2016

Beers Medication: Empowering the Elderly Through Education

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DNP Project Report

Beers Medication: Empowering the Elderly Through Education
A Retrospective Chart Review

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Fall 2016

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Dedication

I dedicate this work and the successful completion of my doctorate degree to my mother who passed away in 2001. An amazing lady, she taught me how to show love and compassion to all people and has been my drive and determination to complete this degree. I would also like to thank my family, friends as well as the future patients I will care for. My family and friends have always believed in me and pushed me to always go the extra mile. This is my life long commitment to help the elderly population feel empowered and take control of their care.

Acknowledgements

I would like to acknowledge Dr. Julie Ossege for all her guidance and reassurance during this practice inquiry project. I am truly thankful for all of the texts, calls and emails, regardless of the time, day or night. I also want to thank Norton Healthcare for making my dream a reality. Kim Tharp-berrie and Tracy Williams; Thank you for empowering the profession and believing in the vision of furthering education. Thank you Jo Singleton for offering to help a fellow DNP collect data. Thank you to my study group: we all started out as strangers and are graduating as family. Lastly, Betty Hayes, you deserve a thank-you a million times for making sure our class always had what we needed. Whether it was a late night run to make a new poster or ordering our favorite food from Panera, we are truly blessed to have you!

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Abstract

The elderly population (those aged 65 years and older) has an increased risk of experiencing adverse effects from their prescribed medications. These adverse effects are due to many reasons, one being changes that naturally occur in the aging body, such as diminished kidney function or decreased gastrointestinal motility. This project explores the prescribing practices of one primary care practice setting. Specifically, this project sought to determine the number of patients in a primary care practice who were prescribed medications on the Beers list and whether or not the patients received education on adverse effects. The results concluded the most frequently prescribed high-risk medications at the project practice site were corticosteroids, Diclofenac, Pseudoephedrine, Alprazolam, Zolpidem and Meloxicam. Also, only four of the 101 patient records reviewed had any documentation regarding education on potential side effects from the prescribed high-risk medication. Further research is needed to uncover reasons why patients are not educated on medication side effects. Strides need to be taken to educate this vulnerable population.

Key words: Beers Medication, High-risk Medication and Education in the Elderly

Introduction

The Beers criteria were originally developed in 1991 by gerontologist Dr. Mark Beer. Dr. Beer developed a list of medications to be avoided in elderly patients and are considered to be inappropriate to prescribe. The list has been updated several times over the past two decades. The American Geriatric Society (AGS) endorses the Beers criteria (AGS, 2001). The criteria were based on high-risk medications proven to cause adverse effects in the elderly population. Beers medications include a variety of drugs including certain anticholinergic, antithrombotic, cardiovascular, central nervous system, endocrine, gastrointestinal, and pain medications. Examples of these medications, some prescribed for decades, include: Promethazine, Hyosyamine, Scopolamine, Nitrofurantoin, Doxazosin, Clonidine, Amiodorone, Digoxin, Phenobarbital, Alprazolam, Ibuprofen, Zolpidem, Testosterone, Glyburide and Metoclopramide. The adverse effects of these medications can be a subtle as the patient experiencing dry mouth to as serious as a cerebrovascular accident. These medications can cause potential harm to the elderly and safer alternatives may be available. For example, Diphenhydramine is a commonly used over-the-counter antihistamine. It causes drowsiness, which can increase the risk of falls in the elderly. A safer alternative would be another non-drowsy over-the-counter antihistamine such as Loratadine. Another example is Zolpidem, a prescription sleep aid. This medication is known to cause confusion and drowsiness in the elderly. A provider could also try a patient on non-medication sleep hygiene techniques rather than Zolpidem. (Beers, 2012).

Prescribing high-risk medication to the elderly population is increasingly an issue in the U.S. health care system. In the past decade growth in the elderly population led to an increase in these potentially harmful drugs being prescribed and administered. According to Pugh et al. (2013), “The Institute of Medicine has deemed the recognition and prevention of drug related

problems in the elderly as a key priority for this decade" (Pugh et al, 2013). In 2050, the population aged 65 and over is projected to be 83.7 million, almost double its estimated population of 43.1 million in 2012 (Hogan, Orthman & Velkoff, 2014). Increases in the geriatric population will likely lead to more geriatric patients being seen by providers and prescribed medications. A recent study of community dwelling elderly adults (n=18,475) using prescription medication in the United States confirmed that 43% were on at least one medication deemed inappropriate based on the Beers criteria (Davidoff et al., 2015). In another study consisting of 18 retrospective reviews, the research concluded patients older than 65 years and taking a medication on the Beers list experienced increased hospitalizations (Jano & Aparasu, 2007). Outpatient preventable medication errors in the elderly cost 4.2 billion per year (Jefferson School of Population Health, 2013).

