider characteristics or ED system characteristics may impact quality of pain management.

Process

Crowding was not a contributing variable to longer wait times for initial pain treatment. Unfortunately, this study does not shed light on what actually happened during the ED visit when severe pain was initially assessed in an older adult. Given many competing priorities for ED provider time and attention, a number on a pain scale for a patient waiting to be seen may be far from a pressing matter (when compared with immediate problems such as hemorrhage, a stroke, gunshot wound, and MI). However, providers are obligated by professional ethics, such as the ANA Code of Ethics (2015) and hospital credentialing standards to acknowledge a person's pain, respond to it and further evaluate the pain as needed. Documentation of the pain scale must be followed by an intervention in order to meet the Joint Commission (JC) standard. After an intervention such as analgesia, a reassessment is necessary. RNs were the professionals who reassessed and documented pain in this study therefore, RNs have a role to play in the timely initiation of pan treatment.

Patient's perceptions and expectations about pain care were not captured in this study and usually are not part of the initial triage assessment. The question remains if those who did not receive any pain medications during the ED visit wanted it that way or whether there was an unmet need, desire or expectation about pain. This study did not evaluate chart notes that may have provided a rationale for why medications were not provided. Such reasons may include the patient self-medicated prior to arrival in the ED or the patient declined analgesia while in the ED. Other patient-specific or provider-specific reasons may have impacted the decision not to treat pain in the ED, however, these reasons would need to be evaluated in the chart documentation.

The unanswered questions in this study suggest that a different approach to inquiry is needed to better understand how to overcome barriers not yet clearly identified. The process must however, start in triage when the patient is initially asked about pain. For an older adult to rate their pain a 7 or an 8 on a scale of 0-10 in triage and have nothing happen for an hour may be inconsistent with ethical codes of conduct (ANA, 2015). Moreover, it is important to understand the processes of care in the ED that impact decision-making around pain treatment in the older adult population from both a technical and interpersonal aspect of care.

Outcomes

Patients in this study waited a long time from triage to the initiation of pain treatment. They waited to see a provider and then they waited again for initiation of pain treatment. In this study patients waited an average of 70 minutes after being seen by a prescribing provider to receive analgesia. Satisfaction is associated with the response of the ED staff to the patient's report of pain (Bhakta & Marco, 2012). This study did not compare wait times to an overall satisfaction score which would be a useful follow up evaluation.

In this study the long waits were not explained by ED crowding but what else may have been going on in the ED at the time of a visit was not accounted for in the individual chart reviews. Previously published studies have reported equivocal findings with relation to crowding and its effect on timely analgesia (Pines & Hollander, 2008, Hwang et al, 2006, 2007). This study found no significance in crowding and delays in initiation of pain care. However, it is not clear what contributed to delayed treatment.

Possibilities include delays in ordering medication (s), administering medication (s), or delay s in documenting administration of medication(s).

In this study types of analgesia varied by age group. PIMs prescribing overall was approximately 20% in the sample of 143 patients who received pain medication during the ED visit. PIMs prescribing was less in the 65 and older cohort, however, researchers point out that NSAIDs are one of the most widely prescribed medications with about 98 million prescriptions filled each year and an estimated 20% of adults over 65 regularly use an NSAID (Fowler, et al 2014). Patients who did receive analgesia in the ED were most often prescribed an opioid. Older adults received less analgesia overall and did receive less opioids but very few received NSAIDs which is consistent with avoiding PIM prescribing in older adults.

While NSAIDS are the mainstay of treatment for chronic pain in conditions such as osteoarthritis they carry many potential risks including gastrointestinal, cardiovascular, renal, and hematological side effects. The hospital-wide pain management policy in use at this medical center does not include a PIMs list or cite any of the explicit criteria. It does, however list the multiple black box warnings for NSAIDs and states that elderly patients are at increased risk of renal insufficiency and GI toxicity secondary to NSAID administration. It is not clear which if any guidelines were used by ED providers when they prescribed analgesia to patients in this study. Lack of consistent, evidence-based guidelines may impact outcomes and overall quality of pain management.

Strengths of the Study

The study showed that there is room for improvement in pain care for both younger and older adults in the ED. Specifically for older adults is the need for

improvement in pain care is evidenced by long waits for analgesia and a large number of patients 65 years and older who did not receive pain treatment. A major strength of this research is timeliness given the current state of pain care in the nations EDs and the important role RNs and APRNS can play in contributing to improved practice (IOM, 2010, 2011). Another strength in the study is that ED providers were blinded to the study so they did not know a pain management study was underway to prevent bias. The study also used a prospective approach so that wait times were captured in real-time and crowding scores were calculated as soon as the subjects were enrolled.

Limitations

The results of this study need to be considered with certain limitations regarding generalizability and validity. This exploratory study was based on a small (n=143), convenience sample drawn from a single urban, academic ED in one geographic area. There is the potential of bias within this sample and results are not generalizable.

One limitation of the study was that the reason for no pain medication administration during the visit was not captured. It is important to measure patient desire for analgesia especially in the older population who often decline adding new medications. In addition, other medications potentially used to treat abdominal pain such as H1- receptor antagonists and proton pump inhibitors (PPIs) were not assessed. The same is true for specific anti-anxiety medications (Valium) and antispasmodics (Flexeril) for back pain.

Another major limitation in this study was the lack of ethnicity and racial data collected. In prior studies, racial disparities were identified and associated with under-

treatment of pain (Todd, 2001; Heins, Homel, Safdar & Todd, 2010). The current EHR does not capture race and ethnicity data. During the registration process once a patient is "admitted" to the ED, the registration clerk will check off Black, Caucasian or Hispanic under race and ask a patient's religious beliefs and this information is stored under demographics in the billing record. This is a separate EHR from Wellsoft® which is the ED EHR. Race or ethnicity was not included in this study because it was not recorded in Wellsoft®. However, the current process for capturing race and ethnicity data during the billing process is inconsistent with current IOM recommendations and would have compromised the integrity of this data in the study (IOM, 2009).

