2021

Nursing Interventions for Reducing Falls Among Older Adults on Polypharmaceutical Agents

Kevin O. Onuekwusi
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Kevin O. Onuekwusi

has been found to be complete and satisfactory in all respects,

and that any and all revisions required by

the review committee have been made.

Review Committee

Dr. Maria Ojeda, Committee Chairperson, Nursing Faculty

Dr. Rachel Pitman, Committee Member, Nursing Faculty

Dr. Mirella Brooks, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost

Sue Subocz, Ph.D.

Walden University
2021

Abstract

Nursing Interventions for Reducing Falls Among Older Adults

on Polypharmaceutical Agents

by

Kevin Onuekwusi

MS, Walden University, 2018

BS, Kaplan University, 2016

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2021

Abstract

In the United States, the cost of treating a resident of a long-term care facility (LTC) after a fall with injury is between $10,000 and $26,000. Current nursing interventions for fall prevention among older adults aged 65 years and over at the local LTC do not address the risk of polypharmacy and are focused on environmental and intrinsic factors. The purpose of this systematic literature review was to find the nursing interventions that have been used to reduce falls in older adults aged 65 years and over in nursing homes and LTCs who are on polypharmaceutical therapy. Primary research articles and systematic reviews published between 2013 and 2020 were included. The Johns Hopkins Research Evidence Appraisal Tool was used to determine the level of evidence and quality of the studies. Out of 1,728 articles uncovered in the literature search, only four met the inclusion criteria. The studies provided Level I, II, and V evidence and all were high quality studies. None of the studies were conducted in the United States. The findings indicated that study designs and settings varied; staff education focusing on the adverse effects of medications, team changes to include nurses, improved communication among professionals using electronic platforms, and implementing the nurse practitioner role in LTCs decreased fall rates and polypharmacy. LTCs may reduce the risk for falls among older adults receiving polypharmaceutical therapy by implementing any one or more of the interventions uncovered in this systematic review. These organizations will benefit by reducing the cost of care related to polypharmacy-related falls and injuries. Positive social change will result from improving nursing practice and thus the safety of the care environment for vulnerable residents. More research is needed before best practices can be determined because of the scarcity of evidence and because existing studies did not provide detailed information on how nurses implemented their roles.

Nursing Interventions for Reducing Falls Among Older Adults on Polypharmaceutical Agents

by

Kevin Onuekwusi

MS, Walden University, 2018

BS, Kaplan University, 2016

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2021

Dedication

This project is dedicated to my late sister, Patricia, who passed recently as I was completing this project. May her soul continue to rest in perfect peace.

Acknowledgments

I thank God immensely for keeping me healthy and giving me the courage and strength to persevere to the end of this program. I couldn't have done it without Him. I want to thank my family, particularly my wife, Christiana for her encouragement and moral support as I carried out this project.

I also want to thank my chair, Dr. Maria M. Ojeda for all her terrific feedback. I appreciate you so much. Thank you for all your support, you gave me hope to keep pushing to the end. I am happy to be a beneficiary of your wealth of experience. Thanks also to Dr. Rachel Pittman, my committee member for your constructive feedback. Thank you all and God bless.

Table of Contents

List of Table

Section 1: Nature of the Project

About 35% to 50% of nursing home residents fall each year, and most of these falls result in injuries such as hip fractures or dislocations and brain injuries, leading to prolonged hospitalizations, loss of independence, diminished quality of life, and increased risk of death (Bor et al., 2017). In addition, over 80% of injury-related admissions to hospitals among people over 65 years old are attributed to falls (Sagawa et al., 2018). Apart from the loss of independence and quality of life, the economic impact of falls in older adults in the healthcare system is enormous. In the United States, the average cost for treating a resident after a fall with injury is $10,000 and $26,000 per fall-related hospitalization (Sagawa et al 2018). Most older adults 65 and over have comorbidities and are on multiple medications which place them at higher risk for fall (Moncada & Mire, 2017).

This project was a systematic review of the literature to find the nursing interventions that have been used to reduce falls in older adults aged 65 years and over who are on polypharmaceutical agents. Nurses are in the forefront of patient care, as they are virtually in constant contact with patients, and are best positioned to observe any changes in behavior or mentation of the residents including how they react to the multiple medications they take routinely that can predispose them to falls. This project is expected to effect positive social change by providing information to nurses that they can apply to reduce falls in this vulnerable population and thus reduce fall-related injuries, hospitalizations, and even death. The ultimate goal is to improve the quality of care, save lives, and reduce healthcare costs, and all these will contribute to positive social change.

Problem Statement

Local Nursing Problem

My work setting is a long-term care unit of an inpatient forensic/civil psychiatric hospital. Many of the forensic patients have been hospitalized for a prolonged period of time because of the nature of their offenses and of the legal system. These older adults have developed comorbidities such as type 2 diabetes, primary and secondary hypertension, heart disease, and chronic renal failure, and some have suffered a stroke. These patients also suffer from psychiatric problems, which include schizophrenia, paranoid schizophrenia, schizoaffective disorder, personality disorder, and polysubstance abuse. Based on their multiple diagnoses, these older adults are on multiple pharmaceutical agents that have known side effects such as hypotension, dizziness, drowsiness, unsteady gait, and confusion that can make them susceptible to falling (Walker et al., 2019).