Many medications are metabolized in the liver and are excreted by the kidneys. As a person ages, kidney function diminishes causing a decrease in drug absorption. The kidneys function at a slower pace, leading to higher levels of the drug remaining in the body for extended periods of time. The decrease in drug metabolism puts elderly patients at a higher risk for adverse effects due to the potential for a toxic dose, even when a fraction of the dose is given. Physiological changes also occur in the elderly gastrointestinal (GI) tract. Many medications are absorbed in the GI tract, and as a person ages, GI motility is decreased leading to changes in drug absorption. This is considered a medication error when the patient receives too much of a specific drug. Caution should be taken when prescribing to the elderly population (Wooten, 2012).

Since the elderly population has increased substantially since 1999, adverse events have also increased (Fialova & Onder, 2009). In 2003, 1523 adverse drug events occurred in the

elderly and 27% were considered preventable (Gurwitz et al., 2003). Researchers concluded 38% of those adverse drug events were either life threatening or fatal. By 2014, the annual death toll due to medication related errors was 123,927 people (U.S. Food and Drug Administration, 2015).

As a person ages, comorbidities can increase, further complicating the dosing of medication. The elderly patient may be prescribed medication for one disease process that interacts with a drug prescribed for another disease process. It is important to be diligent about properly prescribing medications to the elderly. It is also important to educate the elderly patient on the side effects and drug interactions that may be experienced from these medications because with education, many of these side effects can be stopped before great harm is done. When possible, a safer alternative to these high-risk medications should be used.

The purpose of this study was to explore the prescribing practices of one primary care practice, the most frequently prescribed Beers medications at the primary care practice, and to determine if patients in the primary care practice received education on the potential side effects of a Beers medication.

Literature Review

According to Opondo (2012) the most prescribed high-risk medications in the elderly who live in the United States are Propoxyphene, Doxazosin and Diphenhydramine. These medications are often prescribed in a primary care setting (Opondo et al., 2012). The study was a systematic review of 19 studies in which 14 used Beers criteria to determine the appropriateness of the medication prescribed. The median rate of inappropriate medication prescriptions was 20.5%. The researchers concluded one in five prescriptions written at a primary care facility is inappropriate (Opondo et al., 2012).

A literature review was conducted to determine prescribing practices for Beers medication across the United States (U.S.). This review used the key words high-risk medications and elderly for general search criteria. Search databases included National Institute of Health, HHS public access, Medscape and MEDLINE. Of the over 30 articles found, eight met the aims of this review. The main objective was to determine the most frequently prescribed high-risk medications for the US elderly population, as well as the most common adverse drug events experienced. Inclusion criteria were all articles containing high-risk medication and the elderly. The search ranged between 2006 and 2016.

Kentucky ranks among the highest in high-risk medication prescribing patterns. According to the Centers for Medicare and Medicaid Services, Kentucky averages 1.09-1.31 high-risk medication fills per Medicare beneficiary. The national average of high-risk medication fills per patient is 0.86 (Lowes, 2016).

The risk of developing an adverse drug reaction in the elderly is 10.7 %, according to a Wooten (2012). That is almost double the risk (5.3%) when compared to the general population. The most common adverse drug reactions experienced in the elderly are anticholinergic symptoms (dry mouth, constipation and urinary retention), change in mental status, orthostatic hypotension, mood and behavior changes and gastrointestinal tract disturbances (Wooten, 2012). These side effects can result in serious harm to the elderly. For example, orthostatic hypotension can cause the elderly patient to become dizzy and fall, possibly causing fractures. Change in mental status could cause the patient to become lost, non compliant with care as well as combative. Urinary retention is a serious side effect for both male and female elderly patients. Patients that experience urinary retention are at an increased risk of urinary tract infections.

A strong link has been shown between medications on the Beers list and poor outcomes. The percentages of elderly adverse drug events in 2005 in primary care were 27% and long-term care were 42%. Most of these adverse drug events could have been prevented (AGS, 2012). The most serious adverse drug events have been gastrointestinal bleeding, delirium, falls and fractures. It is estimated as much as 40% of older patients receive at least one or more medication on the Beers list (AGS, 2012). These medications are known to cause adverse drug events and are still being prescribed to the elderly, educating elderly patients on the potential side effects they may experience is the key to keeping these elderly patients safe.