Contribution to Nursing Research

The results of this study are consistent with previous research that suggests ED pain care of older adults needs improvement. As previously reported, ED structure, process, and outcome variables may contribute to quality pain care of older adults (Hwang et al, 2007, 2008, 2008). Moreover, this study suggests that nurses who assess pain in triage have a contribution to make to minimize delays in initiating pain treatment. ED nurses play an integral role in increasing the number of reassessments that may contribute to improved overall quality of pain care for older adults. Finally, this study identifies delays in initiation of pain treatment. ED nurses are essential for effective communication and advocacy for patients in pain consistent with their professional Code of Ethics (ANA, 2015). Such efforts may reduce wait times and improve the quality of pain care for older adults in the ED.

A multidimensional systems approach is necessary to evaluate the quality of pain care of older adult in EDs. Understanding the impact of unique structure, process and outcomes on pain care of older adults in this high stress, high-stakes environment has clear implications for clinical practice and subsequent clinical research. A patient-centered, interprofessional approach is necessary for improved pain care.

Implications for Education, Practice, Policy

Education

More than twenty years ago it was identified that nurses and other ED providers have knowledge gaps regarding both pain evaluation and treatment (IOM, 2011). This knowledge deficit may be influenced by patient characteristics as explored in this study but also by personal characteristics of providers including empathy level, knowledge deficits, bias, and prescribing practices all of which require further exploration.

Practice

Since nurses are on the front line of pain, this study and prior research suggest they need to be empowered to treat pain (Dihle, Bjolseth, & Helseth, 2006). While RNs are not authorized to prescribe analgesia without an advanced practice degree, non-pharmacologic measures may be implemented and initiation of early pain care is within their scope of practice just as they initiate life-saving interventions of early lab work and EKGs. Current processes may need improvements to flag an older adult with moderate to severe pain in order to facilitate timely initiation of pain care.

There is no doubt that substance use and behavioral disorders are just as common among ED patients as pain. Adult ED patients are more likely to smoke, drink, use illicit

substances, and misuse prescription drugs than are member of the general population (Bernstien & D'Onofirio, 2013). Older adults are not excluded. Yet there are few procedures in place to screen for substance abuse in patients or policies to provide supportive care to staff as they treat this growing and challenging population right along with patients who seek relief of pain. The cost of not treating addiction and substance abuse issues has far-reaching implications for individuals, society and the health care system http://www.globaldrugpolicy.org/Issues/Vol%202%20Issue%203/Emergency%20Medicine%20and%20Addiction%20Medicine.pdf.

Policy

Prioritizing pain and communicating when a pain protocol needs to be initiated by a prescriber may positively impact wait times for analgesia and improve overall quality of pain care. This requires policies that allow nurses to practice to the fullest extent of their license (IOM, 2007). Guidelines for ED pain care should not only focus on prescribing medications but on comprehensive, interprofessional, patient-centered practices led by nurses on the front-lines of pain. Studies to investigate use of front-line orders for analgesia, early pharmacist consultation, and pain care guidelines are needed.

Perhaps most importantly ED providers need to come to terms with feelings, attitudes and beliefs and find ways to address a prevalent and persistent problem that may be hindering quality pain care. Policies (governmental, organizational and departmental) and guidelines need to be in place to support patient, provider and staff rights, responsibilities and safety in managing pain in the ED (Poon & Greenwood-Ericksen, 2014). Primarily, conversations and science need to merge to find solutions to a complex

matter that single- handedly diminishes the ability of prescribers to effectively treat pain in the nation's EDs. Real solutions will not be easy to advance and will take input from an interprofessional team consisting of (but not limited to) nurses, pharmacists, physicians, social work and ED administration (IOM, 2011).

Policies such as "no-opioid" or "opiod-free" that are on the rise in EDs in urban areas are a one-size-fits-all approach to a serious and complex problem. Evidence shows that effective pain management must be patient-centered and the system cannot be allowed to drive pain care (IOM, 2011). Rather, providers must make an effort to avoid one-size-fits all policies and advocate for better, individualized pain care that meets the needs of all who seek it. Policies that address acute and chronic pain management in the ED may impact quality. While the intentions of opioid stewardship programs are important for improving safety in prescribing analgesia (Bernstein & Onofrio, 2013), such policies may contribute to continued under-treated pain. For older adults, these policies may carry great consequences related to untreated pain.

Recommendations for future research.

Given that the structure (age, gender) and process (crowding) variables evaluated in this study did not make a difference in the outcome of timeliness of pain treatment, other variables need to be explored. The DQF framework of structure, process, and outcomes provides a valid approach to the systematic study of variables within a complex system such as the ED. The following are recommendations for further study of pain care of older adults in the ED using the DQF framework.

Structure

Patient and provider characteristics as well as ED system characteristics require careful and thorough investigation. The growing population of older adults will continue to place demands on EDs. Given that pain is often overlooked by ED providers, further exploration to answer the question of why this occurs is needed. The current state of the system with regard to its ability to effectively manage older adult pain requires further study in order to make improvements.

The ability of ED providers to successfully manage pain relies on their ability to effectively assess pain. Further investigation into tools that provide comprehensive and culturally sensitive pain assessments of older adult pain are necessary. In this study, cognitively impaired older adults were excluded; however, this is an important population to evaluate for safe and effective pain care. The use of behavioral pain scales must be further evaluated for their use in EDs in order to improve pain care of older adults. Moreover, cultural differences have been shown to greatly influence the meaning of pain and how pain is perceived by both patients and providers. There may be reluctance on the part of the patient to report pain when asked a direct question such as the number on the NRS. Often physiologic signs are absent in the presence of chronic pain making assessment more complicated for providers. Further exploration into cultural differences and pain assessment is imperative to improving ED pain care.

Understanding the influence of other patient characteristics such as polypharmacy and comorbidity also requires further investigation. Older adults are living longer with more chronic diseases. Many studies to date have not evaluated patients over age 75, however, this is a growing and important cohort within the older adult population to understand in

terms of their pain care needs and quality outcomes related to pain treatments. This group tends have high ED utilization and more comorbidity and polypharmacy than younger adults. More studies to investigate pain care in the presence of comorbidity and polypharmacy are important to overall quality of pain management in older adults.