My unit has a 27-bed capacity, and from June 2019 to June 2020, there has been a spike in the number of falls recorded. Out of the 27 individuals cared for on this unit, 20 are 65 years or older, and 15 of them take seven or more medications (polypharmacy) every day. We have been recording an average of five falls with injuries every week over the past year. These falls were not due to environmental factors such as wet floors, poor lighting or clutter, neither were they due to poor vision or non-fitting shoes; instead, hypotension, dizziness, drowsiness and unsteady gait were the most common antecedents to falls (Walker et al., 2019). Realizing that these were common side effects of medications taken by these older adults, the organization is concerned that nurses and the

nursing staff might not have adequate knowledge of how to mitigate the risk for falls due to medication side effects.

The current fall reduction protocol the hospital has focused on are environmental and intrinsic factors and not on the effects of medications. Moreover, the organization has an urgent need to address this situation because regulatory agencies such as the Centers for Medicare and Medicaid Services (CMS) and the Joint Commission on Accreditation of Healthcare Organization (JCAHO) use falls as one of the quality measures in their rating of healthcare facilities and for reimbursement. The CMS stopped reimbursing healthcare facilities for preventable hospital-acquired conditions in 2008 (Johnson, 2020).

Significance for Nursing Practice:

The findings from this project will provide information on the nursing interventions used to prevent falls in older adults related to polypharmacy. Not much attention has been paid to polypharmacy as a risk factor in falls occurring among older adults despite the availability of evidence-based resources such as American Geriatrics Society (AGS, 2019) Beers Criteria indicating that some medications such as the serotonin-norepinephrine reuptake inhibitors (SNRIs) are potentially inappropriate for older adults at risk for falling due to their side effects such as weakness and blurred vision. Thus, nurses and the nursing staff will use the knowledge presented by this doctoral project to develop and implement interventions that can reduce falls in this population. Fall reduction as a result of the project might save more lives and reduce healthcare cost not only to the facility but to the entire healthcare system.

Purpose

Gap in Practice

The gap in practice at my facility is that it lacks evidence-based strategies to prevent falls associated with polypharmacy. The nurses and nursing staff focus their fall reduction interventions only on the environmental risk factors such as wet floors, clutter, and poor lighting and intrinsic factors such as poor vison and unfitting shoes with no apparent consideration given to the potential risks posed by the side effects of the multiple medications these older adults are on.

Guiding Practice-Focused Question

This doctoral project will describe the types of nursing interventions that have been used to reduce falls among older adults aged 65 and over who have been prescribed polypharmaceutical treatments in nursing homes and long-term care facilities.

Addressing the Gap in Practice

I conducted a systematic review of the evidence focusing on nursing interventions that have been used to mitigate falls in older adults who are on polypharmaceutical agents. The findings will be made available to the direct care nurses, nursing assistants, nursing leadership, the healthcare providers, the leaders and management of the organization. The organization can then develop a fall prevention protocol that will include strategies that will enable nurses and nursing assistants to identify and reduce fall risks associated with polypharmaceutical agents in this vulnerable population.

Nature of the Doctoral Project

Sources of Evidence

For this project, I reviewed the literature using databases such as CINAHL Plus with Full Text, PubMed, ProQuest, Cochrane, Science Direct, and Medline. I limited my search to primary, peer-reviewed articles published between 2013 and 2020.

Approach to Organize and Analyze Evidence

I tracked the database searches using a spreadsheet that contained the following information: the date of the search, the name of the database that was searched, the keywords that were used, the date range of the search, the keywords used for the search, and the number of articles returned. Zotero, a literature management software, was used to store and organize the evidence (Zotero 2020). I then analyzed the quality of evidence for this project using the John Hopkins system (Dang & Dearholt, 2017). Current nursing practices to prevent falls in my facility have been focused on environmental and patient factors such as wet floors, poor lighting, clutters, poor vision and non-fitting or skid shoes with no attention to the reduction of the potential risk posed by polypharmacy. The purpose of this project was to systematically review current literature (within 7 years) with the aim of finding nursing interventions that have been used by nurses and nursing assistants to reduce falls in older adults 65 and over who are on polypharmaceutical agents in nursing homes and long-term care facilities.

Significance

Stakeholders

The stakeholders include the residents, their families, the nurses, nursing assistants, the nurse manager, the chief nurse executive, and the chief executive officer. The residents' safety and quality of life will be enhanced with the reduction in the number of falls they may experience once the information derived from this project is implemented. Their families will be more satisfied with the care their loved ones are receiving from the facility and will have improved relationship with the facility knowing that their loved ones are safer than was previously the case. The nurses and nursing assistants will be better prepared to carry out their responsibilities and will therefore have better job satisfaction. The managers and administrators will benefit from the improved reputation of the facility for quality and safety in comparison to similar organizations. The reduction in fall rate will improve the rating of the hospital in the society, meaning more business for the facility. Also, the facility will be better positioned to pass inspections by regulatory bodies such as the department of health, the CMS, and the JAHCO. This will be to the advantage of the chief nurse executive and the chief executive officer because it will save the facility from preventable litigations from family members due to fall-related injuries or death of loved ones. It also has the potential to save the facility money because Medicare does not cover the cost of treating fall-related injuries because falls are preventable. Patient falls are regarded as a nursing-sensitive event and therefore preventable.

Contributions to Nursing Practice

The findings from this project will be made available to nurses and nursing assistants so that they will be better equipped to monitor and apply the interventions to reduce falls in this vulnerable population and in the process contribute to the improvement of nursing practice.