Pugh et al (2013) performed a retrospective study of the Healthcare Effectiveness Data and Information Set (HEDIS) to measure new exposure to inappropriate prescribing practices. This study's purpose was to explore associations between new exposures to high-risk medication in the elderly and drug-disease interactions to determine the mortality rate, hospital admission rates, and emergency care visits. A large sample size of over one million veterans was studied to determine how high-risk medications in the elderly are associated with adverse effects. The authors concluded the most commonly prescribed medication groups were antihistamines, skeletal muscle relaxants, opioids as well as gastrointestinal antispasmodics. Pugh et al. (2013) also found exposure to a new high-risk medication increased the elderly patient's mortality rate by 60% in one year, and the use of a new high-risk medication was associated with greater than 50% of emergency room visits or hospital admissions (Pugh et al, 2013).

Adverse drug events are responsible for close to 100,000 emergency department visits each years for those patients aged 65 years old and older in the U.S. (Budnitz, Lovegrove, Shehab & Richards, 2012). A study of over 250,000 Australian patients found Temazepam, Oxazepam, Diazepam, Digoxin, Amiodorone and Ferrous Sulfate have all been shown to cause

more than 100 unplanned hospitalizations per medication, per year. Naproxen also caused close to 99 unplanned hospital admissions per year. Potentially inappropriate medications were responsible for 15.3% of unplanned hospital admissions, a much lower number than found in the U.S study (Pugh et al., 2013). The study concluded high-risk medications cannot be avoided in these patients; therefore the elderly patient needs to be monitored closely (Price, Holman, Sanfilippo & Emery, 2014).

Patients seen by practitioners having formal geriatric training and education had 14% lower risk of an adverse drug event, when compared to patients care for practitioners that did not have formal geriatric training (Walid et al., 2012). A study examining the quality prescribing practices in the elderly at a Veteran Affairs facility (n=2,023,477), concluded patients seen in facilities with providers receiving formal geriatric education had 5% lower exposure to high-risk medication and disease interaction (Walid et al., 2012). Additionally, patients seen in facilities having less of a geriatric population are at increased risk of high-risk medication exposure, presumably because providers are accustomed to prescribing to a younger population. Providers not familiar with the geriatric population, and their lack of drug metabolism may put these patients at an increase risk of adverse drug events. Facilities caring for the geriatric population need to remain aware of issues concerning high-risk medication and falls. Walid et al. (2012) concluded that geriatric training promotes less inappropriate prescribing to older patients.

High-risk medication in the elderly has become a significant issue. The elderly population is increasing and the volume of elderly individuals who receive high-risk medication is growing. Prescribing patterns and co-morbidities lead to an increased number of elderly patients who are prescribed these high-risk medications. This causes an even bigger issue of elderly patients being harmed. These high-risk medications can lead to serious complications

such as falls, gastrointestinal bleeding and changes in mental status. High-risk medications can cause increased emergency room visits as well as poor outcomes.

In an effort to provide optimal quality care for the elderly within one healthcare system, it is important to explore what high-risk medications are being prescribed in primary care. This study is needed to explore Beers criteria medications prescribed to elderly patients and to identify education provided regarding medication side effects. It is also important to explore how providers educate their patients when they are prescribed high-risk medications.

Methods

Design and Setting

This project was a descriptive, retrospective chart review to explore Beers criteria medications prescribed to elderly patients at one primary care practice and to identify education received regarding medication side effects. Both The University of Kentucky's Institutional Review Board as well as the Hospital Office of Research Administration approved the project. The charts were reviewed for evidence of currently being prescribed a medication on the Beers list, and for documentation of side effect education regarding the Beers medication. This information was located in one of two places in the EMR. The PI looked at the after visit summary (AVS) and in the narrative portion of the progress notes for evidence of side effect education. The presence or absence of education was noted on the electronic data collection sheet.

The practice site for this project was a primary care office of a large hospital based system in Kentucky. The office employs both a physician and a nurse practitioner. The patients seen at this project office range in age from newborn to elderly. The practice is located in Oldham County, Kentucky, which has a population of roughly 64,875 people. Twelve percent of the county

population is older than 65 years. The patients in the area are predominately Caucasian (91.4%) (United States Census Bureau, 2016).

The practice sees approximately 739 patients over 65 years of age per MD per year (Information Services, 6/29/16). Following a request from the Informational Services department of the hospital system, the PI received medical record numbers of the 116 patients over the age of 65 years seen at the project office between January 1, 2015 and December 1, 2015 and who were on at least one medication from the Beers list (Information Services, 6/29/16).

