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Improved Medication Management for Elderly Patients Through Increased Review and Documentation

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IMPROVED MEDICATION MANAGEMENT FOR ELDERLY PATIENTS
THROUGH INCREASED REVIEW AND DOCUMENTATION

by

ESMERALDA RIVERA

APPROVED BY CAPSTONE COMMITTEE:

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Abstract

The purpose of this quality improvement project was to improve medication management processes for patients in a wellness center. Medication reconciliation is a safe practice shown to reduce the potential for patient harm by preventing prescribing errors and adverse drug effects. Medication reconciliation includes assessment of medications, development of medication lists, education, and medication counseling for patients (Snyderman, Salzman, Mills, Hersh, & Parks, 2014). Assessment of medication reconciliation in a geriatric wellness center revealed poor medication management. Education on medication management was provided to staff ($N = 10$) and the workflow was altered to improve processes. Electronic medical records of 86 elderly Hispanic patients (mean age = 72.7) were compared before and after the education and the clinic process improvement to assess if documentation, medication reconciliation, patient education, and adverse drugs were addressed. After 6 weeks, 4 improvements were observed: (a) increased rate of staff and provider documentation of patients' medications in the EMR from 25% to 82%, (b) improved patient reminders to bring medications to the clinic resulting in increased medication recording from 10% to 82%, (c) reduced high-risk medications prescribed from 8% of elderly patients to 5%, and (d) improved the receipt of patient medication education from 0% to 82% of patients. The interventions for staff and providers were effective in improving the practice and processes of medication reconciliation. The leadership of the Doctor of Nursing Advanced Practice Registered Nurse improved medication management and enabled this clinic to reach Medicare performance standards.

Keywords: adverse drug events, geriatric, medication reconciliation

Introduction and Overview of the Problem

Medication management in the primary care setting is a multi-faceted process of educating medical assistants, providers, patients, patients' families, and their caregivers about the proper use of prescription medication. It begins with a review of all of the patient's medications. The process of medication reconciliation involves compiling an accurate and updated list of all the medications that a patient is taking regardless of where the medication was obtained. Medication reconciliation allows health care professionals opportunities to identify not only medication duplication, but also inappropriate, expired, or dangerous medications. The inappropriate use of medications can lead to significantly reduced benefits and increase the potential for adverse events, including death. Medication management, reconciliation, and increased patient participation in the management of chronic diseases are an important part of achieving National Patient Safety Goals, specifically, maintaining and communicating accurate patient medication information is listed as NPSG.03.06.01 (Joint Commission, 2015).

The process of medication reconciliation entails a thorough accounting and review of all patient medications, whether prescribed, over-the-counter, or supplements. Medication reconciliation allows the provider opportunities to assess whether patients understand the purpose of their medications and their willingness to participate and learn about the management of their health. The process of medication reconciliation also allows health care professionals opportunities to recognize discrepancies in what the patient tells the provider they are taking compared to the medications they are supposed to be taking. There are many challenges in obtaining a complete and accurate list of an elderly patient's medications. Some of these challenges include the following: (a) a lack of patient knowledge of the names or purposes of their medications, (b) patients forgetting to bring their medications to the office, and (c) a lack of

standardized processes for documenting and educating patients about their prescribed medications.

Significance

Patient safety concerns remain a serious public health issue, even 15 years after *To Err is Human: Building a Safer Health System* (Institute of Medicine, 1999). Improving patient safety through accurate medication reconciliation can prevent adverse drug reactions. The World Health Organization (2014) estimated that medication-related medical costs in the United States were approximately \$29 billion per year. Shepherd, Mohorn, Yacoub, and May (2012) reported results of an 8-year study of 2,340 patients in which adverse drug reaction death rates increased at a rate of 0.0058 for every one year increase. The top two causes of adverse drug reaction and death were related to drugs particularly common in the elderly, those that affected patients' blood constituents (15.5%) and blood thinners (12.1%). Patients over the age of 55 years were more likely to die from an adverse drug reaction than patients younger than 55 years of age (Shepherd et al., 2012). For this reason, most electronic medical record (EMR) systems will alert the provider of medications to avoid in the elderly, specifically those found on the Beers Criteria for Potentially Inappropriate Medication Use in Older Adults, known as the Beers List, a list of guidelines for health care professionals to help improve the safety of evaluating and prescribing medications for older adults (American Geriatrics Society, 2015). The provider can use this EMR medical alert information and the complete medication reconciliation list to make sound clinical decisions for the patient.

Purpose of the Project

Results of the microsystem assessment of elderly patients in a South Texas Wellness Center, the clinical practice site for this project, revealed that medication reconciliation rates

were low, occurring in only 25% or 21 of 86 random charts reviewed between January 12 and February 12, 2016. New patients arrived at their scheduled appointments without their medications or information about their medications. Based on observations, the medical assistants trained as electronic medical transcribers, routinely omitted inputting medications into the EMR system because patients infrequently brought their medications to the office visit. The two providers did not address the lack of medication information in the EMR system. Instead, they asked the patients what medications they were taking. Many of the patients stated they were taking medications for medical conditions but were unsure of the names and doses of their medications. For this reason, the medication list in the EMR system was limited and incomplete despite a location to enter the name, dose, medication instructions, quantity, and a number of refills for each of the patient's medications. The patients stated they did not bring their medication information because they did not know they had to and were not instructed at the time of seeking an appointment to bring their medications with them.

When patients were asked for the name of the pharmacy last used to purchase their medications, patients named various pharmacies, some within the United States and some across the nearby southern border town of Matamoros, Mexico. Patients often claimed they did not need a prescription to purchase their medications in Mexico; they simply asked a pharmacy clerk for their recommendation on what they should purchase for their medical condition. In a study by Su and Wang (2012), the most commonly utilized health service of 966 U.S. border city citizens who traveled to Mexico were medication purchases (39.3%), dental care (39.4%), and doctor visits (33.1%). According to Homedes and Ugalde (2013), the active ingredients in medications purchased from Mexico cannot be validated and although buying medication in Mexico is convenient, regulators have only enforced the prescription requirements for controlled

substances and antibiotics since August 2010, and this regulation excludes enforcement of purchasing medications for chronic conditions. In the Wellness Center, charts indicated that the chief complaint recorded at visits was frequently the need to obtain refills of patient medications. Some of the refills requested were self-prescribed medications that the patient obtained in Mexico. The purchase of medications in Mexico presents a problem for providers in the Wellness Center because patients routinely request refills for these unregulated medications to manage their chronic conditions related to blood pressure, cholesterol, diabetes, thyroid, arthritis pain, anxiety, and sleep disorders.

The microsystem assessment showed that the two clinic providers frequently furnished prescriptions for the 86 patients whose charts were reviewed, without knowing the names of their current medications, the strength of dose or frequency, or the names of other over-the-counter medications taken at home. The most common pain medications prescribed in these 86 patients were ibuprofen (85%) and Tylenol with codeine (15%); for insomnia, alprazolam (65%), trazodone (25%), and melatonin (10%); for diabetes, glyburide in combination with metformin (50%), metformin alone (25%), Januvia (13%), and insulins (12%).

The current substandard level of medication reconciliation suggested a need for the Doctor of Nursing Practice (DNP) graduate student to seek and expand her practice beyond the individual patient to a system-level intervention aimed at improving the process of medication reconciliation and management. Further, it presented an opportunity for advanced practice registered nurses functioning in the primary care arena to provide leadership for a quality improvement project that emphasized the importance of patient outcomes and safety (American Association of Colleges of Nursing, 2006). A clinic's failure to compile a complete patient medication list at every visit poses a risk for poor health care outcomes. Negative clinical events

can be caused by medication errors of omission, duplication, wrong doses, wrong timing, and use of medication that can cause adverse drug interactions (Center for Disease and Prevention, 2015). For these reasons and the safety of vulnerable elderly patients, it was necessary to launch a quality improvement project to address the gap in medication reconciliation processes at the Wellness Center.

The Wellness Center is a privately owned primary health care practice that opened in October 2014 and is located on the west side of Brownsville, Texas. The focus of the Wellness Center is to provide elderly patients comprehensive preventive wellness exams and management of their chronic conditions. The patient population of the Wellness Center is made up of 100% Hispanics with 90% having Medicare and 10% Medicaid as their primary insurance. The average age of the patients who visited the Wellness Center between October 2014 and October 2015 was 72 years of age. Their ages ranged from 60 to 99 years old. Patients were encouraged to schedule appointments for their office visits. The professionals in this practice included 1 board-certified family practice physician, 1 board-certified family nurse practitioner (FNP)/Advanced Practice Registered Nurse (APRN) assisted by 8 medical assistants, of whom one medical assistant served as a receptionist, and a second medical assistant served as office manager. The physician had 40 years of professional experience and has been working at the Wellness Center for 2 years; he was the collaborating physician with the FNP who had 5 years of experience and had been working at the center for 2 years. The six medical assistants had a 6-month technical college training medical assistant certificate and had been working at the center for 2 years. The receptionist learned his duties through on-the-job training and had been working at the center for 2 years. The office manager had a 6-month technical college training medical assistant certificate and had been working at the center for 2 years. The hours of operation are Monday through

Friday, 8:00 a.m. to 5:00 p.m. The typical length of the office visit ranged between 50 minutes for a new patient and 25 minutes for a return follow-up patient. The Wellness Center was set up specifically to fulfill a vision for high-quality care in elderly patients with chronic diseases.

Typically, patients were referred to the clinic for intensive management and after two visits were referred back to their primary care provider.

The focus of this quality improvement project on medication management aligned with national priorities for the provision of high quality care for the elderly population. The themes for improvement were medication reconciliation, recognition of high-risk medications that could be potentially dangerous in the elderly, and the need to provide patients with sufficient medication information for them to use their medications as prescribed.

Initially, a discussion of the clinic needs and selection of the intervention took place with Wellness Center stakeholders, namely the owner of the Wellness Center, physician of the center, the FNP, the clinic manager, and the DNP student, as part of the needs assessment. The DNP student and the clinic director led a brainstorming session about the possible interventions that could be performed to improve the medication reconciliation process and medication management project. All opinions from the staff stakeholders were explored for consideration of useful practical interventions. The stakeholders expressed interest in improving the medication reconciliation process, the safety in prescribing, and the medication information given to patients during their office visits. The stakeholders expressed two possible barriers that could affect the project. The first barrier was that they believed the current EMR system was not capable of producing a printed copy of the patient's current medication list, and the second barrier was that there was only one EMR technician who had limited time for training of the staff and providers on how to enter the names of the medications. A practice test of the EMR system showed others

how to develop and print the medication list for patients to take with them at the end of the office visit.

Purpose of the Project with General Aim

Using Nelson, Batalden, and Godfrey's (2007) framework, a General Aim Statement was developed for the project:

We aim to improve the process of medication management in the Wellness Center. The process begins when the patient brings their medication at the appointment visit. The process ends with the appropriate prescription sent to the pharmacy and the end of the office visit.

By working on this process, the staff expected (a) an improved rate of medication reconciliation, (b) improved methods for obtaining a list of current up-to-date patient medications, (c) a reduction in prescribing of three high-risk and potentially inappropriate medications, and (d) increased medication information given to the patient. It was important to work on this because the staff identified the need to improve (a) medication documentation, (b) the practice of patients bringing their current medications to the clinic, (c) identification of potentially inappropriate prescriptions, and (d) the provision of medication information to patients.