Given that this study shows many older adults do not receive pain care even when they reported severe pain, further investigation into barriers to pain treatment is required. Provider characteristics such as knowledge and attitudes about older adult pain and its treatment are important areas to explore given that pain often goes untreated. In addition, ED provider empathy and moral distress require further exploration as these characteristics may influence provider-decision making. In addition to prescribers (APRNs, Physicians & Physician Assistants) and their differences, ED nurses have an important role to play in improving pain care as they are typically the provider who initially assess and reassess pain. A better understanding of the RN's autonomy, scope of practice, and ability to assess, acknowledge and carry out pain care interventions in the ED may bring to light areas in need of improvement. Nurse's attitudes and beliefs about pain and pain management are important to understand as they are the largest group of providers on the front lines of pain The following questions warrant further exploration: When nurses do not medicate patients in pain do they experience an ethical dilemma? Do ED RNs feel empowered to treat pain with non-pharmacologic interventions and communicate with prescribers about the patient's pain? Do ED RNs experience high levels of moral distress? Such questions will shed light on factors that may influence RN's ability to initiate and implement pain care.

Process

ED prescribers face the difficult challenge of balancing the treatment of legitimate pain with combating the opioid abuse epidemic that is claiming so many lives today. Further studies to evaluate safe prescribing of opioids in the older adult population are needed. The technical aspect of pain care, as well as the interpersonal processes that impact effective pain treatment in the ED require further exploration.

More studies investigating nurse- initiated pharmacologic (front-line orders) and non-pharmacologic pain treatment seems to have value based on the fact that RNs are the professionals who routinely assess pain. Evidence is lacking on the use of front-line analgesia in triage. Further study into this practice is essential in order to improve timeline initiation of pain care. Moreover, studies that explore what pain interventions are initiated by RNs and when they are initiated during a patient's ED visit is important in order to provide a better understanding of ED pain care processes.

In addition, evaluating the impact of utilizing available technology to improve both the number of reassessments and the timeliness of initiation of pain treatment should be explored. Currently, such technology is not in use in the ED where this study took place. Examples of using the available technology include displaying patients' pain scores on the EHR default screen so all providers see in real time an older adult waiting and his or her reported pain. Also, adding prompts for pain reassessments similar to prompts for vital signs, and imbedding pop ups for assessment and treatment guidelines could be evaluated for their impact on overall quality of pain care.

To investigate why patients come to the ED in pain and often leave in pain requires further study to assess chart notes that may shed light on why the patient did not

receive pain medications. Such studies would provide answers to the lingering question of why pain may be overlooked in the ED. Perhaps the older adult did not want to receive pain medication or perhaps there were other reasons why pain treatment was withheld. Careful evaluation of provider (including prescriber and RN) notes when pain is not treated will help in understanding the processes around clinical decision-making and pain care.

Pathways for pain management of older adults also need further evaluation. Currently in the ED there exist several pathways mainly for life threatening emergencies such as trauma, stroke or MI. Given that pain is the most common complaint among ED patients, attention to pathways to improve quality of pain care across all age groups seems reasonable. An interprofessional approach to developing, implementing, and evaluating pathways for older adult pain could provide an initial step to developing further pain pathways for both the general ED population and vulnerable age groups such as children and cognitively impaired older adults who require unique assessments and pain treatments.

Outcomes

Assessment of what are patient and family expectations and attitudes about pain management in the ED is important in evaluating quality outcomes of pain care. Patients and family satisfaction is also an important outcome that needs to be closely evaluated with pain care. Understanding what these expectations are and how they have or have not been met will provide valuable insights.

Response to pain treatment in the ED is another outcome that can be evaluated during the ED stay. While in the ED, reduction in pain is one aspect of measuring a

response to pain care. But reassessing pain post discharge and screening for adverse events related to treatment by making a follow up call to the patient and /or family may be a valuable outcomes assessment. Such documented outcomes will provide information to providers about the quality of pain care older adults' received. It is important to evaluate response in order to gauge outcomes and overall quality. A transition study to evaluate home risk after pain care in the ED, especially when opioids are prescribed as in this study, would provide valuable insight into quality of pain care for older adults. Avoiding adverse drug events and reducing falls in this population is essential. Transition studies post ED discharge could be valuable in identifying at risk individuals and preventing adverse events. Moreover, transition studies related to outcomes of pain care may help identify those seniors most at risk for complications related to unresolved pain.

Finally, adherence to evidence based guidelines for managing older adult pain is essential. Further study to evaluate which guidelines ED prescribers use will help identify areas of improvement. Since the Beers Criteria is not widely accepted among ED prescribers, perhaps other guidelines are in use. Valuable insight may be attained about prescriber use and adherence to pain management guidelines and the effect on quality pain care.

Summary and Conclusion

This study identifies that pain in seniors may be overlooked and go untreated by ED providers especially among those age 65 years and older. It also identifies factors that contribute to quality pain care and brings to light future directions of inquiry to further advance nursing science to improve ED pain care for older adults.

The axiom that pain is more than just a number is actually more than a casual saying. It is a serious clinical and research premise put forth by Gary Donaldson, PhD, Professor and Director of the Pain Research Center Department of Anesthesiology School of Medicine and Statistician for the College of Nursing at the University of Utah. He and his colleagues have been working on a rationale for "changes, assessment and reassessment of pain" (https://hsc.mediaspace.kaltura.com/media/t/0_js0gz6ql/8119062). Their vision is to have health care providers forgo obligating patients to number their pain using the conventional pain scale (NRS) because pain is a complex experience and most people find it difficult to assign a single number to describe what they feel. Instead, Donaldson and colleagues advocate for conversations between providers and patients about their pain. Is their pain tolerable or intolerable? Is their pain comfortably manageable? The "comfortably manageable measure" may be the goal of clinical management as opposed to a drop in the number from 10 to 6 for example. While the NRS is a valid measure of pain, it is a univariate tool that that does not evaluate pain in a comprehensive way. In some cases, the numbers may not be meaningful and may in fact lead to the inability of clinicians to effectively manage pain in older adults. (http://medicine.utah.edu/faculty/mddetail.php?facultyID=u0274011) . This more rational approach to pain management provides momentum to find solutions and advance nursing science that will provide evidence necessary to change pain care in EDs.