Potential Transferability

Systematic literature reviews are the highest level of evidence; therefore, the findings from this project can be transferred to other nursing homes and long-term care facilities in the country with confidence to make part of their fall prevention protocol. The transfer will be accomplished by publishing the findings in the *American Journal of Nursing* and the nursing monthly magazines of the Maryland, Virginia, and the District of Columbia.

Implications for Positive Social Change

Fall reduction using the findings identified through the project means a decrease in fall-related injuries, hospitalizations, and even death. The aim is to improve the quality of care provided to these vulnerable older adults, save lives, and reduce healthcare cost. All of these will in turn contribute to positive social change.

Summary

Falls and fall-related injuries in older adults aged 65 and above living in nursing homes and long-term care facilities are of great concern to the residents, their families, the healthcare organizations, and the healthcare system. This is because fall-related injuries reduce the quality of life of the residence and deny them their independence.

Healthcare organizations are concerned not only because falls are costly (Sagawa et al., 2018) but also because falls are one of the quality indicators that could affect their rating and re-certification by regulatory agencies such as the CMS and the JCAHO.

In the past year, the rate of fall in my 27-bed capacity long-term care unit has been on the increase. The current fall prevention protocol is focused on environmental and resident factors. Little or no attention has been paid to the effects of the multiple medications these older adults need to take to manage numerous comorbidities and what nursing interventions could be used to reduce falls due to these polypharmaceutical agents.

This project was a systematic review of the evidence to identify the nursing interventions used to prevent the occurrence of falls in older adults aged 65 and over in nursing homes and long-term care facilities who are on polypharmaceutical treatments. The findings will be made available to the direct care nurses, nursing assistants, nursing leadership, the healthcare providers, the leaders and the management of the organization. It is expected that the information will be used to improve the strategies used to reduce falls in this vulnerable population. In the second section of this project, I discuss the background and the context of the project.

Section 2: Background and Context

Older adults aged 65 and over in nursing homes and long-term care facilities have multiple comorbidities that are being managed by polypharmaceutical agents (Moncada & Mire, 2017). These multiple medications increase the risk of falls in this vulnerable population (Moncada & Mire, 2017). Most of the current fall prevention protocols in hospitals and long-term care facilities, including the facility where I work, have focused on addressing environmental risk factors and patient factors such as poor vision and unsteady gait (Hill et al 2015). However, not much attention has been paid to the potential role of medications as a risk factor for falling (Trenaman et al., 2018). The practice problem is that there are no strategies in place at the local setting to mitigate falls associated with the combined side effects of medications used to treat numerous comorbidities among the residents. In this doctoral project, I describe the evidence regarding nursing interventions used to mitigate falls among older adults aged 65 and over who are taking polypharmaceutical agents. The purpose of this doctoral project was to conduct a systematic literature review to identify current evidence-based nursing interventions that have been used to reduce falls in this vulnerable population and to recommend them to my organization for use by nurses and nursing assistants in the facility.

In this section, I will describe the concepts, models, and theories used to guide this project. I will also discuss the importance or relevance of the project to nursing practice. The local background and context, and the role of the DNP will also be discussed, ending with a summary and transition to Section 3.

Concepts, Models and Theories

Rationale for Concepts, Models, and Theories

Healthcare workers, including nurses, should rely on scientific evidence for their practice, using the most current research evidence available in the literature. Evidence-based practice (EBP) is a problem-solving approach to the delivery of health care that incorporates the best evidence from studies and patient care data with clinical experiences of experts while taking patient values and preferences into consideration (Melnyk et al., 2010). I applied the concept of EBP in this project, searching for nursing interventions that have been implemented to prevent falls in older adults 65 and over. This was in tune with the Institute of Medicine's (IOM) recommendation in 2001 that every healthcare professional is competent in EBP (Wen-Yu Hu et al., 2020). The adoption and use of EBP within an organization make it possible for everyone to be on the same page and makes room for standardization of practice and processes (Dang & Dearholt 2017).

The John Hopkins Evidence-Based Practice (JHNEBP) model was used to guide the systematic review. This model describes how the gap in practice can lead to critical thinking and inquiry, and how inquiry can result in innovation to improve practice (Dang & Dearholt, 2017). The JHNEBP is made up of three interrelated components: inquiry, practice, and learning (Dang & Dearholt 2017). Inquiry, the first component, is regarded as the basis for nursing practice. This is the stage where the nurses ask questions about issues that they perceive as problems or where they have concerns. They start to think of better ways to approach the problem in order to achieve a better outcome in a safer, more efficient, more effective, and more cost-effective way. Simply put, inquiry leads to a

search for new solutions to an identified problem, in this case, a search for better nursing interventions to prevent falls in older adults 65 and over who are on polypharmaceutical agents. Practice, the second component of the model, involves nurses using or translating their knowledge into action. Nurses have to follow established standards of practice, and they are held to standards already established by professional organizations such as the American Nurses Association (Dang & Dearholt 2017). Nurses have in the past based their practice on policies, protocols, and procedures that may not have been backed by evidence, but the evidence-based approach has become not only the expectation in contemporary nursing practice from professional organizations but also a requirement from regulatory bodies (Dang & Dearholt 2017). The third component of the JHNEBP, learning, is described as the change that comes as a result of experience, which may be in the form of emotional, functional process, skill, and/or behavior. The JHNEBP describes learning as a result of a culture of inquiry that inspires staff to not only keep increasing their knowledge but also develop new skills.