The specific project objectives were:

1. To improve the rate of documenting the patients' medications from a baseline of 25% to 75% of patients seen within a 2-month intervention period at the Wellness Center from June 15 to August 15, 2016.
2. To improve the process of obtaining information on medications taken by asking patients to bring all prescribed and over-the-counter medications to each clinic visit,

- increasing from a baseline of 10% to a goal of 75% within a 2-month period (June 15-August 15, 2016).
3. To improve the identification and reduction of high-risk and potentially inappropriate medication categories used in the elderly clinic population, including (a) benzodiazepine short and intermediate-acting hypnotics; (b) selected sulfonylureas; and (c) non-cox selective NSAIDS; from a baseline of 8% to a goal of 5% of patients seen will not be prescribed high-risk medications within a 2-month period (June 15-August 15, 2016).
 4. To increase the percentage of patients who receive medication information at the end of every office visit, from a baseline rate of 0% to a goal of 75% within a 2- month period (June 15-August 15, 2016).

Benchmarking

Benchmarking was used to measure one's performance compared to another standard or organization that is performing well. By examining how that organization meets performance standards, one can discover interventions to improve one's own performance (Phillips, 2015). Benchmarking is used by insurance companies who use claims data and the most current evidence-based guidelines to share important patient-specific information that can help providers and patients address potential gaps in preventive care. In addition to identifying recommended medical care, insurance companies may also provide information that improves the patients' health care costs. To measure the Wellness Center's performance against external standards, specifically Centers for Medicare and Medicaid Services (CMS), a document was developed to check-off and evaluate performance measured by documenting two current procedural terminology (CPT) codes. This check-off list document was used to address objectives 1 and 3

aimed at improving the number of charts using CPT coding 1159F, which addresses medication list documentation in the patients' records. The check-off list document was also used to identify reduction in use of high-risk and potentially inappropriate medication categories used in the elderly clinic population appraised initially at 0%. The CMS benchmarks for reviewing the patient's medications indicated that CPT codes 1159F, and 1160F must be documented yearly and are reimbursable according to the National Physician Fee Schedule Relative Value File January Release (Arkansas Worker's Compensation Commission, 2014) at a rate of \$70 each visit up to a maximum of \$140 each year per patient. There were no national guidelines or benchmarks specific to objectives 2 and 4: improving the process of obtaining information on the medications that patient are currently taking by asking patients to bring current and over-the-counter medications to each clinic visit, and improving the percentage of patients who receive medication information at the end of every office visit. Benchmarks for the projects were established in conjunction with stakeholders who wanted to participate in the selection of interventions for improvement of medication management processes for patients in the center.

Improving patient safety has become a national public safety initiative, calling on all stakeholders, including the patients, families, and caregivers, to engage in ensuring a safer medication reconciliation experience within the health care system by being an informed participant with the interdisciplinary care team. This requires effective communication, addressing safety across the entire care continuum, and optimizing technology for improved patient safety (National Patient Safety Foundation, 2015). Healthcare organizations provide both incentive and penalties for participating organizations that choose to follow the quality measure of age-appropriate screening. The benefit of this knowledge was the cost savings and benefit for the owner of the center and the patient.

Review of the Literature/Evidence

Multiple strategies are needed to reduce hospital admissions in the elderly with chronic conditions and to prevent premature mortality. Acknowledging the contributing role that medications play is critical. Complications from misuse of medications can lead to adverse events and account for 20% of readmissions in Medicare and Medicaid patients (Snyderman et al., 2014). Emergency room visits due to complications of medications can be prevented with an effective medication management program (Snyderman et al., 2014). Having multiple chronic conditions, being elderly, and having poor medication management skills, can lead to difficulties with adherence to the prescribed medication regimen (Bogner, Morales, Vries, and Cappola, 2012). Patients with chronic illnesses often attempt to self-manage medications, because of their high cost and poor access to medications. However, the complexity of medication regimens, competing consumer messages, and the patient's lack of medication knowledge are also key factors in medical complications and poor medication adherence (Milos et al., 2013). Health care providers need to take advantage of teaching opportunities in outpatient and hospital settings to prepare a patient for medication self-management. By involving elderly patients as active partners in their health care, errors and medication-related health problems can be prevented and their medical conditions and health outcomes improved.

Medication reconciliation is a process designed to enhance patient safety by verifying the current patient medication regimen at the first visit and every point in patient care thereafter. As patients are seen in multiple practice sites by various providers, the reviewing, refilling, and prescribing of patients' medications becomes an important and seamless process that providers undertake to improve the quality of care and patients' medication safety. The Wellness Center did not have an efficient and effective process for documenting complete medication

reconciliations, reminding patients to bring their medications, identifying and reducing inappropriate high-risk medications, and providing medication information to patients. These deficiencies can lead to medication errors, patient harm, and low levels of patient self-medication management behaviors (Agency for Health Research and Quality, 2015).

Question Guiding Inquiry

To determine the optimal evidence-based interventions that address the identified clinical issues, a literature review was conducted. The clinical question that directed the evidence search was: In elderly patients with chronic diseases, how does a medication reconciliation and patient medication education QI program, compared to the absence of such practices, affect levels of patient medication safety?

Three themes emerged from the review of literature and guided the development of this project that surrounds the issue of patient drug therapy safety. The themes include (a) the effective approaches to medication reconciliation, (b) the recognition of high-risk medications that can be potentially dangerous in the elderly, and (c) the best ways to provide patients with medication information.

Medication Reconciliation Methodology

A review of the literature demonstrated that a multitude of methods had been studied for documentation of medication reconciliation. Research validated the importance of establishing a safe system that accurately documents the patients' medications according to evidence-based practice interventions (Frydenberg & Brekke, 2012; Ludman et al., 2013; McGarry, Cashin, & Fowler, 2012; Milos et al., 2013; O'Carroll, Chambers, Dennis, Sudlow, & Johnston, 2013; Olson et al., 2012; Sarzynski, Luz, Rios-Bedoya, & Zhou, 2014; Vejar, Makic, & Kotthoff-Burrell, 2015). The review of research studies demonstrated a significant problem in the need (a)

to maintain quality patient care by facilitating cross-provider communication, (b) to improve health care outcomes, and (c) to reduce the risks of medication errors and adverse medication-related events (Davidoff et al., 2015; Dormann et al., 2013; Keith, Maio, Dudash, Templin, & Del Canale, 2013).

Critique and Synthesis of Research Findings

In a cross-sectional study by Olson et al. (2012), an examination of medication reconciliation practices was performed by a chart review of 100 patient records to compare the primary care providers' medication list to pharmacy claims. Pharmacy claims were used as a source for the approximation of medications used by the patient. The chart reviews also gave insight into the medical conditions through visit notes that contained information of the patients taking certain medications. The review of charts served as a valuable source documenting medications that patients had been taking for their medical conditions. The information from the chart reviews was compared to the patients' current medication lists, and efforts were made through patient contact to clarify the use or discontinued use of medications that was compiled by the chart review. The results of this study indicated a 35% discrepancy rate between the medications listed in the patients' medical records compared to the pharmacy claims; and therefore, home visits were performed to compile an accurate patient medication list. The authors suggested that the accuracy of a medication list can be improved if patients bring their medications with them to the office visit (Olson et al., 2012).

In a quality improvement project study, Vejar et al. (2015) focused on interventions that improve medication reconciliation documentation, the accuracy of the medication list, reducing the use of inappropriate medications and medication duplication in a senior primary health care practice. Lewin's Change Theory was utilized as the framework for the Vejar et al. (2015)

project because the goal was to raise the level of medication reconciliation to the desired standard. The idea of group dynamics and organizational interactions is embedded in Lewin's Theory and was relevant to the intervention (McGarry et al., 2012). This primary interprofessional practice consisted of 7 physicians, 1 geriatric APRN, 1 physician assistant, and 3 medical assistants. A pre-intervention initial performance level was obtained through the review of EMR data. A root cause analysis of the low 53% medication reconciliation rates, revealed that the providers were not documenting the medication list in the appropriate location in the patient's chart and patients were poor historians on the medications that they were currently taking.

Multiple interventions were designed to meet 90% of the National Patient Safety Goals of the Joint Commission (NPSG.03.06.01) to "maintain and communicate accurate patient medication information" (Joint Commission, 2015, p. 5). The interventions according to Vejar et al. (2015), were designed for the project based on the feedback of the collaborative, multidisciplinary team members, review of the evidence-based literature, and periodic project outcome assessments. Interventions for documenting medications in the patients' chart improved to 96% post-intervention. Interventions aimed at patients bringing their medications improved from 0% to 64% post-intervention. Interventions aimed at reducing the use of one or more high-risk medication improved usage from 46% to 17% post-intervention. Finally, interventions to reduce the duplication of medications improved from 39% duplication to 1% post-intervention. The most effective interventions were the result of patient reminder notes in the patient's exam room and feedback to the team members regarding monthly compliance rates and the need to meet the projected goals. The least effective intervention was increasing the involvement of medical assistants in providing patient education given their long list of daily responsibilities.

In an exploratory case study, Frydenberg and Brekke (2012) performed interviews and collected referral letters that included the patients' list of medications. The medications on the referral letter were compared to the medication list obtained by a personal face-to-face and telephone interview with the patient. The results indicated that there were 50 medication errors in 30 patients who used a total of 250 medications. More than half of these medication errors were the direct result of incomplete medication lists in the referral letter. The medication list should be compiled and reviewed with the patient on the first office visit, and each patient should leave the office visit with an updated medication list that is given to them by the provider at each office visit (Frydenberg & Brekke, 2012).

In a cross-sectional pilot study by Sarzynski et al. (2014), patients were given brown bags to encourage them to bring their medications to their next clinic visits. The results showed less than 40% of patients brought their medications to the follow-up to the clinic office visit, 35% of providers documented the medications brought in by patients, and only 6.5% of the medications on the compiled list were accurately recorded. The brown bag technique failed to motivate patients to bring their medications but prompted some providers to remember to document the medications in the EMR system. Medication lists composed by structured in-person interviews turned out to be more accurate for the 77% who used the brown bag compared to the 42% who did not.

The medication reconciliation process varies from one facility to another. The participants in the medication reconciliation process may include medical assistants, nurses, and providers. While it is important to accomplish a complete medication reconciliation, there remains a lack of consensus on the methods to use in performing a medication reconciliation, especially in the out-patient setting.

Potentially Dangerous Medications

The current knowledge among providers about how to identify and avoid high-risk medication prescriptions in an elderly patient with multiple chronic conditions is limited. The increasing volume of new medications and the related information presents a challenge to the provider in keeping up with the latest research recommendations on which medications to select and which to avoid for a particular chronic condition. Although the use of medications can produce important therapeutic effects, their misuse can result in adverse health care outcomes. Several studies investigated the extent of inappropriate prescribing for the elderly.

The Beers List is intended to guide providers in the safety of evaluating and prescribing medications for the elderly (Davidoff et al., 2015). The Beers List was used to measure the amount of potentially inappropriate medications in a retrospective cohort study by Davidoff et al. (2015). The results indicated that 46% of 18,475 elderly patients had potentially inappropriate medications included as part of their medication regimen. The top two categories of inappropriate medications according to the Beers List were nonsteroidal anti-inflammatory drugs (e.g., Ibuprofen) (10.9%) and benzodiazepines (e.g., alprazolam) (9%).

In a prospective study, Dormann et al. (2013) investigated the effects of potentially inappropriate medications causing adverse drug events in patients admitted to the hospital emergency department. Using the PRISCUS list, which is similar to the Beer's List, the results indicated that 277 out of 752 patients had medical errors in the prescribed medications due to no indication/wrong indications (59.2%) and contraindications (23.5%), all of which could lead to adverse drug events.

Medical records of patients older than 75 years of age were reviewed by a nurse, a clinical pharmacist, and a physician in a randomized control trial study by Milos et al. (2013).

The results of this study concluded that 33% or 123 patients had one potentially inappropriate medication, and there were 431 drug-related problems in a sample of 369 patients, 16% of which developed into adverse events as a result of potentially inappropriate medications. This study indicated that medication reviews performed by a nurse, pharmacist, or a physician reduced the number of patients from 123 to 21 with potentially inappropriate medications, thus improving the quality for safe, appropriate prescription medication use in this elderly population (Milos et al., 2013).