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Appendix A: Updated Beers Criteria

Identifying Medications that Older Adults Should Avoid or Use With Caution: the *2012 American Geriatrics Society Updated Beers Criteria*

HEALTH IN AGING
Trusted Information. Better Care.

Summary of this Study

For more than 20 years, *the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults* has been the leading source of information about the safety of prescribing drugs for older people. To help prevent medication side effects and other drug-related problems in older adults, the American Geriatrics Society (AGS) has updated and expanded this important resource. The expanded *AGS Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults* identifies medications with risks that may be greater than their benefits for people 65 and older.

Why Experts Developed the Beers Criteria

As you get older, your body changes. These changes can increase the chances that you'll have side effects when you take medications. Older people usually have more health problems and take more medications than younger people. Because of this, they are also more likely to experience dangerous drug-drug interactions. Every year, one in three adults 65 or older has one or more adverse (harmful) reactions to a medication or medications. This is why it's important for researchers to identify and help reduce use of drugs that are associated with more risks than benefits in older people.

The *Beers Criteria* was last updated in 2003. The criteria need to be updated regularly because new drugs continue to be marketed and new studies continue to provide information on the safety of existing medications. In 2011, the criteria was updated by the American Geriatrics Society using a panel of healthcare and pharmacy experts. The AGS will continue to update the criteria on a regular basis.

The updated 2012 AGS Beers Criteria is published in the *Journal of the American Geriatrics Society.* It is available online at www.americangeriatrics.org.

What the Researchers Found

Using a time-tested method for developing care guidelines, and following the recommendations of the Institute of Medicine, members of the expert panel reviewed more than 2,000 high-quality research studies about medications prescribed for older adults.

Based on the review of this research, the experts identified:

- 34 medications and types of medications that are "potentially inappropriate" for older people. Healthcare providers should consider avoiding drugs on this list when

prescribing for adults 65 or older. These medications pose a higher risk of side effects, may not work as well in an older person, and may be replaced with safer or more effective medications or non-drug remedies.

- Medications used for 14 common health problems that are potentially inappropriate for older adults. Older adults often have other diseases or disorders in addition to these 14 health problems that the medications may make worse.

- 14 types of drugs that are potentially inappropriate and should be used only with caution in older adults. Drugs on this list may cause medication-related problems and may not be completely effective. However, they may be the best choice available for certain older patients. Healthcare providers need to carefully monitor how these drugs are working and keep an eye out for side effects. And older adults who take these medications, or their caregivers need to let their healthcare professionals know if these drugs don't seem to be working, or appear to be causing side effects.

How Health Professionals Are to Use this List

Healthcare providers refer to the *AGS Beers Criteria* when deciding whether and what to prescribe for older adults, but *should not make these decisions based only on the criteria.* Among other reasons, they shouldn't do this because the criteria don't apply to all situations that older patients face. The criteria, for example, don't take into account all of the unique circumstances of older people getting palliative or hospice care.

Because the criteria shouldn't dictate what healthcare providers prescribe, healthcare providers should not be penalized for prescribing a medication for an older person simply because it is on one of the criteria lists. Different older adults respond differently to the same medication, and, again, for some patients, drugs listed in the criteria will be the best choices.

The criteria are also used in research, training, determining healthcare policy, developing insurance company policies regarding medication coverage, efforts to improve the quality of prescribing for older people, and the development of quality standards for drug therapy for older adults.

- Ask if any of your medications are known to cause side effects. And if so, ask what they are—so you can watch for them. If you think you may be having a bad reaction to a drug, tell your healthcare professional. You should also speak with your healthcare provider if a drug you are taking appears in the *2012 AGS Beers Criteria* and you are concerned that it may be causing side effects or other problems. You should **not** simply stop taking a medication because you think it may not be working or causing side effects, or because it is included in one of the three lists mentioned above. **You should never stop taking medications without first checking with a healthcare professional.**