The JHNEBP model used the Practice, Evidence, and Translation (PET) process as a framework for systematically providing an answer to a practice question, finding the best evidence, and translating best evidence into practice and use as best practices for improvement in patient care delivery (Dang & Dearholt 2017). In the JHNEBP model, the evidence is the second phase of the PET process. It addresses the search, appraisal, and synthesis of the best evidence. Based on the strength of the evidence, a decision is made regarding a change in practice, and the evidence-based finding is then adopted as the best practice (Dang & Dearholt 2017). In relation to my DNP project, the systematic

review of literature produced evidence on nursing interventions that have been used to mitigate falls in older adults 65 and over who are on polypharmaceutical agents in nursing homes and long-term care facilities. The evidence (findings) can be translated into practice protocols that integrate best practices to prevent falls, which can then be implemented in the clinical setting, resulting in improvements to clinical (i.e., falls/fall-related injuries), organizational (i.e., improved quality and safety outcomes, lower costs), and knowledge (i.e., development of staff education to increase knowledge of fall prevention) outcomes.

Clarification of Terms

Patient risk factors for falls: These are those conditions that can cause patients to fall that originate from the patients or residents themselves. They include poor vision, wearing of non-fitting or skid shoes, musculoskeletal weakness, and unsteady gait (Joseph et al., 2019).

Environmental risk factors for falls: These are conditions of the patients'/residents' surroundings that cause them to fall. The conditions include wet slippery floor, broken/unstable furniture, lack of handrails along hallways, and poor lighting (Tiefenbachová & Zeleníková 2019).

Polypharmacy: This is defined as the simultaneous use of five or more medications by a single patient to treat one or more diseases or conditions (Halli-Tierney et al., 2019).

Long-term care: This consists of various services designed to meet a person's health or personal care needs for a long period of time (six months and above) (National Institute on Aging, 2017).

Fall: An unplanned descent to the floor with or without injury to the patient, or when a patient land on a surface where they are not normally found or when a patient is assisted to the floor due to physiological reasons such as fainting or due to environmental reasons such as wet and slippery floor (Agency for Healthcare Research and Quality [AHRQ], 2013).

Falls with injury: These are falls that result in fractures, lacerations, or internal bleeding (AHRQ 2013).

Relevance to Nursing Practice

A Brief History of the Broader Problem in Nursing Practice

The goal of nursing care in healthcare facilities is to maintain patient safety, but unfortunately, the safety of patients and residents in hospitals and long-term care facilities remains a concern not only to the resident and family but also to the entire healthcare system (AHRQ, 2019). Nurses are at the forefront of patient care and are therefore expected to prevent any harm to patients, including falls. Falls pose a substantial threat to patient safety in long-term care facilities and fall-prevention practices are among the many activities required to prevent patients/residents from harm (AHRQ, 2019). About 1.6 million nursing home residents fall each year (AHRQ, 2019). The rate of falls in nursing homes and long-term care facilities is a quality indicator, and the CMS consider falls with injury as a never event, meaning that it is preventable and should

never happen (AHRQ, 2019). The JCAHO also takes falls with injury very seriously that it designated them as reportable events (AHRQ, 2019).

With the increasing number of Americans living longer and seeking long-term care or nursing home placement, the need for their safety cannot be overemphasized. Falls are one of the main threats to the safety of older adults 65 and over in nursing homes and long-term care facilities (Whitney et al., 2017). Fall prevention is important in nursing practice because falls are listed on the National Database of Nursing Quality Indicators (NDNQI; Rahn, 2016). Since falls are listed on NDNQI as a nursing-sensitive quality measure, it is the responsibility of nurses and nursing staff to make efforts to prevent falls in hospitals, nursing homes and long-term care facilities. Fall rates in these settings are used to evaluate the performance of nurses and rate nursing practice by healthcare regulators such as the CMS and the JCAHO (Sagawa et al., 2018).

Current Nursing Practice for Fall Prevention and Recommendations

Current nursing interventions on fall prevention are focused on addressing environmental risk factors such as clutter, unstable furniture, poor lighting, lack of handrails in the hallway, and patient factors such as poor vision and unsteady gait (Hill et al 2015). Despite literature indicating that certain medications are potentially inappropriate for older adults due to their side effects such as weakness and blurred vision (Cameron et al., 2018; Trenaman et al., 2018), there are no nursing interventions explicitly focusing on preventing falls caused by the effect of medications these older adults may be taking to treat their comorbidities (Cameron et al., 2018). The current

recommendation is to expand the focus on fall prevention to include medication-induced falls in older adults and how to prevent them (Cameron et al., 2018).

Quality improvement initiatives to improve fall prevention include nursing staff education, training, and retraining, aimed at promoting patient safety by improving the adherence of nursing staff to the fall prevention protocol (Johnston & Magnan 2019). Other practices include NDNQI developing falls as an indicator of nursing care quality so that healthcare organizations will take fall prevention more seriously since it is tied with healthcare cost reimbursement (Sagawa et al., 2018).

The gap found in the literature is that the current fall prevention protocols only address falls due to environmental and patient factors and not on falls caused by medications (Cameron et al., 2018). In this project, I systematically reviewed the literature to find evidence-based nursing interventions that have been used to mitigate falls caused by polypharmaceutical agents in older adults 65 and over. These findings will be made available to organizations to include in their fall prevention protocols; the organization may make the same available to the nurses and nursing staff to be used for fall prevention.