Clinical guidelines for reducing potentially inappropriate medication prescribing were developed by a cohort of physicians and geriatric specialists in a multi-phase prospective study (Keith et al., 2013). The guidelines included tracking of potentially inappropriate medications (PIMs) by providing a list of the PIMs and alternative medications to the physicians. The results indicated a reduction in exposure rates of 31.4% in one group and 21% in a second group. The education provided to the physicians regarding the goal to reduce PIMs influenced prescription behaviors that led to reductions in their use.

Educating Patients

Medication problems can be avoided in patients who take multiple medications by compiling a complete and current list of all medications taken, reducing inappropriate prescribing of PIMs and by providing patients' information on the name, dose, timing, and purpose of their medications. Efforts to encourage patients to participate in managing medication information can be explored to meet the Joint Commission's National Patient Safety Goals for the prevention of adverse drug events (Shepherd et al., 2012).

The management of chronic conditions is difficult for patients who have to organize their lives while coping with chronic disease symptoms, treatment regimens, and constant

responsibilities for lifelong interventions, including taking their medications as prescribed.

Interventions to help patients gain self-support in taking care of their chronic conditions were examined over a 12-month period in a randomized control study by Ludman et al. (2013).

Ludman et al. (2013) stated that ongoing support leads to a patient having positive behaviors and knowledge on how to better manage chronic conditions that led to better health care outcomes.

Interventions for increasing patient knowledge about their medications were assessed in 214 patients. The interventions were patient-centered. Four nurses and a primary care provider designed individualized clinical and self-management goals. The goals included patient visits with the primary care provider every 3 weeks to monitor the patient's chronic disease progress and self-care activities. Nurses used motivational counseling to motivate patients to take their medications. Once patients met their target laboratory or medical condition goal, a revised plan for maintenance was devised by the nurses. The nurses continued to follow up with patients by telephone calls every 6 weeks to review adherence to medications. The results indicated that interventions increased knowledge on medication adherence from a high of 82% at baseline to 89% at two 6-month follow-up intervals. This study found that collaborative care interventions could support important aspects of patient self-care activities for disease improvement including taking medications as prescribed.

The personalizing of interventions for adherence to preventive stroke medications was examined in 58 patients in a randomized control study by O'Carroll et al. (2013). The interventions focused on teaching patients patterns of habits or routines to improve higher levels of medication adherence. Medication adherence according to O'Carroll et al. (2013) was defined as patients taking their medications on schedule. The results indicated a 10% increase from 86%

to 96.9% in adherence to taking hypertensive medications as prescribed. Empowering patients with knowledge of their medications led to a reduction of stroke and death.

Improving Medication Management through Toolkits

Toolkit aids have become useful in improving the standards of safe patient care. The Geriatric Medication Management Toolkit (n.d.) and Medication Adherence Educators' Toolkit (2012) were examined for their potential to address one of the most challenging and complex problems confronting elderly patients with multiple chronic conditions, the task of managing multiple and high-risk medications. These toolkits contained clinically focused intervention tools to facilitate implementing strategies to manage medications, communicate more effectively with patients and providers about medication risks, and provide access to best practice resources to reduce medication problems. The toolkits also contained a comprehensive list of free tools that can be downloaded and printed including a form for patients to document information about their medications. The toolkit aids did not contain any evidence of reliability and validity.

Limitations

In summary, 10 studies were reviewed to determine the appropriate interventions for this wellness center. The studies were categorized as follows: (a) cross-sectional studies ($n = 2$), (b) exploratory ($n = 1$), (c) prospective study ($n = 2$), (d) quality improvement project ($n = 1$), (e) retrospective cohort ($n = 1$), and (f) randomized control study ($n = 3$). The studies were conducted between 2012 and 2015. Although best practices in medication management were well documented in the review of the literature, there was a gap in identifying the precise benchmarks to use to measure the Wellness Centers performance against a national standard, specifically for the interventions associated with Objectives 1-4. This limitation or gap in the evidence meant it was difficult to determine clearly, what group or standard the Wellness Center

should be compared to for the measurement of outcomes, although CMS standards are pertinent to a center that serves a predominantly older population.

As presented above, the Wellness Center microsystem assessment revealed that only 25% of 86 patient charts had a medication list at baseline after a review using the EMR system data. The list of medications, according to the CMS standards, needed to be reviewed and updated with every office visit using appropriate CPT and International Classification of Diseases-10 codes for care of older adults, in order to maintain compliance with the health care effectiveness data and information set (HEDIS) measures and for full reimbursement of the health care center provider services (Centers for Medicare and Medicaid Services [CMS,] 2015). The CPT Codes used to meet this quality measure are labeled 1159F, used for medication list documented in the medical record, and 1160F for the review of all medications by the prescriber documented in the medical record (CMS, 2015). These standards of care guide the practice of medication management in primary care practices and the care of elderly patients and were relevant to the project at the Wellness Center.

A root cause analysis was performed to determine the reasons for the low-performance rating for medication reconciliation at the Wellness Center and to tailor the development of interventions to the needs of the clinic. The reasons for the low-performance were due to the following:

1. Patients were not bringing in their medications to the office visit because they did not receive instructions to do so.
2. The medical assistants were not documenting the medications in the EMR system because most did not know how to perform this procedure and more than half of the

patients did not bring their medications to the office visit. The providers did not address the lack of an incomplete medication list in the EMR system.

3. Patients were unable to provide information on their medications, including the name, dose, frequency, and purpose of their medications.
4. Providers missed opportunities to identify, discontinue, and replace potentially inappropriate medications that could lead to adverse events because the medication list on the EMR was incomplete or absent.

The results of the root cause analysis constituted the rationale for the selection of the project's objectives and interventions. It was critical that interventions for this quality improvement project (QIP) be tailored to the clinic's processes and specific to the needs of the Wellness Center.

In summary, medication management for the elderly patient requires optimizing standardized processes for well-coordinated interventions to achieve outcome improvements in patient safety and quality of care in the Wellness Center. The review of literature validated the importance of documenting the processes of a complete medication reconciliation, including the documentation of medication lists in the EHR, identifying and reducing the use of inappropriate medications, and the potential benefits of the use of toolkits can have for improving patient outcomes. The studies presented a wide range of strategies to facilitate the medication management for elderly patients who take multiple medications for the maintenance of their chronic conditions. The selection of the intervention approaches, described in the section below, was based on the evidence found in the various studies reviewed. Their selection for use at the Wellness Center was due to their adaptability and user friendly capabilities.

Methodology/Project Plan

Patient safety concerns remain a serious public health threat. Improving patient medication safety in the elderly population must be addressed with a more pervasive response to implement interventions that ensure a safer patient and provider experience within the health care system. The mission of the Wellness Center is to provide a full range of health care services that will improve the quality of life and be affordable for all patients. The Wellness Center aimed to improve the processes of medication management in the Wellness Center for elderly patients by implementing four interventions that reflect meaningful outcomes. Therefore, a quality improvement plan with detailed processes, timelines, and evaluation measures was developed to address the problems identified at the Wellness Center.

Design

The interventions and evaluation plan of this quality improvement project was guided by the Kellogg Logic Model. In support of the four intervention strategies, the project utilized two established tool kits: (a) the Geriatric Medication Management Toolkit (n.d.) and (b) the Medication Adherence Educators' Toolkit (2012). Data for the evaluation of the outcomes of this QIP were collected at two points in time. Baseline data were gathered in June 2016 preceding the initiation of the interventions. Post-intervention data were collected following a 3-month implementation period in summer 2016.

The Location and Participants

The project study site was a privately owned wellness center for geriatric patients in a South Texas urban community that had 1,273 patient clinic visits from October 2014 through October 2015. The clinic is part of a larger system of clinics owned and operated by a single physician owner. The focus of the Wellness Center is to increase geriatric patients' adherence

levels to age-appropriate health promotion, preventive quality care measures, and chronic disease management. This QIP included all elderly patients who were >65 years of age who visited the Wellness Center between June and August 2016 in the new medication management processes. It was estimated that approximately 86 patients would be seen during this time. A total of 172 patients were seen in the clinic and were exposed to the interventions. A baseline review of 86 charts was conducted at the start of the project, with a separate sample of 86 charts reviewed at the end of the period. The patients at the Wellness Center were only seen on average of one to two times annually; therefore, it was not feasible to sample the same 86 charts at the end of the intervention period. No patients were directly interviewed or asked to participate in the project, as this was improvement in the routine processes of the clinic.

Procedure Plan

An initial microsystem assessment of the Wellness Center was performed in fall of 2015, with a needs assessment performed in the spring of 2016 in order to gain a deeper understanding of the way the Wellness Center functions: its purpose, patients, professionals, processes and patterns, as well as identifying themes of problem areas and awareness of opportunity for change and improvements in the Wellness Center. In particular, the needs assessment examined the perspectives of stakeholders, namely, the owner, chief executive officer, 1 physician, 1 family nurse practitioner, 8 medical assistants, 1 office manager, and patients of the Wellness Center.

Opportunities and Challenges to Implementation

A SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis was performed as part of the needs assessment at the Wellness Clinic in Brownsville, Texas. A SWOT analysis of the Wellness Center identified both internal and external factors that affected the system.

Strengths. The needs assessment identified several strengths of the organization including the following: There was enhanced utilization of an advanced practice provider who had the ability to deliver high quality outcomes for patients. The team members supported the efforts in providing the best possible care for elderly patients. Both the physician and the APRN were knowledgeable in the chronic care of patients with multiple medications. Both providers attended Medicare monthly quality measures meetings on provider performance ratings. The providers stayed current with the information of the Beers List criteria of medications that are potentially dangerous and should be avoided in elderly patients 65 years of age or older. All of the team members, including the providers, were bilingual; therefore, facilitating communication with the patient, caregivers, and family. The team members demonstrated a strong commitment to improving the patient care at the Wellness Center. The small number of friendly staff empowered secure communication across interprofessionals. There was a low turnover rate of providers and team members. The city transportation services had a bus station across from the Wellness Center, making it easier for patients to access the clinic.

Weaknesses. Weaknesses and areas for improvement existed in the Wellness Center. Weaknesses included lack of EMR system training in the staff, a history of not informing patients to bring their medications, and lack of meeting the quality performance measures as set forth by CMS and insurance companies. The owner of the Wellness Center had not received insurance reimbursement for medication reconciliation since the opening of the center and had been penalized by a 2% reduction in Medicare reimbursements. The two physicians at competing locations each received \$52,000/year from the CMS for meeting the requirements of documenting CPT code 1159F used for medication list documented in the medical record and 1160F for the review of all medications by the prescriber documented in the medical record.

Lack of documenting the CPT codes affected reimbursement of \$70.00 for each code per year for each patient seen at the Wellness Center. The competition functioned as an incentive to improve the clinic processes. The weaknesses of the Wellness Center can also be opportunities for improvement.

Opportunities. Opportunities for improvement were derived from the strengths and weaknesses of the analysis. The staff and medical providers had the opportunity to improve the medication management of elderly patients. The staff learned to ask routinely and remind patients to bring their medications to each office visit. The staff learned how to document the medications in the EMR system. The providers reviewed the list of medications in the EMR and with the patient. The providers used the CPT codes for medication reviews and submitted these billing codes for reimbursement. The providers and staff printed and gave a copy of the current list to the patients. The staff offered additional medication forms to patients for documenting other medications. Improving documentation will improve compliance with the reporting and tracking of medication reviews and documentation; this will decrease the penalties and increase revenue.

Threats. One threat discovered in the needs assessment was that insurance companies were referring patients away from the Wellness Center due to the low-performance ratings, thus resulting in reduced government insurance reimbursement and increasing the competition. Loss of patient volume would decrease the need for staff and services. Loss of employment and resources are potential threats to clinic stability if the loss of patient volume decreases. A second project threat was the scheduling of training needs without disrupting the normal patient flow and on administrative Friday afternoons. An increase in provider-patient office visits from 20 minutes to 30 minutes was necessary to incorporate the need to review the patient's medications.