- Keep in mind that if a drug you take is on one of the lists in the *AGS Beers Criteria*, this does not necessarily mean that it poses greater risks than benefits *for you*. The way *you* respond to a medication or medications can differ from the way other people respond to it. This is why the experts who updated the criteria use the phrase "*potentially* inappropriate." While the drugs on the lists *may* cause side effects in some older adults, they won't necessarily cause these problems in *all* older people.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Anticholinergic drugs—these drugs can cause side effects such as confusion, hallucinations, sleepiness, blurred vision, difficulty urinating, dry mouth and constipation in older adults.		
Antihistamines—drugs that are typically prescribed for allergies, hives and eczema: • Brompheniramine • Carbinoxamine • Chlorpheniramine • Clemastine • Cyproheptadine • Dexbrompheniramine • Dexchlorpheniramine • Diphenhydramine (oral) • Doxylamine • Hydroxyzine • Promethazine • Triprolidine	These drugs cause many side effects in older adults, including confusion, drowsiness, blurred vision, difficulty urinating, dry mouth and constipation. Safer medications are available.	Avoid Use of diphenhydramine in special situations—such as for treating severe allergic reactions—may be appropriate.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Antiparkinsonian drugs prescribed for Parkinson's disease and other health problems: • Benztropine (oral) • Trihexyphenidyl	There are other medications that are usually more effective for Parkinson's disease and related disorders than these. The drugs should not be used for other conditions, like treating side effects of other medications (for example the movement side effects of antipsychotic medications).	Avoid
Antispasmodic medications prescribed to relieve cramps or spasms: • Belladonna alkaloids • Clidinium-chlordiazepoxide • Dicyclomine • Hyoscyamine • Propantheline • Scopolamine	It's is not clear whether these drugs are effective, but they have side effects.	Avoid except if used in short-term "comfort care."
Antithrombotics—these are medications to prevent or dissolve blood clots that can form inside blood vessels. These blood clots can be life-threatening.		
The short-acting form of Dipyridamole that is taken by mouth	This form may make your blood pressure drop when you stand up. This can make you dizzy and may lead to dangerous falls. More effective alternatives are available. The form of dipyridamole that is injected, however, can be used during a heart "stress test."	Avoid
Ticlopidine	Safer, effective alternatives to this drug are available.	Avoid
Anti-infective drugs—such as antibiotics and antiviral drugs		
Nitrofurantoin, an antibacterial drug prescribed for urinary tract infections	This drug may cause side effects that affect the lungs. Safer medications are available.	Avoid long-term use and in patients with certain kidney problems.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Cardiovascular drugs—for disorders that affect the heart and blood vessels.		
Alpha$_1$ blockers—drugs for the prostate but also prescribed for high blood pressure. • Doxazosin • Prazosin • Terazosin	These drugs can cause a drop in blood pressure and dizziness when you stand up. This can lead to falls. Alternative treatments provide better results with lower risks.	Avoid using for high blood pressure.
Medications, called Alpha agonists, which are prescribed for high blood pressure. • Clonidine • Guanabenz • Guanfacine • Methyldopa • Reserpine at doses greater than 0.1 milligrams daily	These drugs may cause a slow heartbeat and dizziness. They are not recommended for routine treatment of high blood pressure.	Clonidine should not be a first-choice treatment for high blood pressure. The other drugs on the list should be avoided.
Antiarrhythmic drugs prescribed for atrial fibrillation (irregular heart beat). (Class Ia, Ic, III) • Amiodarone • Dofetilide • Dronedarone • Flecainide • Ibutilide • Procainamide • Propafenone • Quinidine • Sotalol	Other treatments may provide better results, or cause fewer side effects, or both. Amiodarone may contribute to thyroid, lung and heart problems.	These drugs should not be the first choice for treating atrial fibrillation.
Disopyramide	Disopyramide may increase risks of heart failure in older adults and may cause confusion, blurred vision, difficulty urinating, dry mouth and constipation. Safer medications are available.	Avoid
Dronedarone	There are other drugs that provide better results in patients with atrial fibrillation (irregular heartbeat) or heart failure.	Avoid in some patients with atrial fibrillation or heart failure.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Digoxin at doses higher than 0.125 milligrams per day	In older patients with heart failure, higher doses appear to offer no additional benefit and may increase risks of dangerous side effects. Older patients with kidney problems are at particular risk of side effects.	Avoid
Nifedipine, immediate release	This drug may lower blood pressure and could cause other heart problems.	Avoid
Spironolactone at doses higher than 25 milligrams daily	In people with heart failure, higher doses may boost risks of high potassium.	Avoid higher doses in patients with heart failure or lower kidney function.
Drugs affecting the brain and spinal cord		
Tertiary Tricyclic Antidepressants, alone or in combination: • Amitriptyline • Chlordiazepoxide-amitriptyline • Clomipramine • Doxepin at doses of more than 6 milligrams per day. • Imipramine • Perphenazine-amitriptyline • Trimipramine	Potential side effects include: confusion, drowsiness, blurred vision, difficulty urinating, dry mouth and constipation in older adults. They can also cause a drop in blood pressure and dizziness when you stand up. Safer medications are available.	Avoid
All antipsychotic drugs	These drugs may increase risks of confusion, sleepiness, blurred vision, difficulty urinating, dry mouth, constipation, stroke, and death in people with dementia.	Avoid using these drugs to treat behavioral problems in older people with memory disorders unless non-drug options haven't worked and the patient is a threat to himself or herself or others.
Thioridazine Mesoridazine	These drugs may cause confusion, sleepiness, blurred vision, difficulty urinating, dry mouth and constipation. They may also increase risks of dangerous changes in heartbeat.	Avoid

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Barbiturates • Amobarbital • Butabarbital • Butalbital • Mephobarbital • Pentobarbital • Phenobarbital • Secobarbital	These medications can be addictive. Over time, they get less effective in helping older adults sleep. They are more likely to cause overdoses at lower doses than alternative drugs.	Avoid
Benzodiazepines *Short- and intermediate-acting:* • Alprazolam • Estazolam • Lorazepam • Oxazepam • Temazepam • Triazolam *Long-acting:* • Chlorazepate • Chlordiazepoxide • Chlordiazepoxide-amitriptyline • Clidinium-chlordiazepoxide • Clonazepam • Diazepam • Flurazepam • Quazepam	Older adults are especially sensitive to these medications. These drugs may increase risks of mental decline, delirium, falls, fractures, and car accidents in older adults. Despite these risks, they may be appropriate, in certain cases, for treating seizures, certain sleep disorders, anxiety disorders, withdrawal from benzodiazepine drugs and alcohol, and end-of-life care.	Avoid benzodiazepines (all types) when treating insomnia, agitation, or delirium (serious confusion that may have lasting effects).
Chloral hydrate	Not effective long-term, with high risk of overdose.	Avoid
Meprobamate	This medication makes older adults sleepy and can be addictive.	Avoid
Nonbenzodiazepine hypnotics • Eszopiclone • Zolpidem • Zaleplon	These medications may not significantly improve sleep and can cause many serious side effects, including confusion, falls, and bone fractures.	Avoid ongoing use of these drugs (over 90 days).
Ergot mesylates Isoxsuprine	These medications are not very effective.	Avoid