Local Background and Context

The local setting is a long-term care unit of an inpatient psychiatric hospital. Most of the patients in this unit committed crimes but were deemed to be insane at the time of the offence. Their legal status of not guilty by reason of insanity (NGBRI) means that they cannot go to jail for their crimes, hence their prolonged hospitalization and subsequent transfer to the long-term care units of the hospital for continuity of care as

older adults. As they age and develop serious chronic medical conditions, these patients are placed on multiple medications because of their comorbidities. These medications have side effects such as hypotension, drowsiness, and confusion that can predispose these older adults to falls (Walker et al., 2019). Most of the ancillary nursing staff are not trained as nursing assistants or technicians but are either former corrections officers or without any form of training.

In the past year, the rate of falls in this population has increased, and the facility is concerned about potential deficiencies in meeting the requirements of regulatory agencies and certifying bodies. In a 27-bed unit, an average of five falls with injuries have been recorded every week for the past one year. Most of these falls are not due to environmental factors or patient factors (e.g., poor vision or faulty shoes). In most cases, the patient has reported dizziness, drowsiness or "head spinning" which are known side effects of some medications used to treat common conditions (Walker et al., 2019). During post fall assessment, in most of these cases, hypotension was identified as a factor (Walker et al., 2019). Thus, there is an urgent need for the administration and staff to better understand how to prevent falls and mitigate the risk for falls related to polypharmacy among this population of older adults as they are currently focused on preventing falls caused by environmental factors such as wet floors, clutters, poor lighting, broken furniture and patient factors such as poor vision and nonfitting shoes. The mission of the facility is to provide person-centered high-quality care that supports recovery and treatment, increase patient safety, satisfaction and minimize cost. This makes fall reduction a high priority to the facility.

State and Federal Context

This DNP project has state and federal significance because falls are one of the quality measurements tracked for hospitals and long-term care facilities by healthcare regulators such as the JCAHO and the CMS (Sagawa et al., 2018). Healthcare organizations make extra efforts to minimize the incidence of falls in their facilities in order to be recertified by healthcare regulatory bodies such as the JCAHO and CMS (Sagawa et al., 2018). Falls result in extended hospital stays and increased healthcare costs. In 2015, the estimated medical costs attributable to fatal and nonfatal falls involving older adults aged 65 and over in the United States was approximately $50 billion. Medicare paid approximately $28.9 billion for nonfatal falls, Medicaid $8.7 billion, and private and other payers $12.0 billion (Florence et al., 2018). The findings from this project, if applied by nurses and other staff, will contribute to the reduction of falls in older adults, thereby reducing patient injury, human suffering, and healthcare cost.

Role of the DNP Student

Student Professional Context

I work in an inpatient psychiatric hospital as a team leader/assistant nurse manager. I lead a team of other nurses and behavior health technicians to deliver quality care to older adult patients. This includes close monitoring to reduce falls in the population. My responsibilities are to supervise nurses and the behavior health technicians as well as serve as their resource person. When a fall incident occurs, I am expected to assess the patient and write a report of the incident.

Student's Role in the Doctoral Project

My role in this DNP project was to systematically review the literature on the best evidence-based nursing interventions that have been used to prevent falls in older adults who are on polypharmaceutical agents. I compiled, organized, reviewed, evaluated, reported, and made recommendations regarding the best available evidence. I will also make recommendations to my facility that will improve nursing practice in this area. The findings may be adopted as best practices for my facility to be used by nurses and nursing staff to improve patient outcome.

Motivation

As I mentioned earlier, the focus of the organization's fall prevention strategy has been on mitigation of environmental and patient risk factors. I was motivated to pursue this doctoral project after noticing the increase in fall rate and realizing that nurses and nursing staff were considering only patient and environmental risk factors in their nursing interventions for fall prevention, and not paying attention to the side effects of their medications. At the completion of this project, the findings will help refocus the efforts of the nurses and nursing staff to include the strategies for reducing falls related to the effects of polypharmaceutical agents. The success or failure of any team to a great extent depends on the leadership. While the leader is congratulated if the team succeeds, he/she also takes the blame if the team fails. The desire to be part of the solution to a big problem facing the facility which is the increasing number of falls among older adults is another motivating factor. Finding evidenced-based methods of preventing falls due to

polypharmaceutical agents and making them available to the facility for inclusion in their fall prevention protocol would satisfy that desire to be part of a success story.

Potential Biases

I have worked on my current unit as a team leader/assistant nurse manager for about 10 years, and over these years, patient safety has remained a top priority. As a team, we frequently discuss patient falls, causes and nursing interventions that could reduce the fall rate among these older adults. The findings from this project will be based solely on the information obtained from the systematic literature review and not on my ideas or experience.

Summary

Every day, older adults in my facility are faced with the threat of potentially avoidable fall-related injuries. These fall-related injuries may lead to loss of independence, temporary or permanent physical disability or even death. Falls also lead to hospitalization and increased healthcare cost. The organization is making tremendous effort to mitigate these falls, but the focus is mainly on the risk posed by environmental factors and patient factors. Little or no attention is paid to how the effects of the polypharmaceutical agents might contribute to falls among these older adults with multiple comorbidities. This doctoral project will use the JHNEBP model that includes the PET process as a framework. The project will focus on the evidence portion of the model as I search the literature for evidence-based nursing interventions that have been used to mitigate falls in older adults on polypharmaceutical agents. I will compile, review, evaluate, report and make recommendations regarding the best available

evidence. I will also make recommendations to my facility that will improve nursing practice in this area, to fill the gap in practice. In Section 3, the focus will be on the collection and analysis of evidence used to address the practiced-focused question: What are the nursing interventions used to mitigate falls in older adults 65 years and over who have been prescribed polypharmaceutical treatments in nursing homes and long-term care facilities?