The needs assessment at the Wellness Center found that the clinic had several gaps in the processes of care. The gaps were in documenting the patients' medications, obtaining information on the medications that patients were currently taking, inappropriate use of high-risk and potentially inappropriate medication categories, and the low percentage of patients who received medication information. The office manager and the two health care providers expressed a need to improve the current medication reconciliation process and patient education on their medications. Patients expressed frustration in knowing little or nothing at all about their medications. The provider stakeholders, specifically two full-time health-care providers, were informed of the gaps in the processes of care, and they offered suggestions in designing the improvement process. Input was also sought from the staff including the 8 medical assistants who despite limited prior work experience, expressed support for the QIP and its design. Table 1 describes the staff level of experience.

Description of Procedure

The QIP project plan focused on improving medication reconciliation documentation, improving the accuracy of medication lists, improving the reduction of three categories of high-risk and potentially inappropriate medications, improving patient participation in the management of their medication regimens, and evaluating the specific activities of the project objectives. The Kellogg Logic Model was selected because of the practical application approach and because it provided all the stakeholders a clear picture of the sequence of events needed to accomplish the goals of this project. The Kellogg Logic Model facilitated their inclusion in the planning process of the DNP project and also provided an evaluation plan for the project. The Kellogg Logic Model assisted the organization of the Wellness Center improvement project

interventions and allowed for the assessment of the objectives, while examining the success of the project's strategies.

Table 1

Description of Professionals

#	Professionals	Gender	Education	Years of Experience	Time at Center
1	Medical Doctor	M	Medical Doctor	40 Years	1 Year 4 months
2	APRN	M	MSN	0 Years	10 Months
3	Medical Assistant	M	Technology College	6 Months	6 Months
4	Medical Assistant	M	Technology College	6 Months	6 Months
5	Medical Assistant	M	Technology College	1 Year	6 Months
6	Medical Assistant	F	Technology College	6 Months	6 Months
7	Medical Assistant	F	Technology College	6 Months	6 Months
8	Medical Assistant	F	Technology College	6 Months	6 Months
9	Medical Assistant/Call Station Receptionist	F	Technology College	6 Months	6 Months
10	Medical Assistant/Office Manager	F	Technology College	5 Years	1 Year

The interventions for this QIP were selected based on the root cause analysis results, the evidence review, and the microsystem team members' feedback. Viewpoints of the key stakeholders remained positive and in support for the project. The DNP student who was the project director, considered the suggestions of all team members and administration. Open and regular communication with all team members and stakeholders encouraged suggestions. A Kellogg Logic Model was used for each of the four objectives with activities for reaching and evaluating the effectiveness of each objective (see Appendix A). A business plan was developed

and reviewed with the stakeholders (see Appendix B). The planned interventions for each project objective and the evaluation indicators for each, were as follows:

Interventions for Objective 1. Improve the rate of documenting the patients' medications.

- DNP student will develop and then provide a procedure outline to the medical assistants and providers at an orientation meeting. It will explain how to document a medication and how to alert the provider if the patient is having any problems with their medications via the EMR system (see Appendix C).
- Clinic manager will give a demonstration on how to input the patient's medications into the EMR system and how to alert the provider if the patient claims they are having a problem with their medication.
- Provider will be asked to review the medication list in the EMR, ask the patients if there are any problems with their medications, and document code 1159F, which means the medication list was documented in the medical record.
- DNP student will develop a medication skill check-off list to be used for evaluation of the medical assistants or providers doing the documentation.

Evaluation of Objective 1.

- Clinic manager will document the attendance of the medical assistant and the provider at the orientation meeting.
- DNP student and office manager will use a check-off list for documentation of the number of patients' charts that have complete, up-to-date medications, and CPT coding 1159F in the EMR system.

- Medications that cause problems will be discontinued and changed by the provider as documented in the chart and evidenced by chart review and counted by the DNP student.

Interventions for Objective 2. Improve the process of obtaining information on medications taken by asking patients to bring all prescribed and over-the-counter medications to each clinic visit.

- DNP student and the office manager will inform the clinic operators of the new procedure in instructing patients to bring all of their medications to every office visit.
- The office manager will place visual notices for the patient in the exam room informing them to bring their medications to every office visit.
- DNP student and the office manager will observe team member wearing a promotional name tag/button designed by the DNP student and a marketing staff member that will remind patients to bring their medications. The owner of the Wellness Center offered to pay for all promotional supplies.
- The receptionist, Wellness Center operator, medical assistants, and providers will inform patients verbally to bring all of their medications with every appointment and visit.
- The front desk or the medical assistant will keep two logs: (a) one for the patients who brought their medications or photographs of their medication labels on their phones to the follow-up office visit and those who did not and (b) a log of the reasons stated by the patients for not bringing their medications, including (a) not informed, (b) forgot, (c) did not want to, (d) feels they know medications sufficiently, and (e) did not need to bring bottles (see Appendix D).

Evaluation of Objective 2.

- DNP student and the office manager will observe the number of times the patients are informed to bring their medications during live phone call reminders. A total of 10 phone calls each day for one week will be observed.
- DNP student and the office manager will do a walkthrough of the patients' rooms to document evidence of notices for patients to bring their medications to each office visit.
- DNP student and the office manager will observe team members for participation in wearing promotional name tags reminding patients to bring their medications.
- A review of the log of patients who bring their medications will be tabulated and discussed with the front desk clerk, medical assistants, and providers.
- A review of a second log of patients who did not bring their medications will be tabulated for the reasons that patients did not bring their medications to their appointment.

Interventions for Objective 3. Reduce the number of high-risk and potentially inappropriate medication categories used in the elderly clinic population, including (a) benzodiazepine short and intermediate-acting hypnotics, (b) selected sulfonylureas, and (c) non-cox selective NSAIDS; from baseline rate of 8% and reaching a goal of 5% within a 2-month period between June 15 to August 15, 2016.

- DNP and office manager will select and schedule in-service date for staff and provider.
- DNP student and the office manager will provide an in-service informational meeting for providers to help identify elderly patients who have a high-risk-medication

- (alprazolam, glyburide, and ibuprofen) and potentially inappropriate medication by pre-flagging charts and keeping a record log and to discuss prescribing strategies
- DNP student and the office manager will provide the Beers List of high-risk and potentially inappropriate medications to the providers, and specifically discuss the prescribing of alprazolam, glyburide, and ibuprofen. This meeting will occur on a Friday afternoon when patients are usually not scheduled.
 - CPT coding (1160F) will be used to indicate a review of all medications by the provider has been performed.

Evaluation of Objective 3.

- DNP student will document the number of providers who adhere to the recommendation of the Beers List during patient's office visits.
- DNP student and the office manager will document and observe that the providers record on a log patients who were identified as having high-risk and potentially inappropriate medications and also list the medication that was identified.
- DNP student and the office manager will review the log of patients and the medications that changed as a result of the medication review.
- The office manager will document the number of medication chart reviews documented for proper CPT coding 1160F by using the evaluation check-off list to document the results of the review (see Appendix E).

Interventions for Objective 4. Increase the percentage of patients who receive medication information at the end of every office visit.

- The office manager and DNP student will teach providers and staff how to print a summary of the prescribed medications.

- The medical assistants will print out the medication list for the provider.
- From the printed reconciled medication list, the providers will explain to the patient, family members, or caregivers the name of the medications, the reason for taking the medications, the start date, number of refills, how much medication to take, and when to take the medications.
- The providers will identify patients who are at high-risk for medication nonadherence and thus will offer a medication form in English or Spanish that patients can use to document their medication information and schedule (see Appendices F, G, H, and I).
- Providers will identify the preferred patient language for prescriptions.
- Providers will indicate the purpose of the medication and the patient's preference for language, on all new prescriptions.

Evaluation for Objective 4.

- The office manager and the DNP student will document the number of medication summaries given to the patients by the provider as evidenced by chart review documentation.
- DNP student, medical assistant, and office manager will document the distribution of the medication form by keeping inventory and counting the forms at the beginning and the end of the shift.
- A review of charts and checklist will indicate the number of patients who received prescriptions with instructions for translation of medical information
- A review of charts and checklist will indicate the number of patients who received prescriptions with a statement of the purpose of the medication.

Organization Readiness and Support

The success of the project depended on the stakeholders' understanding and support of the goals, adherence to the schedule for interventions, and remaining within the organization's budget (Moran, Burson, & Conrad, 2014). The viewpoint of the key stakeholders was important in gaining support for a change in the organization. The two key stakeholders were the owner and the CEO of the Wellness Center. The owner and the CEO of the Wellness Center were actively involved in the progress of the project improvement plans. The planning and expenses were reviewed and approved by the key stakeholders.

The office manager and the 2 providers embraced the opportunity to improve the current deficiencies in medication adherence. The office staff verbalized the support to improve the medication management and education in the center. The team was ready to make a change in the processes of medication management care for all patients.

Organization Resources and Support

Careful planning was supported by leadership as voiced by the CEO and the director of human resources. It was their strong belief that all patients deserve the opportunity to feel safe and have confidence in the quality of the care they received, while in the hands of health care providers. Providing opportunities for elderly patients and the staff to be valued through the provision of basic needs such as the management of medications helped build self-worth and self-esteem.

Clinic management supported the introduction of several forms and were approved by the owner of the Wellness Center to facilitate the process change. The first was a procedure form that was used to document the names of the patient's medications in the EMR system (see Appendix C). The second form was a patient survey used to log and determine the reasons why patients did

not bring their medications to the clinic (see Appendix D). Two patient education and documentation tools called *My Medication List* and *Script Your Future* available in both English and Spanish were printed and given to patients to document their medications (see Appendices F, G, H, and I). Additionally, with the assistance from the liaison marketing specialist, approval was granted by the CEO for the purchase of 500 medication reminder stickers/buttons worn by the staff to promote the medication management campaign (see Appendix J), 10 patients' room reminder flyers were placed on the walls of patients rooms, 100 medication bags were distributed to remind patients to bring their medications, and finally the staff printed and gave medication information to each patient at the end of every office visit. The total financial commitment to the project by administration was approximately \$250.00 for materials. A timeline was used to track progress of the activities (see Appendix K) that were collected on a data collection sheet (see Appendix L).

Another form was used to audit the documentation of two CPT codes 1159F: indicating the medication list was documented in the medical record and 1160F (see Appendix E) indicating a review of all medications was documented by the prescriber in the medical record. The health benefits for all patients and the potential financial rewards from the review of the business plan for the key stakeholders motivated the key stakeholders to approve the resources and support needed for the project.

Evaluation Plan

The evaluation plan is outlined in the Kellogg Logic Model (see Appendix A). Each of the four objectives has an evaluation component in the Logic Model. The collection of evaluation data occurred over 3 months. Excel was used for collection of the population and staff demographic data. Statistical Package for the Social Sciences, version 19, was used for data

analysis. Descriptive statics and chi-square analysis was used to measure improvement in the four objective outcomes. The four objective outcomes were evaluated statistically.

Personnel Training Costs

The number of registered patients has increased from 1,273 in October 2015 to 5,686 in July 1, 2016. The QIP will not require the clinic to add more staff to sustain the changes implemented. The financial gain of reimbursement was projected at \$974,260.00. As part of the sustainability plan, the medical assistants currently employed helped with orientation of the one new medical assistants. Medical assistants cross-trained and performed the regular duties of obtaining vital signs, assessing patient history, inputting the names of the patients' medications in the EMR, and assisted the providers during the examination of the patient. One of the new medical assistants helped in registering and checking-in the patients as they arrived. The small work area became crowded, requiring repositioning of furniture. The collaboration with the Chief Executive Officer, the human resource manager, and the manager of the Wellness Center contributed to the facts included in the business plan for the Wellness Center. The final results of the business plan were reported to all of the stakeholders in an effort to communicate the facts, figures, status of the business plan, and the need for gaining support to implement the DNP Capstone project fully from the beginning to the end of the project evaluation process. The success of the project was motivated by the opinion and acceptance of all of the concerned stakeholders. A copy of the business plan was distributed and reviewed with all interested stakeholder parties. Questions and answers regarding the business plan were entertained by the DNP student and the CEO of the Wellness Center.