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Drugs and treatments for conditions affecting the glands that produce and secrete hormones, such as androgens ("male hormones") and estrogen and progestins ("female hormones")		
Androgens • Methyltestosterone • Testosterone	These drugs may worsen heart problems and cause other side effects. They shouldn't be prescribed for men with prostate cancer.	Avoid using in men with prostate cancer. In other men, prescribe only for moderate to severe declines in natural testosterone production.
Desiccated thyroid	Desiccated thyroid may not be appropriate for patients with a history of heart problems. Safer medications are available.	Avoid
Estrogens with or without progestins	These hormones may increase risks of breast cancer and cancer of the lining of the uterus. They don't appear to help protect women from heart disease or loss of cognitive (thinking) ability in later life. Estrogen cream inserted into the vagina does help vaginal dryness and is safe in women with breast cancer, especially if low doses are used.	Avoid pills and skin patches. Vaginal creams can be used at low doses to relieve pain during sex, and help prevent urinary tract infections, and related vaginal problems.
Growth hormone	Growth hormone has many side effects, including joint pain, swelling, enlargement of breast tissue in men, and carpal tunnel syndrome. It may also increase the chance of getting diabetes.	Avoid, except in patients who have had their pituitary gland removed for medical reasons.
Insulin, sliding scale	This way of dosing insulin is not very effective and can increase the chance of low blood sugar.	Avoid
Megestrol	This drug, prescribed to increase appetite, is not very effective, and may increase the chance of blood clots and, possibly, death.	Avoid

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Sulfonylureas, long-duration • Chlorpropamide • Glyburide	Both medications can cause dangerous low blood sugar and other side effects in older adults. Safer medications are available.	Avoid
Medications for gastrointestinal problems		
Metoclopramide	This medication may cause shakiness, sleepiness, and uncontrollable abnormal body movements. Frail older adults may be even more likely to get these effects.	Avoid, except for gastroparesis, a condition that reduces the ability of the stomach to empty its contents.
Mineral oil, taken by mouth	When swallowed, mineral oil may be accidentally inhaled and, as a result, can cause pneumonia. Safer medications are available.	Avoid
Trimethobenzamide	Not very effective for treating vomiting. This medication can cause side effects such as shakiness, sleepiness, and abnormal body movements.	Avoid
Pain Medications		
Meperidine	This is not a very effective pain reliever and may seizures. Safer medications are available.	Avoid

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults		
Drugs and Categories of Drugs	**Why these drugs may be inappropriate for older adults**	**Recommendations**
Non–COX-selective Non-Steroidal Anti-inflammatory Drugs (NSAIDs), oral • Aspirin at doses higher than 325 milligrams per day • Diclofenac • Diflunisal • Etodolac • Fenoprofen • Ibuprofen • Ketoprofen • Meclofenamate • Mefenamic acid • Meloxicam • Nabumetone • Naproxen • Oxaprozin • Piroxicam • Sulindac • Tolmetin	These medications increase the chance of stomach and intestinal bleeding in adults 75 or older, and adults 65 and older taking certain other medications (like prednisone warfarin, and clopidogrel) and medicines to prevent stroke. Taking a powerful stomach medication like a proton-pump inhibitor (omeprazole) or misoprostol at the same time as these drugs lowers—but doesn't eliminate—these risks.	Do not use these medications regularly unless there are no other effective alternatives and they are prescribed along with a proton-pump inhibitor or misoprostol.
Indomethacin Ketorolac	These drugs are NSAIDs that are even more likely to increase the chance of stomach and intestinal bleeding and ulcers or to cause other harmful effects.	Avoid
Pentazocine	This pain reliever can cause confusion, hallucinations and other side effects. Safer medications are available.	Avoid
Skeletal muscle relaxants • Carisoprodol • Chlorzoxazone • Cyclobenzaprine • Metaxalone • Methocarbamol • Orphenadrine	Most muscle relaxants have questionable effectiveness and can cause side effects such as sleepiness and increased risks of bone fractures in older people.	Avoid

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults			
Disease or Syndrome	**Drug(s)**	**Rationale**	**Recommendation**
Delirium	All Tricyclic Antidepressants (TCAs) All Anticholinergic drugs Benzodiazepines Chlorpromazine Corticosteroids H_2-receptor antagonist Meperidine Sedative hypnotics Thioridazine	These medications can cause or worsen delirium in older people. Avoid these drugs in older adults with or at high risk of delirium.	Avoid
Dementia and cognitive/ mental impairment	Anticholinergic drugs Benzodiazepines H_2-receptor antagonists Zolpidem Antipsychotics—used regularly or as needed	Avoid these drugs in adults with cognitive or "thinking" problems because these medications may make this worse. Antipsychotic drugs should not be prescribed for behavioral problems related to dementia unless non-drug or safer drug options are not working and a patient is a threat to himself or others. Antipsychotic drugs may increase the chance of stroke and death in people with dementia.	Avoid
A history of falls or fractures	Anticonvulsants Antipsychotics Benzodiazepines Nonbenzodiazepine hypnotics • Eszopiclone • Zaleplon • Zolpidem Tricyclic Antidepressants (TCAs) and Selective Serotonin Uptake Inhibitors (SSRIs)	These drugs can cause fainting and falls, and make it hard to coordinate movements.	Avoid unless safer medications are not available. Avoid anticonvulsant drugs in someone with a history of falls/ fractures unless it is for seizures.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults			
Disease or Syndrome	**Drug(s)**	**Rationale**	**Recommendation**
Insomnia	Oral decongestants • Pseudoephedrine • Phenylephrine Stimulants • Amphetamine • Methylphenidate • Pemoline Other medications • Theophylline • Caffeine	These drugs make insomnia worse.	Avoid
Parkinson's disease	All antipsychotics except quetiapine and clozapine Antiemetics • Metoclopramide • Prochlorperazine • Promethazine	These drugs may worsen symptoms of Parkinson's disease and/or cause Parkinson's-like symptoms Quetiapine and clozapine appear to be less likely to worsen symptoms of Parkinson's disease than the other drugs listed here.	Avoid
Chronic constipation	Oral medications for urinary incontinence • Darifenacin • Fesoterodine • Oxybutynin • Solifenacin • Tolterodine • Trospium Antihistamines • Brompheniramine (various) • Carbinoxamine • Chlorpheniramine • Clemastine (various kinds) • Cyproheptadine • Dexbrompheniramine • Dexchlorpheniramine (various kinds) • Diphenhydramine • Doxylamine • Hydroxyzine • Promethazine • Triprolidine	The medications can worsen constipation and safer medications are available.	Avoid unless no other alternatives are available.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults			
Disease or Syndrome	**Drug(s)**	**Rationale**	**Recommendation**
Chronic constipation (cont'd)	Heart/blood pressure medications • Diltiazem • Verapamil Other medications • Antipsychotics • Belladonna alkaloids • Clidinium-chlordiazepoxide • Dicyclomine • Hyoscyamine • Propantheline • Scopolamine • Tertiary Tricyclic Antidepressants (amitriptyline, clomipramine, doxepin, imipramine, and trimipramine)	The medications can worsen constipation and safer medications are available.	Avoid unless no other alternatives are available.
Repeated stomach or intestinal ulcers	Aspirin at doses higher than 325 milligrams per day Non–COX-2 selective NSAIDs	These drugs may make ulcers worse and increase the chance of new ulcers.	Avoid these drugs unless other medications are not effective and the patient can take an accompanying medication that can help prevent ulcers—such as a proton-pump inhibitor or misoprostol.
Poor kidney function	Nonsteroidal anti-inflammatory drugs Triamterene (alone or in combination with other medications)	These drugs may increase risks of potentially serious kidney damage.	Avoid
Urinary incontinence (accidental loss of urine) in women	Estrogen in pill or patch form (but not estrogen cream inserted into the vagina)	Estrogen in pill or patch form can make urinary incontinence worse in women.	Avoid in women.