Section 3: Collection and Analysis of Evidence

The fall prevention protocol in the long-term care inpatient psychiatric hospital where I work has primarily focused on falls due to environmental factors such as wet floors, broken furniture and poor lighting, and on patient factors such as poor vision, unfitting and skid shoes. A sharp increase in the fall rate was recorded on the unit in the past year, however, those falls were found to be unrelated to environmental and patient factors, but rather due to sedation, dizziness and hypotension, and these are known side effects of medications (Moncada & Mire, 2017). Not much attention has been directed towards mitigating falls associated with the side effects of the polypharmaceutical treatments required to treat multiple comorbidities, especially among the older adults.

The purpose of this doctoral project was to systematically review the literature to find current peer-reviewed, evidence-based nursing interventions that have been used to reduce falls caused by the side effects of polypharmaceutical agents in older adults 65 and over in nursing homes and long-term care facilities and to recommend these interventions to my organization in the hopes that the information will become part of its fall prevention protocol for nurses and nursing staff. In this section, I will provide the sources of evidence, as well as an overview of the methods used to search for evidence, including the limitations and inclusion and exclusion criteria. I will also describe the systems used for organizing and analyzing the evidence, including any software used in the process.

Practice-Focused Question

The current fall prevention protocol in my facility is focused on strategies to prevent falls due to environmental and patient factors with no consideration given to how to prevent falls caused by the side effects of the polypharmaceutical agents older adults are taking due to their multiple comorbidities. The gap in practice is that the current fall prevention protocols in my facility only address falls due to environmental and patient factors and not on falls caused by medications. The practice-focused objective of this project is to describe the nursing interventions that have been used to mitigate falls caused by polypharmaceutical agents in older adults 65 years and over in nursing homes and long-term care facilities.

Clarifying Purpose

The purpose of this doctoral project is to systematically review the literature for current evidence-based nursing interventions that have been used to reduce falls associated with the side effects of polypharmaceutical agents among older adults 65 and over residing in nursing homes and long-term care facilities. This approach aligns with the practice-focused question because the evidence-based findings from the literature search will be used to make recommendations to the organization of prevention strategies for inclusion in its fall prevention protocol that can be developed and implemented by nurses and nursing staff.

Sources of Evidence

The sources of evidence to address the practice-focused question came from research published in peer-reviewed journals. The collection and analysis of the extant

research obtained through this literature search was necessary to provide enough evidence to answer the practice-focused question. The evidence extracted from these sources will be described and summarized so that the findings can be translated by nurses into effective fall prevention protocols for implementation at the local setting and at other clinical settings experiencing high fall rates among older patients.

Published Outcomes and Research

I used the following databases to obtain the peer reviewed articles: CINAHL plus with full text, PubMed, ProQuest, Cochrane, Science Direct, and Medline. In addition, Google Scholar and Online Journals Search Engine were used to uncover other peer-reviewed publications not included in the above databases. The key search terms used were *falls, fall prevention, older adults, elderly, nursing intervention, nursing home, long-term care,* and *polypharmacy.*

Scope of the Review

Primary research, systematic reviews, and meta-analysis published between 2013 and 2020 were included. All of the articles included a nursing intervention designed to mitigate the risk for falling associated with medication side effects. Articles older than 7 years, those not focused on adults 65 years and over, and those conducted outside of the inpatient or long-term care setting were excluded. The databases and search engines used, the search terms, phrases and combination of terms used to extract the extant literature ensured the exhaustive and comprehensive nature of the search. The search covered the main concepts in the practice-focused question including the target population, the clinical practice problem to be addressed, and the outcome of interest. The articles

returned were screened for relevancy by first reading the abstracts, those articles with abstracts indicating their relevancy to this doctoral project were retained and the full text was read for potential inclusion in this doctoral project. I kept a record of the number of articles returned after each search, the number of articles excluded and why, and the final number of articles to be included in this literature review. I believe this process produced adequate information to answer the practice-focused question.

Analysis and Synthesis

The evidence from the literature search was recorded in a spreadsheet with the following information: the date of the search, the name of the database that was searched, the keywords that were used, the date range of the search, the keywords that were searched, and the number of articles returned. The JHEBP Research Evidence Appraisal Tool was used to determine the level of evidence, the quality of the evidence and was also used to critically evaluate the quality of each individual article. The JHEBP Evidence Level and Quality Guide describes the following levels of evidence:

- Level 1 includes experimental studies, randomized control trial (RCT), explanatory mixed method design, that includes only Level 1 quantitative study, systematic reviews of RCTs, with or without metanalysis.
- Level 2 includes quasi-experimental study, explanatory mixed method design that includes only a Level 2 quantitative study and systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only with or without meta-analysis.