Training

Administration supported the project by allowing medical assistants to attend 2 hours of training. This cost was absorbed by the clinic at a total cost of 8 hours of all personnel training for a total combined cost of $\$231.50/\text{hr.} \times 2 \text{ hrs.} = \463.00 .

Funding

The provision for this QIP was approved by the proprietor of the Wellness Center. Additional financing for the daily operations and training of all team members was derived from the insurance reimbursement of staff training for payment of services rendered to patients. The goal of the stakeholders and team members was to improve the current quality measurement score of a 1.7 or 36% in 2014 on medication reconciliation to 1.85 points sliding scale measuring scoring approach or above the 80th percentile as required by insurances such as Accountable Care Organization and HealthSprings. The sustainability of the project interventions can continue through the combined efforts of the current team members, training offered to new members, and informing all stakeholders of the progress in meeting the quality measure audits. The potential reimbursement by documenting the correct CPT codes for medication reviews was calculated and a cost savings of sustaining the interventions for the project could have resulted in an amount of \$974,260.00 in revenue for the total Wellness Center patient population of 6,959 patient visits reimbursement from properly documenting the two CPT codes from October 2014 to July 2016 for each CPT code: 1159F (medication list documented in the medical record) and 1160F (a review of all medications with the patient documented are each reimbursable at $\$70/\text{each} \times 2 = 140 \text{ (CPTs)} \times 6.959 \text{ patients} = \$974,260.00$. The revenue that was recouped during the 3-month project was $(20 \text{ patients/day} \times 5 \text{ days} = 100 \text{ patients/week} \times 4 \text{ weeks in a month} = 400 \text{ patients/month} \times 3 \text{ months} = 1,200 \text{ patients in 3 months} \times (70 \times 2 =) \$140 \text{ for each CPT code (1159F and 1160F)} = \$168,000 \text{ reimbursement for a 3-month intervention period}$. These increases in reimbursement were offset by the cost of training of the

personnel at a rate of \$233/hr. x 2 hours = \$466.00 total training. A net profit of \$168,000 (3-month reimbursement) - \$466.00 (cost of personnel training) = \$167,068 in 3 months.

IRB Processes

The QIP proposal and the Institutional Review Board (IRB) application were approved on April 29, 2016, by the committee members of the University of the Incarnate Word. The IRB approval number is 16-04-016 (see Appendix M). The QIP adhered to the guidelines for the protection for persons involved in the project. The participants who were the staff, providers, and patients of the Wellness Center, were not identified in any data that were collected and, therefore, were not placed at any risk. The QIP was a process improvement that involved the staff and providers whose goal was to improve the processes of medication management and reconciliation for every patient in the clinic. As such, the procedures that were implemented were intended to become a normal part of the operation of the clinic. There were no data collected from staff or providers. Rather, data were collected from charts of patients with a focus on provider documentation. No patient data were collected from patients directly. Therefore, consents from the staff, providers, and patients were not required.

The DNP student explained the purpose of the QIP and included details about the study, outlined the benefits and risks of the study, and the rights of the staff and provider volunteers. The staff and providers were assured that their decision for participation would not affect the working relationship as an employee of the Wellness Center, and their involvement in the process improvement would be a normal part of the clinic procedure. While only aggregate data were compiled from the charts and transferred into a spreadsheet without any identifying data, the fact that there were only 2 providers could potentially reveal which providers completed which document. Every attempt was made to keep their identities confidential. There were no staff or providers who refused to participate or decided to withdraw from the project. The staff

and providers were informed that they could leave the study at any time without any consequences. All data collection was stored in a protected password laptop computer accessible only by the DNP student. A letter of support to implement the DNP project was provided by the owner of the Wellness Center (see Appendix N).

Results

DNP project began with a microsystem assessment of a Wellness Center and resulted with the identification of a problem in the processes of medication reconciliation. The lack of an efficient medication reconciliation process for elderly patients with chronic conditions can lead to poor patient safety outcomes (Olson et al., 2012). For this reason, a quality improvement project was initiated to address the gap in clinical prevention and to evaluate the interventions for improvements in medication management for elderly patients.

This project was conducted over 2 months as part of the DNP program. All of the objectives were accomplished by August 15, 2016. The project was guided by the following specific objectives. The objectives of the project were achieved through a set of targeted interventions. The project was evaluated based on the outcomes of each of the four objectives in the Kellogg Logic Model. The implementation of all the activities for each objective was monitored for the effectiveness of strategies that engaged patients and stakeholders in patient-centered outcomes and health care improvement.

Analysis of Data and Results

Baseline data were collected prior to the start of the intervention phase of the project and these were compared to data collected at the conclusion of the intervention. The interventions of the project incorporated information from the microsystem and needs assessment of the Wellness Center. The study design utilized a sample of 86 patient EMRs to obtain baseline demographic

and if medications were listed in the EMR system, representing 6.76% of the 6,959 total clinic population. Although 86 patients received the QIP interventions, only 86 patient EMRs were randomly selected at the start of the project and reviewed by the project director prior to the intervention. A second sample of 86 records of patients who visited the clinic during the intervention period, were reviewed following the intervention to determine if interventions improved care processes. The criteria for the selection of the second group of participants included patients who were 65 years or older who left the office with at least one medication prescription.

Data for both samples were abstracted and entered into spreadsheets and analyzed with the Statistical Package for the Social Sciences. Analyses included descriptive and analytic statistics. Descriptive statistics included a summary of the demographic characteristics of the staff, providers, and patients at the Wellness Center using percentages, means, and standard deviations. A chi-square test of independence was performed to examine differences between the categorical variables before and after the intervention. In addition, tests of proportions examined if pre- and post-percentages were significantly different pre- and post-intervention.

Prior to initiating the intervention, a questionnaire was used to obtain data on the profession, gender, age, ethnicity, education level, years of experience, and length of employment at the center of the 2 providers, 6 medical assistants, 1 receptionist, and 1 office manager. Descriptive statistics were used to display the demographic information that was obtained from a questionnaire given to staff. There were 60% males and 40%, females. The age of the staff ranged from 25 to 68 years with the medical assistants' average age being 28. All the staff were of Hispanic origin, and all spoke Spanish. Table 2 displays the demographic data of the staff that worked at the Wellness Center.

Table 2

Demographic Characteristics of Wellness Center Personnel

Demographic Characteristics	<i>n</i> = 10 (100%)
Profession	
Medical Doctor	1(10)
Family Nurse Practitioner	1(10)
Medical Assistant	6(60)
Medical Assistant /Receptionist	1(10)
Medical Assistant /Office Manager	1(10)
Sex	
Male	6(60)
Female	4(40)
Age	
25-35	7(70)
36-46	2(20)
47-57	0
58-68	1(10)
Ethnicity	
Hispanic	10(100)
Education Level	
Graduate level college	2(20)
Technical vocational training	8(80)
Years' Experience	
0-5	8(80)
6-10	1(10)
>10	1(10)
Length of Time at the Center	
0-6 months	7(70)
>6 months	2(20)
>1 year	1(10)

The patient demographic variables included: sex, age, ethnicity, number of chronic diseases or comorbidities, primary language, educational level, and number of medications taken by each patient. The gender distribution was 53% male and 47% female in the pre-intervention group, and 43% male and 57% female in the post-intervention group. The mean age was similar at baseline and post-intervention (73.3 years) with a range of 60 to 90 years of age. The ethnic

distribution of the subjects was 100% Hispanic. The majority of the patients spoke English and Spanish with approximately 42% who spoke Spanish only in the post-intervention group. The educational level was similar in both groups with 70% of the patients having a high school diploma or less. The majority (90%) of these elderly patients had the HealthSprings managed plan as their primary insurance and (10%) had prescription coverage through Medicare Part D. The demographic characteristics of the pre- and post-intervention samples were similar. The patient sample was elderly, Hispanic ethnicity, and most Spanish-speaking. Table 3 illustrates the patient demographics of the pre- and post-intervention EMRs.

The 3 most common comorbidities in the pre-intervention group were hypertension (94%), hyperlipidemia (89.5%), and diabetes (94%). The average number of chronic diseases per patient in the pre-intervention group was 8 with an average of 5 co-morbidities in the post-intervention group. Figure 1 illustrates that the most common chronic conditions in the pre- and post-intervention groups were diabetes and hypertension and hypertension followed by hyperlipidemia in Group 2.

Each of these conditions is medically managed with multiple pharmaceutical agents. Although the patients had significant rates of chronic disease, only 19 (16.34%) patients had their medications listed in the EMR in the pre-intervention group. This increased to 82% in the post-intervention group. A total of 52 high-risk medications in 86 patients were found in the pre-intervention group as opposed to 16 in the post-intervention group. The average number of medications per patient in the pre-intervention group was 8 and the average number of chronic diseases was 9. The average number of medications per patient in the post-intervention group was 9 and the average number of chronic diseases was 6.

Table 3

*Patient Demographic Characteristics Derived from the EMR System Before and After**Interventions*

Patient Demographics	Pre-Intervention <i>n</i> = 86(100%)	Post-Intervention <i>n</i> = 86 (100%)
Sex		
Male	46(53)	37(43)
Female	40(47)	49(57)
Age (Years)		
55-64	7(8)	0(0)
65-75	57(66)	56(65)
76-85	19(22)	25(29)
86-96	3(3)	5(6)
Mean Age (SD)	72.01(6.57)	73.33(6.64)
Ethnicity		
Hispanic	86(100)	86(100)
Primary Language		
English and Spanish	47(55)	50(58)
Spanish Only	39(45)	36(42)
Education Level		
High school or less	58(67)	62(72)
2 years of college or less	18(21)	20(23)
>2 years of college	10(12)	4(5)
Insurance		
Managed Medicare	86(100)	86(100)
Medicaid	9(10)	9(10)
Number of Charts with Medication List in EMR	19(22)	71(82)
Number of High Risk Medication	52(60)	16(19)
Medication Education	0(0)	86(100)

Results of Intervention Evaluation

In order to evaluate the success of the QIP interventions, each objective was evaluated individually, using descriptive and inferential statistics. The project outcomes improved for all four objectives.

Objective 1 aimed to improve the rate of documenting patients' medications from a baseline of 25% to 75%. The intervention included an in-service education session to provide staff instruction on documenting patient medications in the EMR system, and their competencies were assessed using a skills check-off list. The pre-intervention compliance rate of 25% improved to 83% post-intervention. Figure 2 illustrates the patients' medication lists were not present in 75% of charts in the pre-intervention group and increased by 83% in the number of medications documented after the interventions. A total of 86 post-intervention patient chart reviews were conducted in which this 83% rate occurred. This constitutes a 228% improvement.