AGS Beers Criteria for Potentially Inappropriate Medication Use in Older Adults			
Disease or Syndrome	**Drug(s)**	**Rationale**	**Recommendation**
Prostate enlargement or urinary problems in men	Ipratropium inhaler Tiotropium inhaler	These medications may cause aggravated prostate problems and make urination more difficult.	Avoid in men.
Stress or mixed urinary incontinence (loss of urine when sneezing/ coughing/ bending over/with exercise)	Alpha-blockers • Doxazosin • Prazosin • Terazosin	These may make bladder-control problems worse	Avoid in women.

***2012 AGS Beers Criteria for Potentially Inappropriate Medications* to Be Used with Caution in Older Adults**		
Drug(s)	**Rationale**	**Recommendation**
Aspirin to prevent heart attacks and other "cardiac events"	In adults 80-years-old and older, aspirin may do more harm than good	Use aspirin with caution in adults 80 and older.
Dabigatran	This medication, used to prevent the formation of blood clots in patients with atrial fibrillation, increases the chance of bleeding in adults 75 years and older more than another drug, warfarin, that is used for the same purpose. There isn't enough evidence that dabigatran is effective and safe in patients with kidney problems.	Use this drug with caution in adults 75 and in older adults with kidney problems.
Prasugrel	This drug can increase the chance of bleeding in older adults, but may be appropriate for some older adults at very high risk of future heart problems.	Use with caution in adults 75 years or older.
Antipsychotics Carbamazepine Carboplatin Cisplatin All antidepressants Vincristine	These drugs may lower your blood sodium level to dangerous levels. Healthcare providers should monitor patients taking these medications.	Use with caution.
Vasodilators	These drugs may increase risks of fainting in older adults with a history of fainting.	Use with caution.

Sharon R. Rainer, MSN, APRN-BC, FNP-C, ANP-C

EDUCATION

PhD Nursing- University of Wisconsin-Milwaukee, School of Nursing
PhD, May, 2015
Post-Masters Certification -2007 Family Nurse Practitioner Program Thomas Jefferson University, College of Graduate Studies, School of Nursing
Post-Masters Certification – 2000 Adult Nurse Practitioner, University of Pennsylvania, School of Nursing
Master of Science in Nursing-1999, University of Pennsylvania, School of Nursing
Bachelor of Science in Nursing 1995 LaSalle University, School of Nursing
Associate in Science in Nursign-1991,Hahnemann University, School of Nursing

POST-GRADUATE TRAINING AND INTERNSHIPS

Sigma Theta Tau Nurse Faculty Leadership Academy, 2014-

Jefferson Center for Interprofessional Education, Geriatric Interprofessional Education Certificate Program, 2013-2014

Jefferson Center for Interprofessional Education and Care Practicum, Thomas Jefferson University, 2010

Academy of Emergency Nursing (AEN), Establishing Mentors Internationally for Emergency Nurses Creating Excellence (EMINENCE) Mentor Program, 2010

US Chamber of Commerce, Institute for Organizational Management Cert. Association Management, 2004

Nurse in Washington Internship, 1999

United States Department of Labor, Occupational Safety and Health Administration (OSHA) Nurse Intern, 1998

PROFESSIONAL EXPERIENCE

Academic Experience:

08/2009- Present	Instructor, Graduate School Faculty- Thomas Jefferson University, School of Nursing
2001-2002	Undergraduate clinical adjunct faculty, University of Pennsylvania, School of Nursing.

Clinical Experience:

2005- Present	Family Nurse Practitioner Department of Emergency Medicine, Thomas Jefferson University
2003-2005	Registered Nurse Cooper University Hospital Emergency/Trauma
1991-2000	Registered Nurse Critical Care/Trauma

Industry Experience:

2000-2009	Deputy Executive Director/ Chief Lobbyist New Jersey State Nurses Association
1997-2000	Worker Compensation Case Manager Department of Occupational Medicine University of Pennsylvania

CERTIFICATION

Certified Family Nurse Practitioner (FNP)
Certified Adult Nurse Practitioner (ANP)
Advanced Cardiac Life Support (ACLS)
Pediatric Advanced Life Support (PALS)
Basic Life Support (BLS)

LICENSURE

New Jersey Registered Nurse
New Jersey Advanced Practice Nurse (APN), Adult and Family Health
Pennsylvania Professional Registered Nurse
Pennsylvania Certified Registered Nurse Practitioner (CRNP), Adult and Family Health
Prescriptive Authority-DEA Certified