- Level 3 includes nonexperimental study, systematic review of a combination of RCTs, quasi-experimental and nonexperimental studies, or nonexperimental studies only with or without meta-analysis.
- Level 4 includes opinion of respected authorities, and/or respected nationally recognized expert committees.
- Level 5 includes experiential and non-research evidence including integrated reviews, literature reviews, quality improvement, program or financial evaluation, case reports, opinion of national recognized experts based on experimental evidence. (Dang & Dearholt 2017)

The JHEBP Evidence Level and Quality Guide was used to determine the quality rating of each article. It determines if the article is of high, good, or low quality based on the characteristics; for example, a high-quality evidence is expected to be consistent, with sufficient samples, able to produce generalizable results and include multiple sources of research evidence (Dang & Dearholt 2017). The JHNEBP Synthesis Process and Recommendations Tool was used to guide the synthesis. The synthesis process involves the appraisal of the level and quality of individual evidence, determining the quantity of evidence, the consistency of the findings, the generalizability as well as the recommendations based on the strength of the evidence collected. Literature management software, Zotero was used to store and organize the articles, and the results of the systematic review will be presented in a table format. The articles were organized using the following: year of publication, name of authors, title, design and the findings.

Summary

Patient safety remains the main goal of nurses and nursing staff. The ultimate goal of this project is to contribute to improving the safety of the patients. This doctoral project was a systematic review of the literature to find current nursing interventions that have been used to mitigate falls due to the side effects of polypharmaceutical agents prescribed to older adults 65 and over in nursing homes and log-term care facilities. I searched field-specific academic databases using relevant key terms for sources of evidence published within the past 7 years. The evidence was organized using literature management software. The John Hopkins system and tools were used to conduct the analysis. The results of the systematic review will be presented in the form of a table detailing the focus of the study, aspects of the design, the findings, and the quality of each study.

Section 4: Findings and Recommendations

In the past year, the rate of fall among older adults at the local long-term inpatient psychiatric hospital has been on the increase. The current fall prevention protocol is focused on environmental and patient factors that contribute to falls and does not include the nursing interventions that could be used to reduce falls due to polypharmacy. The practice-focused objective of this doctoral project was to describe the nursing interventions that have been used to mitigate falls caused by polypharmaceutical agents in older adults 65 years and over in nursing homes and long-term care facilities. The purpose of this doctoral project was to systematically review current literature (within 7 years) with the aim of finding nursing interventions that have been used by nurses and nursing assistants to reduce falls associated with the side effects of polypharmaceutical agents among older adults 65 years and over residing in nursing homes and long-term care facilities.

The literature search was completed using the following databases: CINAHL Plus with Full Text, PubMed, ProQuest, Cochrane, Science Direct, and Medline. I limited my search to primary, peer-reviewed articles, systematic reviews and meta-analyses published between 2013 and 2020. The key search terms used were *falls*, *fall prevention*, *older adults*, *elderly*, *nursing intervention*, *nursing home*, *long-term care*, and *polypharmacy*. The JHEBP evidence level and quality guide was used to describe the level of evidence. The JHEBP Research Evidence Appraisal Tool was used to critically evaluate the quality of each individual article as shown in Tables 1 and 2.

Table 1

Quality Appraisal of Systematic Review Article

	Question number											
Article	1	2	3	4	5	6	7	8	9	10	11	12
Tricco et al., 2019	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y

Table 2

Quality Appraisal of Research Studies

	Question number														
Article	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Juola et al., 2015	Y	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Kilpatrick et al., 2020	Y	Y	Y	Y	N/A	N/A	N/A	Y	Y	N	N/A	N	Y	N	Y
Mahlknecht et al., 2017	Y	Y	N	Y	N/A	N/A	N/A	Y	Y	N	Y	Y	Y	Y	Y

Findings and Implications

The literature search initially yielded a total of 1,728 articles, of which four were selected for analysis because they met the inclusion criteria (see Table 3). I analyzed each of the four articles using the John Hopkins Research Evidence Appraisal Tool and quality rating guide. The analysis yielded two studies with an evidence rating of Level I (Juola et al., 2015; Trico et al., 2019), one article (Mahlknecht et al., 2017) reflected Level II evidence, and one study (Kilpatrick et al., 2020) was determined to be Level V evidence. The quality of all of the studies was determined to be high.

Table 3

Literature Search Log

Date	Database	Keywords	No. of articles returned	No. of article selected
02/02/2021	CINAHL Plus with Full Text	Falls, older adults, fall prevention, polypharmacy, nursing intervention, nursing home	119	2
12/8/2020	Cochrane	Falls, older adults, polypharmacy, nursing intervention, nursing home	1	0
12/10/2020	MEDLINE with full text	Falls, older adults, polypharmacy, nursing intervention, nursing home	85	0
12/12/2020	ProQuest Central	Falls, older adults, nursing intervention, Fall prevention, Polypharmacy, nursing home	4	0
02/02/2021	PubMed	Falls, older adults, polypharmacy, fall prevention, nursing intervention, nursing home	53	1
02/02/2021	Science Direct	Falls, older adults, nursing intervention, Fall prevention, nursing home, polypharmacy	1,519	1

Study Designs

The designs varied across studies. One was a systematic review and meta-analysis (Tricco et al., 2019), in which 1210 full text articles were screened and a total of 126 RCTs were included. One study was a secondary analysis of data from a cluster RCT (Juola et al., 2015). Another was a quasi-experimental single-arm interventional study (Mahlknecht et al., 2017). The fourth was a prospective cohort study of a quality improvement program (Kilpatrick et al., 2020). There was one interventional study (Mahlknecht et al., 2017; see Table 4). Two of the studies collected data prospectively (Juola et al., 2015; Kilpatrick et al., 2020), and two retrospectively (Mahlknecht et al., 2019; Tricco et al., 2019). All the studies had sample sizes of greater than 200.