Sample

All 116 charts were reviewed to confirm inclusion and exclusion criteria. Those patients younger than 65 years old, patients seen before January 1, 2015 and after December 1, 2015 and patients who were not prescribed a medication on the Beers list were excluded.

The retrospective chart review consisted of 116 patients. Of those 116 patients, one had since passed away and 14 were not on a Beers medication leaving a sample size of 101 patients. The sample consisted of 51 females and 50 males. The mean age was 73 years old. The number of high-risk medications per patient ranged from 1-7 medications. The average amount of high-risk medications per patient was 1.66 medications. See Appendix A

Results

One hundred and one charts from one primary care practice were reviewed for evidence of currently being prescribed a medication on the Beers list, and for documentation of side effect education regarding the Beers medication. The chart review revealed a total number of 196 high-risk medications were prescribed during the study dates of January 1, 2015 and December 1st, 2015.

Most Common Beers Medication

The study's objective was to explore the prescribing practices at a primary care office. The review determined the most frequently prescribed high-risk medications at the project practice site were corticosteroids (19.80%), Diclofenac (17.82%), Pseudoephedrine (15.84%), Alprazolam (12.87%), Zolpidem (10.89%) and Meloxicam (10.89%). The study cohort consisted of 50 males and 51 females. The male group of patients had a total of 88 high-risk medications prescribed. The female group of patients on the other hand, had a total of 108 high-risk medications prescribed. The data analysis also concluded 20% of the patients were on a controlled pain medication such as Hydrocodone, Vicodin and codeine. Narcotic pain medication can be associated with constipation, urinary retention, respiratory depression and sedation (Chau, Walker, Pai & Cho, 2008)

Patient Education

The charts were reviewed for evidence of patient education documentation between the provider and the patient. Of the 101 patients prescribed medications on the Beers list, only four charts documented the patient received education on side effects. In other words, 0.039% of the patient's charts stated the patient was given education explaining the possible side effects they may experience from medication. Due to the small sample size, differences between those who received education and those who did not could not be explored.

Discussion

When comparing the most prescribed high-risk medications at the project site to the rest of the United States, the findings were not comparable. Depending on the particular study, there are variations regarding the most frequently prescribed medications. Narcotic pain medications as well as antihistamines were the most common among the studies. Antihistamines and narcotic

pain medications were prescribed to some of the patients in this study, however; they were not the most frequently prescribed. Many of the medications were not prescribed universally. The studies examined had a wide variety of high-risk medication prescribed including: alpha-blockers, skeletal muscle relaxants, benzodiazepines and anti-arrhythmic.

There is a definite gap when it comes to educating patients on the potential side effects they may experience from their medication. Out of the 101 patients in this study, only four received any type of medication education regarding directions about potential side effects. There is a need to spend time educating patients on the serious side effects that can and often do occur. Time spent educating patients on high-risk medications could decrease the number of emergency room visits and in return lower the cost of adverse drug reactions.

The implication of the findings from this study could raise awareness that the elderly population is vulnerable to adverse effects received when taking certain medications. This study could also alert healthcare providers that these elderly patients need education on the side effects they may experience.

Currently, at the project practice site, there is no system notifying providers they are prescribing a high-risk medication. Several studies are available on the benefits of notification systems such as electronic reminders as well as algorithms the providers can use (Poudel, 2015 & Peterson et al., 2014). Peterson and colleagues (2014) investigated the use of a computerized flagging system for pharmacists. The flag alerted the pharmacist and suggested an alternative medication. The majority of the time, 31/40, the provider proceeded with the pharmacist's recommendation by prescribing an alternative medication (Peterson et al., 2014). Potentially a similar system could be initiated for the practice site in this study.

The Japan Geriatric Society proposed an algorithm for prescribing high-risk medication (2015). The algorithm could be used to identify high-risk medication, evaluate current usage and benefit and alter high-risk medications the patient is already on. The study does examine the use of a list containing high-risk medication, however this list is quite extensive. This four-step algorithm could be a quick tool to use when providing care to the elderly population in a busy clinic (Poudel, 2015).

American Geriatric Society also proposed a model that not only uses the Beers list as a guide to prescribing to the elderly, but also as a reminder that close monitoring needs to occur while patients are on these medications. This monitoring can be incorporated into the electronic health record used to detect these high-risk medications. The article also explains that providing economic and organizational incentives can be used to develop a model to help reduce adverse drug reactions (AGS, 2013).

This project lays the groundwork for future Doctor of Nursing Practice students to help solve the problem of prescribing high-risk medication to the elderly. Further research is needed to determine if education is lacking in other primary care offices within this hospital system. More investigation would provide a bigger picture of the hospital system as whole, if other offices and providers were audited for patient education documentation as well.