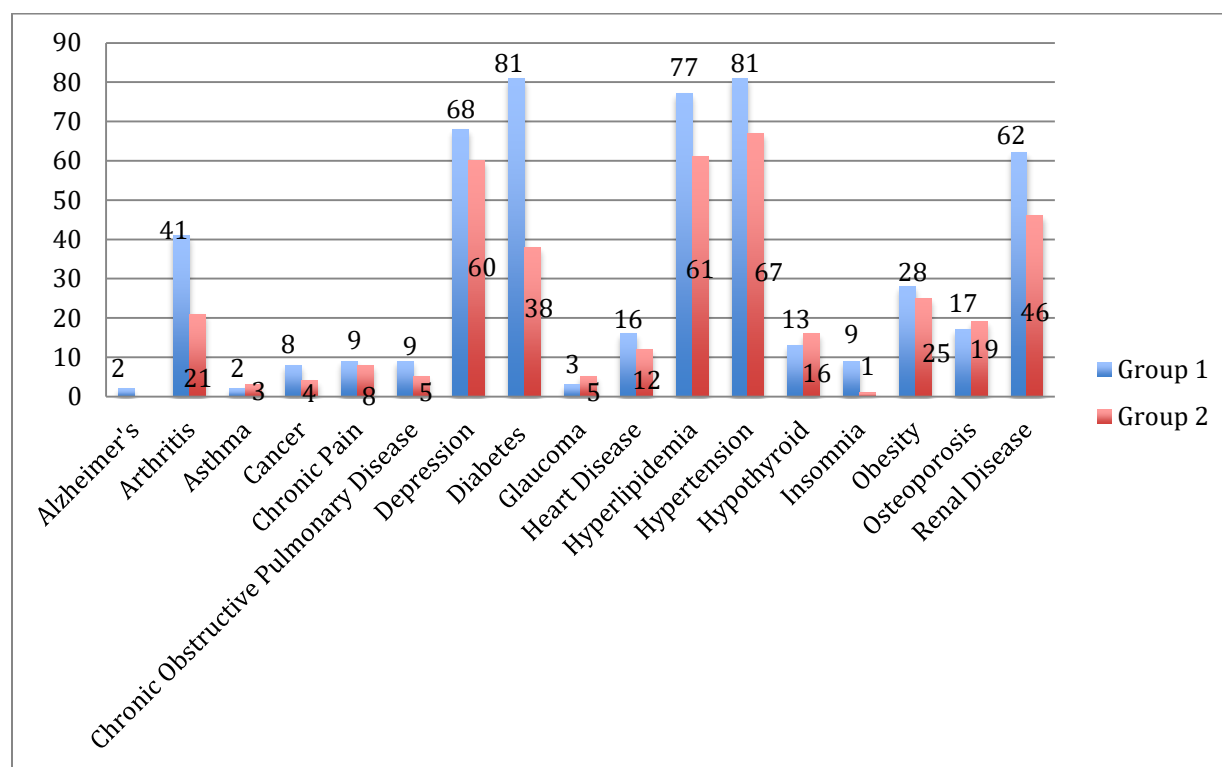


Figure 1. Frequency of chronic diseases.

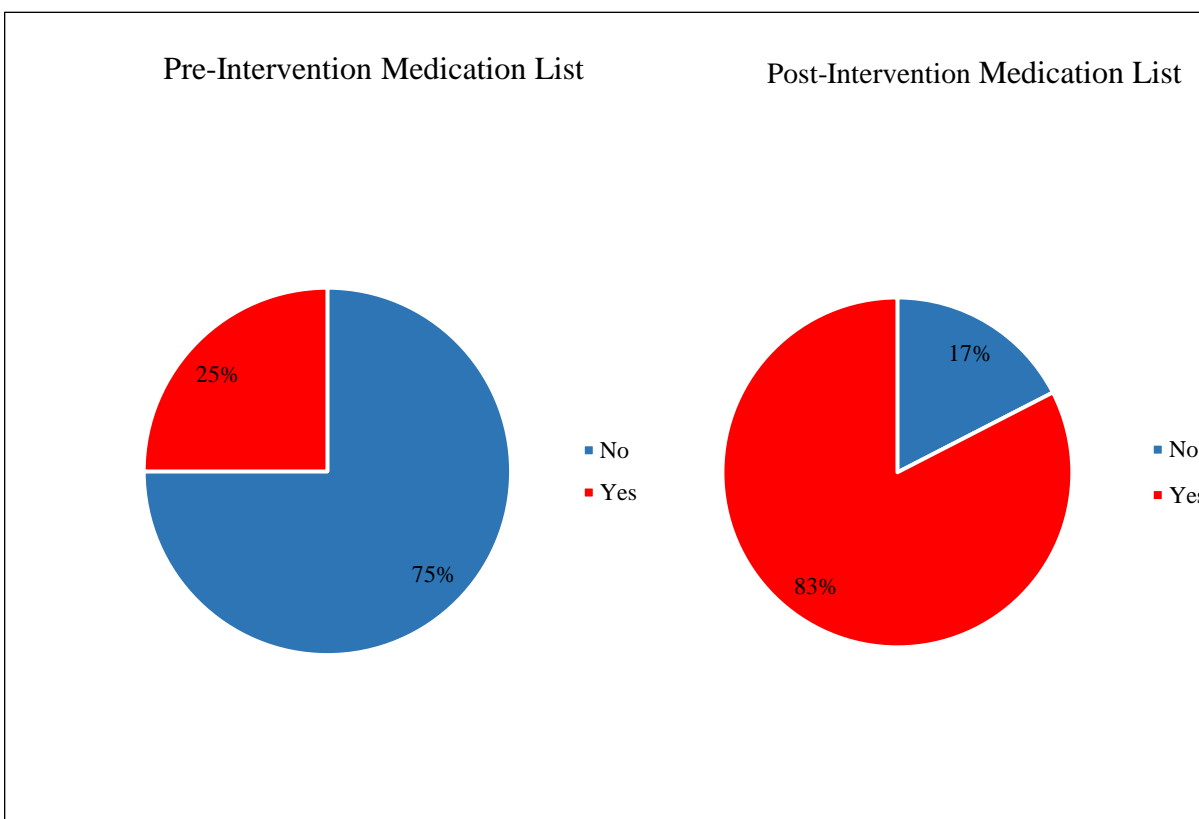


Figure 2. Patients' pre-intervention and post-intervention medication lists.

The improved rate of documenting the patients' medications in the EMR system was associated with complete staff and provider (100%) participation in the project in-service and a successful staff-return demonstration of how to document patient medications as illustrated in Table 4. Both providers routinely began to review charts flagged by the medical assistants indicating patients who stated they were having a medication problem. A daily audit of the EMR chart by the DNP student and manager was performed using a checklist (see Appendix E) to evaluate the consistency of the provider's documentation of the patient's medications, and CPT code 1159F (medication list documented in the patient's record). The number of charts with the CPT code of 1159F improved from 0% to 89%. In summary, Table 4 outlines the components and activities for Objective 1 were met, suggesting dramatic improvements in clinic medication documentation.

Table 4

Results for Objective 1

Objective 1	Pre-Intervention		Post-Intervention	
	#	%	#	%
By August 15, 2016, improve the rate of documenting the patients' medications from a baseline of 25% to 75%.	22	25	71	83
a. Number of staff and providers that learned how to document the names of the patient's medications in the EMR.	NA	NA	10	100
b. Number of staff and providers that improved the rate of documenting the patient's medications in the EMR system.	0	0	10	100
c. Number of charts flagged as an indicator of greater attention to medication issues on the part of the provider.	9	10	86	100
d. Number of charts with CPT Code 1159F (medication list documented in the patients' record).	0	0	77	89

Objective 2 aimed to increase the percentage of patients who brought prescribed and over-the counter medications to clinic from a baseline of 10% of patients to a goal of 75%. As shown in Table 5, the pre-intervention compliance of 10% improved to 82% post-intervention. This constituted a 720% improvement. All of the staff members informed the patients to bring their medications to every office visit. Reminder phone calls by the receptionist were made to inform patients to bring their medications with them at the time of the office visit. Flyers were placed throughout the patient rooms educating the patients to bring their medications to every

office visit. The office manager distributed promotional sticker buttons to the staff to remind patients to bring their medications. The office manager monitored and reported that all staff and providers participated in the use of the promotional sticker button.

Table 5

Results for Objective 2

Objective 2	Pre-Intervention		Post-Intervention	
	#	%	#	%
By August 15, 2016, improve the process of obtaining information on medications taken by asking patients to bring all prescribed and over-the-counter medications to each clinic visit increasing from a baseline of 10% to 75%.	9	10	71	82
a. Number of staff who informed patients to bring their medications.	0	0	10	100
b. Number of participating staff and providers utilizing promotional buttons to remind patients to bring their medications.	NA	NA	10	100
c. Number of patients who brought their medications.	0	0	71	82

The success of this “Bring Your Medication” campaign was based on effectively helping patients remember to bring their medications. Therefore, the number of patients who brought their medications was recorded by the front desk receptionist. Additional analysis of a survey handed out by the receptionist determined the reasons why 17% of post-intervention patients

returned for subsequent office visits without their medications. The results of the survey indicated that 27% did not know that they were supposed to bring their medications to the office visit, although the log of receptionist phone calls indicated that a patient was notified to do so. The majority of the patients (15 or 60%), stated they forgot their medications at home, while none of the patients indicated they did not want to bring their medications. Only two patients (13%) stated they knew the names and dosages of their medications and could provide the information; however, when seen, the provider reported neither patient could recall the strength of their medications. This survey was useful in understanding why patients did not bring their medications to the office visit.

Objective 3 aimed to reduce the number of high-risk and potentially inappropriate medication categories prescribed to the elderly clinic population, including (a) benzodiazepine short and intermediate-acting hypnotic, (b) selected sulfonylureas, and (c) non-cox selective NSAIDS. The baseline rate of 8% patients taking high-risk medications was compared to the goal of no more than 5% being prescribed these categories of drugs. Post-intervention analyses showed that just 3% of patients continued to be prescribed medications on the Beers List, which consists of those contraindicated in the elderly. Thus, the project goal was achieved. Figure 3 demonstrates the number of total medications in relationship to the number of high-risk medications in each sample. The reason for the large discrepancy in the number of medications taken from 206 to 613 was because the first EMR group of patients were not bringing their medications; therefore, the list of medications was shorter.

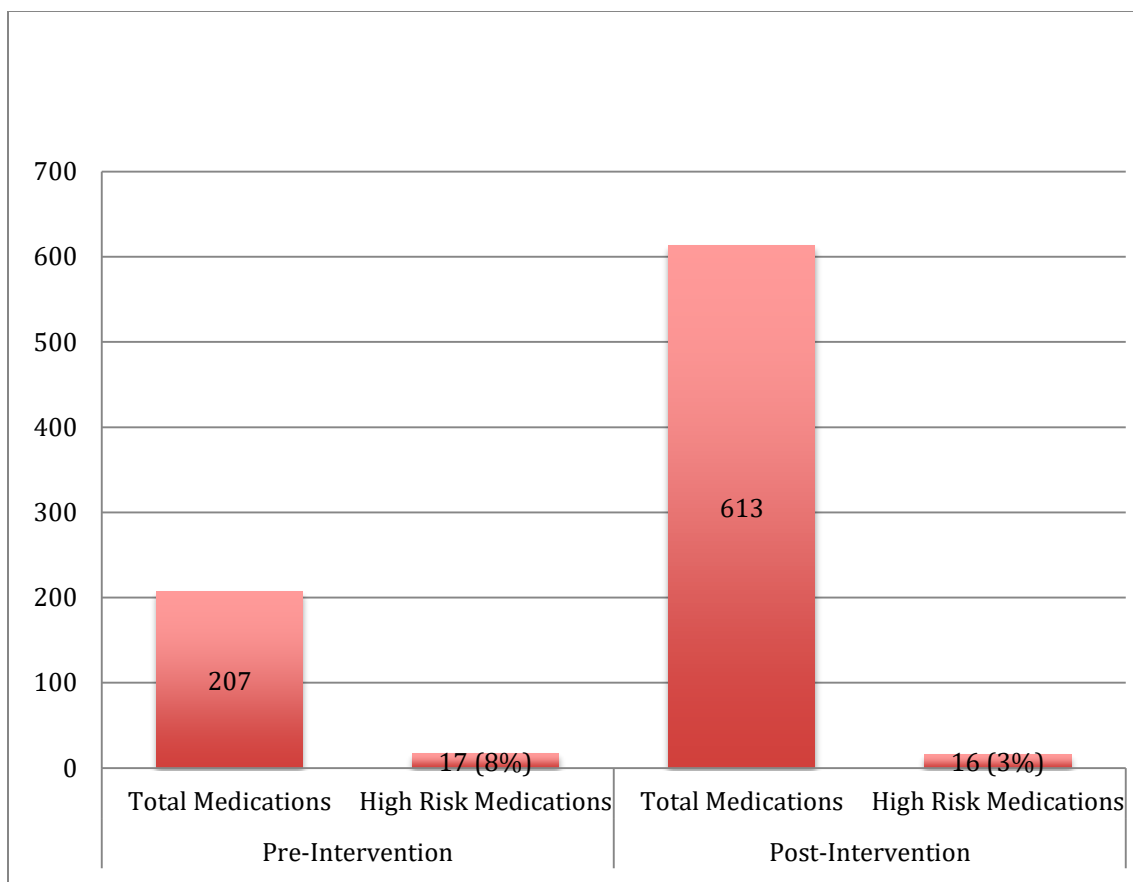


Figure 3. Comparison of pre- and post-intervention medication reporting.