HONORS AND AWARDS

2014	Dean's Faculty Achievement Award, Thomas Jefferson University, School of Nursing
2012	Work Environment Council of NJ, Volunteer Appreciation Award
2011	Burlington Count Medical Reserve Corps Service Award
2005	Nurse Luminary- Nurses Lighting the Way to Environmental Health

2005	New Jersey State Award for Excellence as a Nurse Practitioner, American Academy of Nursing
2000	Textilease Medique Occupational Health Nursing Leadership Award
1999	Dean's Award, University of Pennsylvania, School of Nursing
1998	Policy and politics in Nursing Fellowship Award, National Federation of Specialty Nursing Organizations

GRANTS

2010	Thomas Jefferson University School of Nursing Seed Money for beginning researchers.
2009	RN No Harm, American Nurses Association
2008	Health Care Without Harm, Nurses Workgroup Mini Grant
2006	Health Care Without Harm, Nurses Workgroup Mini Grant

PUBLICATIONS

Hall, E., Rainer, S.R. (2015). Effects of yoga on glycemic control in type 2 diabetics. *The Journal for Nurse Practitioners.* In press. Accepted for publication 3/20/15.

Rainer,S.R. (2015). ENP Policy Watch. American Academy of Emergency Nurse Practitioners Newsletter. Winter, 2015

Aungst, L. Rainer, S. (2014). Importance of Vitamin D to Postmenopausal Women's Health. The Journal for Nurse Practitioners. 10 (9). 653–659DOI: http://dx.doi.org/10.1016/j.nurpra.2014.06.017

Rainer, S.R. (2010). Taking an active role in the policy arena: Communication is Key. *Pennsylvania Nurse,* 65 (3). 26.

Green-McKenzie, J., Behrman, A., Emmett, T., Rainer, S. (2002). The effects of a health care managed initiative on reducing workers' compensation costs. *Journal of Occupational and Environmental Medicine*, 44 (12) 1100-1105.

Rainer, SR., Papp, E., (2000). The Self Employed Occupational and Environmental Health Nurse: Maximizing Business Success by Managing Financial Resources. *American Association of Occupational Health Nurses Journal*. 48 (4) 185-194.

MAJOR SPEECHES AND PRESENTATIONS

Timeliness and Satisfaction with Pain Management Among Older Adults with Minor Musculoskeletal Injuries. Poster. 2014 Emergency Care Conference New Jersey State Council of the Emergency Nurses Association

Interprofessional Education: Developing Cultural Awareness Using a Workshop Model, Interprofessional Education Workshop, Thomas Jefferson University, March 2009.

Medication Safety and Older Adults, Thomas Jefferson School of Nursing, Grand Rounds, Riddle Memorial Hospital, February 2009.

Creating Policy, Nurses Role in Trenton, Speaker, New Jersey Institute for Nursing, 2005, 2006, 2007, 2008, 2009.

A Heavy Lift: Workplace Changes to Reduce Nurse Musculoskeletal Injuries. American Nurses Association Convention, Minneapolis, MN, July, 2004.

Ergonomics and the Aging Nursing Workforce. American Nurses Association Convention, Philadelphia, PA. June, 2002.

A Short Primer on Regulatory and Statutory Changes in New Jersey, New Jersey Nursing Convention, Atlantic City, NJ. March, 2002.

Effective State and Local Lobbying, New Jersey State Nurses Association Student Legislative Workshop. Trenton, NJ March 2001.

Effective Techniques in Reducing Hospital Workers' Compensation Costs. Poster presentation at the 85Th Annual American Occupational Health Conference (AOHC). Philadelphia, PA. May 2000.

The Use of Managed Care in Reducing Hospital Worker's Compensation Costs. Poster presentation at the Johns Hopkins Education and Research Symposium. Baltimore, MD, May 2000.

Administrative Topics in Occupational Health. University of Pennsylvania School of Nursing Occupational Health Seminar. Philadelphia, PA 1999.

UNIVERITY SERVICE

Treasurer- Delta Rho Chapter, Sigma Theta Tau International 2014-

President- Delta Rho Chapter, Sigma Theta Tau International 2012-2014

Member, Curriculum Committee- 2011-2014

President-Elect, Delta Rho Chapter, Sigma Theta Tau International 2010-2012

Student Progress, Promotion and Outcomes Committee, 2009- 2011

Evaluations and Outcomes Committee 2010-2011

Nurse Executive Council – 2010- 2013

Clinical Preceptor: Thomas Jefferson University- Jefferson College of Health Professions, Department of Nursing. Adult Nurse Practitioner Program January 2009-2010

APPOINTMENTS/ELECTED POSITIONS

2015-	Chair, Political Action/Advocacy Committee, American Academy of Emergency Nurse Practitioners
2009- 2012	Pennsylvania State Nurses Association (PSNA), Chair, Government Relations Committee.
2009- 2011	Emergency Nurses Association (ENA), Position Statement Review Committee.
2004-2008	Committee Chair, State Government Relations, New Jersey Association of Occupational Health Nurses
2001-2003	American Nurses Association (ANA) House of Delegates
2001-2004	Corresponding Secretary, State of New Jersey Association of Occupational Health Nurses
2000-2002	President, Sigma Theta Tau International, Kappa Delta Chapter
1999-2009	Board of Trustees, Treasurer, Interested Nurses Political action Committee, New Jersey State Nurses Association (NJSNA)
1999-2001	Director, Southern New Jersey Chapter, State of New Jersey Association of Occupational Health Nurses

MEMBERSHIPS AND PARTICIPATION IN PROFESSIONAL ORGANIZATIONS

Sigma Theta Tau, International Nursing Honor Society (STTI)

American Nurses Association (ANA)

National League for Nursing (NLN)

Emergency Nurses Association (ENA)

National Organization of Nurse Practitioner Faculty (NONPF)

Eastern Nursing Research Society (ENRS)

American Association of Nurse Practitioners (AANP)

American Academy of Emergency Nurse Practitioners (AAENP)