Although most insurance companies such as Humana and Blue Cross and Blue Shield audit patients on high-risk medications, this is not enough to stop providers from prescribing these medications. The insurance company monitoring prompts a letter to the provider alerting them of the situation and offering a safer alternative. This letter is clearly not enough. One reason could be that by the time the provider receives the letter, the patient may have already received the medication.

It would also be beneficial to compare the prescribing practices of both primary care providers with hospital-based providers. It would be interesting to determine if hospital based providers prescribe more high-risk mediations because their patients are in an acute state.

Limitations

Several limitations existed with this project. The most important limitation of the study was the relatively small sample size. This narrows the number of charts reviewed and decreases the range of variability and traits. Another limitation of the study was it only examined the prescribing practices at one primary care office employing two providers. One of the two providers was a nurse practitioner, and claims data only audits the physician in the office. Therefore it is difficult to examine all of the elderly patients seen at the project office. The small office and auditing on just the physician further limits the study by decreasing the number of patients that can be reviewed.

Determination of how long the patient had been on a high-risk medication was another limitation. It would have been informative to know if the medication was new to the patient or one they had taken for years. Finally, an additional limitation was the validity of determining if patient education occurred. The education could have been provided to the patient, but not documented in the chart. These potential documentation omissions could alter the results of how many patients in the study received education. This is a potential benefit to the patient, but negatively affects this study of data collection.

Conclusion

High-risk medication use affects a large majority of the elderly population. Certain adverse circumstances may arise from patients taking high-risk medication. The patient may have been on the medication for years and never experienced a problem. Patients may experience

side effects of these medications but not be aware the symptoms they are experiencing are a side effect. It is important providers do their part in protecting these vulnerable patients from potential side effects by recognizing Beers list medications, by considering alternative medications when possible and by educating the patients so they are informed of the potential signs and symptoms to watch for.

If high-risk medications must be prescribed to the elderly, education is a simple and effective way of allowing patients to take control of their care. Education can empower a patient to report a symptom if something is not right.

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Appendix A

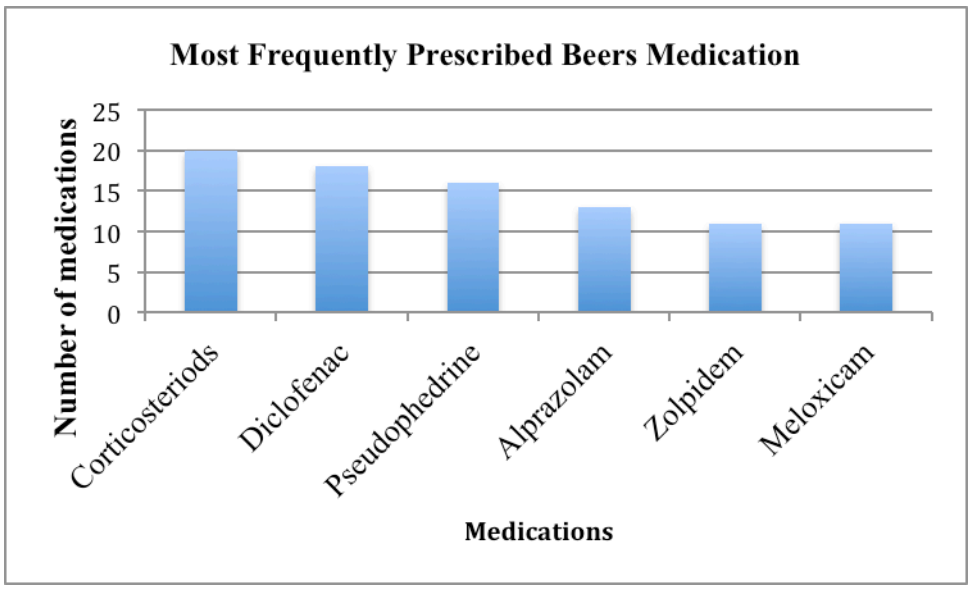

Figure A1. Most frequently Prescribed Beers Medication at Practice Site

Appendix B

Table B1
Gender Distribution

Male	**50**
Female	51

Table B2
Number of medications per patient

Range of meds	# of patients
1-2	76
3-4	22
>4	3

Table B3
Comparing most frequently prescribed medications

Literature	Project site
Propoxyphene	Corticosteroids
Doxazosin	Diclofenac
Diphenhydramine	Pseudoephedrine
Temazepam	Alprazolam
Oxazepam	Zolpidem
Diazepam	Meloxicam
Digoxin	