The two providers were observed using the Beers List to recognize the 3 medication categories on all patients' visits. A daily audit of the EMR charts of the post-intervention patients was performed following a checklist (see Appendix G) to evaluate the consistency of the provider's documentation of the review of medications in the medical record and the use of CPT coding 1160F (review of medications by the provider documented in the patient's record). The number of charts with CPT code 1160F (review of medications by the provider documented in the patient's record) improved from 0% to 89%, as illustrated in Table 6.

The components and activities of Objective 3 were met through improvement in the processes of the 2 providers identifying and reducing the use of high-risk and PIM categories

through the use of the Beers List criteria in the elderly patients at the Wellness Center. Table 7 describes the results of Objective 3 with three sub-objectives.

Table 6

Results for Objective 3

Objective 3	Pre-Intervention		Post-Intervention	
	#	%	#	%
By August 15, 2016, reduce the number of high-risk and potentially inappropriate medication used in the elderly clinic population, including Benzodiazepine short and intermediate-acting hypnotics, Selected sulfonylureas, and Non-cox selective NSAIDS beginning with a baseline of 8% to a goal of 5%.	17	8	16	3
a. Number of charts reviewed for high-risk and potentially inappropriate medication use.	0	0	71	82
b. Number of providers who use the Beers List to recognize medications in 3 high-risk categories.	0	0	86	100
c. The number of audited charts contain				
1) a review of medications by the provider documented and	1) 0	0	86	100
2) use of CPT code 1160F.	2) 0	0	77	89

Objective 4 aimed to increase the percentage of patients who received medication information at the end of every office visit, beginning with a baseline rate of 0% to a goal of 75%. The pre-intervention compliance with patient medication information distribution was 0%, and this improved to 82% post-intervention as illustrated in Table 7. The number of medication list summaries given to the patients by the provider were audited by daily chart reviews and

revealed that 82% of the patients received a printed version of information about their medications at the end of the project. The medication education pamphlets in English or Spanish were counted daily through inventory and given to 100% of the patients for them to record additional medications. The number of patients for whom the provider wrote prescriptions in the preferred language and included the indication for the prescription were tracked daily through chart review audits by the DNP student.

Table 7

Results for Objective 4

Objective 4	Pre-Intervention		Post-Intervention	
	#	%	#	%
By August 15, 2016, increase the percentage of patients who receive medication information at the end of every office visit, from a baseline rate of 0% to a goal of 75%.	0	0	71	82
a. Number of medication summaries given to patients by the provider.	0	0	71	82
b. The number of Toolkit forms given in English or Spanish for patients to document their medications	0	0	86	100
c. The number of patients for whom the provider	1) 0	0	86	100
1) wrote prescriptions to be dispensed in the preferred language and	2) 0	0	86	100
2) included the indication for the prescription.				

The results revealed 100% adherence of the providers in ordering that the prescription include the purpose of the prescribed medication and include a message for the receiving

pharmacist to translate the patients' medications in the preferred language, during dispensing. The components and activities of Objective 4 were met as indicated by post-intervention improvements in the increase in printed EMR system medication summaries that were given to the patients at the end of the office visit, the number of the Geriatric Medication Management and Medication Adherence Educators Toolkit medication forms for patients to document their own medications, and use of the newly adapted procedure by the providers related to written prescriptions indicating the purpose of the patients medications with instructions for use written in the preferred language of English or Spanish. The Toolkit form *Script Your Future Take My Meds* taken from the Medication Adherence Educators Toolkit worked well for patients to document their home medications. Table 7 describes the results of Objective 4.

To examine the strength of the relationship between the intervention and the different indicator variables described in the objectives, a chi-square test of independence was performed. Specifically, these tests were used to determine if statistically significant differences were seen pre- and post-intervention for each of the objectives. The independent variable was the intervention and the dependent variables were the objective outcome variables. All of the outcome variables showed significant improvements post-intervention. The improvement on the inclusion of a medication list in the EMR (Objective 1) was statistically significant ($\chi^2 = 58.42, p < .001$); charts with CPT code 1159F (Objective 1) significantly improved ($\chi^2 = 139.41, p < .001$); charts with CPT code 1160F (Objective 3) significantly increased ($\chi^2 = 136.17, p < .001$); increases in distribution of printed medication summaries to patients (Objective 4) was significant ($\chi^2 = 120.911, p < .001$); and finally medication education (Objective 4) was also significantly increased ($\chi^2 = 136.17, p < .001$). All of the objectives were met as outlined in Table 8.

Table 8

Results of Chi-Square Test for Medication List on the EMR (Objective 1), EMR Charts with CPT Code 1159F (Objective 1), Charts with CPT Code 1160F (Objective 3), and Printed Medication Summaries, and Medication Education (Objective 4)

	Pre-Intervention <i>n</i> = 86(%)	Post-Intervention <i>n</i> = 86(%)	χ^2	<i>p</i>
Medication List in EMR				
Yes	21(24.4)	71(82.6)	58.42	<.001
No	65(75.6)	15(17.4)		
Charts with CPT Code 1159F				
Yes	0	77(89.5)	139.41	<.001
No	86(100)	9(10.5)		
Charts with CPT Code 1160F				
Yes	0	76(88.4)	136.17	<.001
No	86(100)	10(11.6)		
Printed Medication Summaries				
Yes	0	71(82.6)	120.91	<.001
No	86(100)	15(17.4)		
Medication Education				
Yes	0(0)	76(88.4)	136.17	<.001
No	86(100)	10(11.6)		

Discussion and Conclusions

Education of the staff, providers, and patients played a significant role in improved medication management for elderly patients by increasing medication review, EMR documentation, and patient education. Communication and information between the health care providers and the patient enhances the participation of elderly patient in decision making about taking their medications according the prescription instructions (Modig, Kristensson, Troein, Brorsson, & Midlöv, 2012). The review of literature revealed that there was convincing evidence

that interventions involving medication reconciliation and reviews by the provider can reduce medication related problems. Improvements in medication management throughout this QIP increased accuracy of existing patient medication lists and reduced the possibility of an adverse drug event.

Discussion of Main Findings

The primary goal of this quality improvement project was to improve medication management processes for elderly patients in a geriatric wellness center through increased provider and staff review of medications, documentation and education of patients. A total of 4 objectives were implemented and evaluated at the staff, provider, and patient level. Interventions for Objective 1 improved the documentation rate of patients' medications from 25% to 82%. Interventions for the first objective included delivering an in-service to the personnel of the Wellness Center on documenting patient medications in the EMR system and evaluating the performance of each staff member by using a medication audit checklist. All staff and providers learned to document the names of the patient's medication in the EMR, improved the rate of documenting the patient's medications from 25% to 100% flagged charts of patients with medication problems, and documented the appropriate CPT codes corresponding to medication reconciliation process. The results of Objective 1 interventions were consistent with the findings of several reviews (Olson et al., 2012; Sarzynski et al., 2014; Vejar et al., 2015).

A cross-sectional chart review disclosed discrepancies of medications used by patients compared to pharmacy claims. The importance of accuracy in documentation of the patient's medications by the primary care provider was emphasized to establish a safer medical system (Olson et al., 2012). The patient list of medications in the first group of 86 charts reviewed showed incomplete lists compared to the requests for medication refills. Discrepancies of

medications used were present consistent with the findings from the study conducted by Olson et al. (2012). The collaborative team approach and education trainings used throughout this process was effective in improving the accuracy of a complete patient medication list.

The World Health Organization and the Joint Commission require that all health care organizations accurately document the reconciliation of medications (Sarzynski et al., 2014). Quality improvement efforts for documenting medications according to Sarzynski et al. (2014), need to be in place for seamless reconciliation processes of listing the patient's medications in the EMR. Medication reconciliation according to Vejar et al. (2015), involves a complete compilation of an accurate list of all of the medications including the over-the-counter medications that the patient is taking on a daily basis or as needed. According to Vejar et al. (2015), medication reconciliation is the responsibility of the provider and every effort should be made to have a process in place for learning how to document and update a complete patient medication list.

Objective 2 interventions improved the process of obtaining information on the medications that patients were taking, increasing from 10% to 82% the amount of patients who brought their medications to the clinic. Objective 2 was accomplished by informing all of the patients to bring their medications to every office visit. Sarzynski et al. (2014) recommended that patients bring a medication list rather than the bottles of the medications for convenience and time. The staff wore promotional buttons to remind patients to bring their bottles of medications and a list of any refrigerated medications that should be left at home such as insulin to the office visit. The task of obtaining a complete medication list enabled the providers to complete a thorough medication reconciliation process, considered to be in alignment with best practice guidelines and critical to patient outcomes. The results of Objective 2 interventions were

consistent with the findings of several reviews (Frydenberg & Brekke, 2012; Olson et al., 2012; Sarzynski et al., 2014; Vejar et al., 2015). In a quality improvement project, Frydenberg and Brekke (2012) stated the importance of monitoring the patient's medications by the primary care provider. The lack of monitoring according to Frydenberg and Brekke (2012), contributed to the use of inappropriate drugs by the patient and an incomplete medication list. An 80% discrepancy was found between the names of the medications as reported by the patient compared to the actual prescribed medications. A request to update the patient's medication lists at every visit was recommended by Frydenberg and Brekke (2012) to avoid miscommunication and errors in the names of the medications that the patient was using.

Medical records are typically deficient in the complete documentation of medications as described by Olson et al. (2012) in a cross-sectional study. Olson et al. (2012) stated that a review of medications at each office visit is needed particularly in patients with multiple chronic diseases; therefore, patients should be encouraged to bring their medications to every office visit. Sarzynski et al. (2014) performed a cross-sectional pilot study and concluded that patients who brought their medications to the office visit and engaged in a review of their medications prompted the staff to document a more thorough medication list in the EMR. Establishing a process of medication reconciliation can be challenging, but not completing a medication list can be costly and dangerous (Vejar et al., 2015). Interventions in the study by Vejar et al. (2015) focused on patients bringing all their medications to each office visit, phone calls made by the staff to remind patients to bring their medications to the office visits, resulting in increased medication reconciliation rates and accuracy in the patient's medication list. The conclusion by Vejar et al. (2015) was supported in the current QIP, which found that the process of medication reconciliation improved after educational trainings and interventions that focused on encouraging

the patients to bring their medications to the clinic. The patients from the Wellness Center responded well in bringing all their medications including their medications from Mexico to the office visit and this resulted in increased medication reconciliation, identification of any inappropriate medication classification, and accurate medication list rates. It was critical that patients brought in medications that were purchased in Mexico because some patients do not consider these medications prescribed since the patient can purchase them without a prescription and may contribute to a duplication or direct interaction with their prescribed medications in the United States. Telephone appointment reminder calls made from the Wellness Center receptionist was a good approach to remind the patient to gather their medications and bring them to the office visit.

Interventions for Objective 3 reduced the prescribing of high-risk and potentially inappropriate medication categories in the elderly clinic patients, dropping the rate of patients with contraindicated medications from 8% to 3%. In this QIP, the providers reviewed 100% of 840 new patients' charts of patients seen from June 15 to August 15, 2016, in the Wellness Center for high-risk and potentially inappropriate medications by using the Beers List.

Additionally, chart reviews revealed that the use of CPT coding by the providers increased from 0% to 100%. A total of 325 high-risk medications and 14 unsafe medication combinations were replaced with safer medication alternatives. High-risk medications and unsafe combinations posed a health threat for elderly patients. For example, combinations such as benzodiazepine (alprazolam), sleeping medication (Trazadone), and a muscle relaxant (Flexeril) together can induce central nervous system depression and lead to respiratory arrest. The results of Objective 3 interventions were consistent with similar findings of several reviews (Davidoff et al., 2015; Dormann et al., 2013; Keith et al., 2013; Milos et al., 2013). In a retrospective cohort

study, the Beers List was used to identify, replace, and prevent writing of prescriptions that posed health risks to 18,475 elderly (Davidoff et al., 2015). According to Davidoff et al. (2015), 42.6% of these patients had at least one medication that was classified as PIMs for elderly, and from 2006 to 2007, the rate of PIMs decreased from 45.6% to 40.8%. In the QIP, the rate of PIMs also decreased after the use of the Beers List criteria from 8% to 3%. A prospective review of 752 elderly patients was conducted to determine if these patients experienced adverse drug events from the use of high-risk medications (Dormann et al., 2013). A similar method to the Beers List criteria called the PRISCUS List was used to identify and screen for high-risk medications in the elderly. Not unlike the findings in this QIP where 58% of patients had inappropriate prescriptions, the Dormann study indicated that 87.5% of these elderly patients were taking at least one high-risk medication and were more likely to suffer an adverse event.

A quality improvement project by Keith et al. (2013) focused on educating general practitioners on the risks for prescribing dangerous medications in the elderly. As a result of providers having the Beers List criteria on hand, a decrease in exposure to PIMs was reduced from 7.8% baseline to 5.3% post-intervention group similar to the results of the QIP reduced from a PIM baseline of 8% and reduced to 3% post-intervention. The providers at the Wellness Center also used the Beers List criteria that was conveniently located next to the EMR system keyboard. A randomized control study was conducted to evaluate the use of PIMs through the use of a review of medical records in 369 patients (Milos et al., 2013). One-third of these patients were found to have at least one PIM. The review of the PIM medications was performed by a pharmacist, thus adding to the team of interprofessionals who screen for inappropriate and dangerous medications prescribed for elderly.

Objective 4 interventions improved the consistency with which prescribed medication information was given to each patient at the end of every office visit, and this increased in from 0% to 82% of patients who received a medication. Objective 4 was accomplished by giving medication summaries to 100% of the patients as audited by a daily chart review and educational brochures given to patients. The number of prescriptions given to patients with instructions on the purpose of their medication and preferred language also increased from 0% to 100%. The results of Objective 4 interventions were consistent with the findings of two reviews (Ludman et al., 2013; O'Carroll et al., 2013). Ludman et al. (2013) showed in a randomized controlled study that the intervention effects on patient knowledge about medications improved disease outcomes. The interventions were successful in significant improvements in clinical outcomes of chronic conditions due to an increase in patient medication information and patients understanding how, why, and when to take their medications. While the QIP did not assess patient health outcomes, however, it would be projected that improvement in patient's outcomes would be affected by patients understanding how to take their medications correctly as opposed to incorrectly.

O'Carroll et al. (2013) conducted a study to prevent stroke survivors from suffering another stroke by establishing interventions for patients to learn how to take their medications and clarifying through patient education of any misinformation regarding the use of their medication. The interventions in this study increased patient participation in taking their medications and prevented stroke survivors from developing chronic illness-related complications. Although the patients in the QIP post-intervention group received a printed medication summary, verbal instructions by the provider on how to take their medications, choice of written language for the prescriptions, including printing the purpose of the medications on the prescription labels, and participation in the bringing all their medications to

the office visit, the question of whether these interventions will prevent these patients from suffering complications related to their chronic diseases is a researchable question for another QIP.

Implications for Practice

Deficient medication reconciliation management processes for elderly patients presented significant challenges to both patients and health care providers to improve the safety of medication use through improved medication management and documentation of the patient's medication information in the EMR system. A microsystem and needs assessment of the Wellness Center revealed a continuous failure of the staff to collect and properly document complete medication reconciliations in every patient. In addition, there was a lack of patient education regarding the proper use of their medications. The collaborative team approach and specific and targeted staff and provider education played a major role in improving medication management in the patients at the Wellness Center. The routine implementation of medication reconciliation upon the initial office visit could have potential effects on adherence, quality of life, and therapeutic health outcomes (Hellström, Höglund, Bondesson, Petersson, & Eriksson, 2012). The value of teaching the medical assistants and providers how to input the names of the patients medications into the EMR system, emphasizing to the staff the importance of calling the patients for appointment reminders and instructing them to bring all of their medications, and reviewing the list of the patients printed medication list are valuable lessons for the success of improving medication management in the elderly at the Wellness Center.

Lessons Learned

Improvement in the process of medication reconciliation required an awareness of the low performance rating compared to the quality performance measures set by CMS. The

providers, staff, and patients benefited from the educational interventions that resulted in improved medication management, patient safety, and quality of care in the clinic. Proper and consistent documentation of CPT codes 1159F and 1160F enabled the improvement of the Wellness Center's performance ratings and could have generated a revenue of \$972,056.10 for properly documenting medication reconciliation CPT codes. An estimated incentive bonus in the amount of \$52,000 yearly from HealthSpring insurances for meeting Medicare performance standards is possible for the fiscal year 2016-2017. The implementation of the interventions required continuous monitoring for sustaining effective changes. The poster reminders for patients to bring their medications were written in English; some patients only read and spoke Spanish. Therefore, some patients did not understand the information on the posters instructing patients to bring their medications to every office visit. A modification to the poster reminders in Spanish became necessary during the course of the project, although unfortunately, the change was not supported by the clinic manager due to cost and time for approval by the other stakeholders. The DNP student played a major role in changing and improving a troubled medication reconciliation process to one of safer and higher patient-centered quality care. The workload for the medical assistants increased by documenting every medication in the EMR system by 10 minutes per patient; this caused a longer waiting time for the patient. This translated to 3 hours of extra time on average clinic day.

Limitations

More than half of the patients in the study visited the Wellness Clinic only once a year, making it very difficult to use the original 86 patient sample for comparison after project interventions; for this reason, data were collected post-intervention on 86 different patients who had been seen by the clinic during the course of the project. It would be preferable to follow the

initial 86 patients to see outcomes within the same sample of patients. A second limitation pertained to finding external benchmarks that precisely matched the outcomes of the project were not available. The physicians in private practice hold the benchmarks secretly as given to them by managed care organizations that do not include advanced practice nurses. The small size of the staff ($n = 8$) and providers ($n = 2$) affected the representation of other clinic populations that are much larger in patient numbers and staff time for more patient medication education and follow-up. The short timeframe of conducting the project was also a limitation because there is a possibility that conducting the project over a longer span of time could have yielded different outcome data. More than half of the patients only spoke Spanish and had less than a high school education; this information is important when planning educational sessions and selecting education level teaching material.

Recommendations for Future Sustainability

The following recommendations were discussed with the stakeholders of the Wellness Center for future sustainability of the achievements in the goals of the DNP project objectives and interventions. A copy and a universal serial bus of the educational training, skills check-list, and evaluation forms were provided to the office manager, providers, and the owner of the center for future orientation use of new employee. Recommendations for future sustainability also included the sharing of current ratings and goals with the team members during regular employee staff development meetings. Instructing all patients to bring their medications to every office visit, documenting a complete medication reconciliation, and providing a medication information summary printout at the end of every visit became a regular part of the clinic procedure, and thus, these interventions are already sustained. Sharing the expected increase in revenue to the

chief financial officer and the owner of the Wellness Center can contribute to the sustainability of the interventions.

Relevance of the Project to the Role of the DNP and Implications for Practice

APRNs who hold a DNP degree have the educational preparation to play an essential role in supporting and leading transformations in health care delivery systems that result in improvements of health care outcomes. The DNP student provided leadership in assessing the needs at the Wellness Center and implemented strategies that created changes and improved the processes of medication management for elderly patients through increased staff and provider medication review and documentation. The relevance of the project to the role of the DNP and implications for practice focused on improvements of the project objective outcomes. The DNP student used evidence-based practice and information technology skills that improved the health care practice and patient health care outcomes in the Wellness Center.

The DNP student was guided by the American Association of Colleges of Nursing (AACN) Essentials of Doctoral Education for Advanced Nursing Practice for improving the medication management in The Wellness Center. Essential I: Scientific Underpinnings for Practice (AACN, 2006), established the foundation used to develop, implement, and evaluate health care delivery approaches using research-based evidence. Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking (AACN, 2006), explains how the project was developed, implemented, and evaluated based on advanced communication, skills to improve patient outcomes and improvement of practice outcomes. Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice (AACN, 2006), translated research into practice through the review of literature and functioned as a practice leader in the development and implementation of a clinical project. Essential IV: Information systems

Technology and Patient Care Technology for the Improvement and Transformation of Health Care (AACN, 2006), was utilized to manage patient information, evaluate project outcomes, and apply new skills and knowledge to improve the reviews and documentation of medications in the EMR system. Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes (AACN, 2006), was accomplished through engagement, interprofessional collaboration, and through continuous communication with stakeholders of the Wellness Center. This was critical to the actual deployment of new medication management strategies and in improving care that will continue to be given in this clinic and to a vulnerable elderly client population. Finally, Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health (AACN, 2006), was incorporated in the evaluation of the intervention strategies taking into consideration the unique needs of the personnel and the clinic population of the Wellness Center. The interventions for this QIP were key in preventing and managing chronic disease for the patients who came to the Wellness Center seeking assistance in managing their health care.

Conclusion

The QIP succeeded in the aim to improve the process of medication management in the Wellness Center. The review of literature supported the need to provide elderly patients with chronic diseases a complete medication reconciliation, avoid the use of high-risk medications, and increase patient medication education. The Geriatric Medication Management Toolkit (n.d.) and Medication Adherence Educators Toolkit (2012) provided forms in English and Spanish that patients could use to document their medications.

The interventions and evaluations of this QIP were guided by the Kellogg Logic Model. The project study site was a privately owned wellness center for geriatric patients in an urban

community of South Texas. The Wellness Center stakeholders were actively involved throughout the planning, intervention, and evaluation of the project. A microsystem assessment was performed in August 2015, and a needs assessment was performed in the spring of 2016. The needs assessment at the Wellness Center discovered gaps in the processes of medication reconciliation. The interventions for this QIP were based on the root cause analysis, a SWOT analysis, literature review, microsystem team members' feedback, and multiple meetings with the stakeholders. An evaluation and data analysis plan was designed to measure the outcomes each of the four objectives. A business plan was developed to support the need for the project. Protection of human subjects and IRB approval was reviewed and approved.

The outcomes of the QIP showed improvement in the processes of medication management in a geriatric wellness center. The literature demonstrated that there was a gap in the use of standardized processes in the medication management of elderly patients in the Wellness Center. The implementation of research-based evidence supported new clinical practice approaches for improvements in medication management for elderly patients through increased review and documentation. The development, implementation, and evaluation of the QI project was performed based on the needs assessment, data collection, and systems improvements in the Wellness Center. The DNP student functioned as a practice leader, consultant, collaborator, communicator, facilitator, and role model by motivating an interdisciplinary team to make an improvement in the process of the medication management in elderly patients. The use of the Geriatric Medication Management and Medication Adherence Educators Toolkits supported the translation of evidence by the implementation and application of evidence-based practices that improved medication management for elderly patients in the Wellness Clinic in Brownsville, Texas.

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