Table 4

Analysis and Synthesis of Evidence

Author(s)	Title	Purpose	Setting	Design	Findings	Level of evidence	Quality rating
Kilpatrick et al., 2020	A mixed methods quality improvement study to implement nurse practitioner roles and improve care for residents in long-term care facilities	To identify how nurse practitioners in long-term care facilities influence care quality and inform the wider implementation of these roles in Québec.	Long-term care facilities	Quality improvement study (cohort study)	The number of medications decreased by 12% at the end of the study, and the incidence of polypharmacy, falls, restraint use, and transfers to acute care also decreased.	V	High
Mahlknecht et al., 2017	Impact of training and structured medication review on medication appropriateness and patient-related outcomes in nursing homes: results from the interventional study InTherAKT	To improve interprofessional communication and medication safety using a combined intervention and to improve medication appropriateness and health-related outcomes of the included residents.	Nursing home	Single-arm interventional study	Medication appropriateness increased, get up and Go (TUG) time remained constant, indicating no further decline in mobility.	II	High
Juola et al., 2015	Nurse education to reduce harmful medication use in assisted living facilities: Effects of a randomized controlled trial on falls and cognition	To investigate whether educating nursing staff in assisted living facilities about harmful medication use has effects on the incidence of falls and cognition.	Assisted living facilities	Randomized controlled trial	Providing a relatively light education intervention to nursing staff using activating learning methods can reduce the prevalence of harmful medications and the incidence of falls among residents in institutional settings, particularly among residents with an MMSE score of greater or equal to10.	I	High
Tricco et al., 2019	Quality improvement strategies to prevent falls in older adults: a systematic review and network meta-analysis.	To find quality improvement strategies for falls prevention in older adults.	Nursing home and community	Systematic review	Team changes may reduce risk of injurious falls and a combination of case management, patient reminders, and staff education, as well as case management and patient reminders may reduce risk of falls.	I	High

Participant Characteristics

In all of the studies, the majority of the participants were female. The majority of the participants also tended to be of rather advanced age. In the systematic review by Tricco et al. (2019), the majority of the participants were 75–84 years of age. In Kilpatrick et al. (2020), Juola et al. (2015), and Mahlknecht et al. (2017), the average age was 82, 83, and 85.2 years, respectively. None of the articles measured or tracked the race of the participants.

Settings

The settings varied among the studies. Kilpatrick et al.'s (2020) study was conducted in nursing homes in Canada, and Mahlknecht et al. (2017) was conducted in nursing homes in Germany. One study (Juola et al., 2015) was conducted in assisted living facilities in Finland. The RCTs in Tricco et al. (2019) were carried out in Europe, New Zealand, Australia, North America, and Asia, and in a variety of settings, with 24% of the sample recruited from chronic care and retirement home settings.

Nursing Roles and Interventions

The most commonly used intervention was staff education (Juola et al., 2015; Mahlknecht et al., 2017; Tricco et al., 2019). However, training methods varied. Two of the studies used interactive methods to train nurses (Juola et al., 2015) and healthcare personnel, including nurses (Mahlknecht et al, 2017). In Juola et al.'s (2015) study, nursing staff involved in the study received two 4-hour interactive training sessions directed towards recognizing harmful medications, adverse drug events, and suitable alternatives. Nurses involved in the study were encouraged to present as well as discuss

what they learned from the training. The educational training was divided into two sessions. Session 1 focused on acquainting the nursing staff with potentially harmful drugs for older people as well as getting to know about the drugs that could benefit the frail institutionalized older people. Staff were also trained to understand the risk related to polypharmacy, particularly drug to drug interaction. Also included in the training were the basic changes in drug metabolism in old age particularly in relation to renal insufficiency. Methods of the training were through lecture and discussions on patient cases. In the second session, nurses were trained on how to reflect and to discuss the rationale for the use of drug in their own patients, and on how to effectively present this same information to other participants through workshops. Nurses involved in the study were encouraged to present as well as to discuss what they learned from the training. In Mahlknecht et al.'s (2017) study, interprofessional education was provided aimed at improving the knowledge of professionals specific to medication processes, adverse drug effects, and drug risk management. Nurses (along with other healthcare professionals) helped develop the training/education program that was provided to healthcare staff. In their systematic review, Tricco et al. (2019) found that educational interventions to reduce falls were targeted to specific patient populations or disorders. The staff education piece involved increasing the understanding of principles that guided clinical care and awareness of specific recommendations regarding older adults. This education was carried out in the form of conferences, workshops, distribution of educational materials (written, video, or other materials), and educational outreach visits.

Two of the studies examined the effectiveness of interventions other than education and training. Mahlknecht et al. (2019) used an electronic interprofessional communication platform. The nurse was involved in collecting and entering residents' data and current medications into an electronic data sheet. The nurse received the medication plan from the general practitioner (GP) and delivered the medication, monitored the residents for symptoms, and reported them promptly to the GP through an online communication platform. Tricco et al. (2019) described the implementation of nurse case managers, changes to the roles of care team, nurse assessments of geriatric patients (in addition to an assessment by a geriatrician), and patient reminders of specific aspects of self-care as effective in the prevention of falls. However, due to the nature of the systematic reviews, there was no indication of which interventions were specifically effective in addressing polypharmacy. Lastly, Kilpatrick et al. (2020) implemented the use of part-time nurse practitioners specifically trained in the care of LTC patients. Six nurse practitioners cared for 538 residents across the six sites in the first 12 months of implementation. Nurse practitioners provided a thorough physical and mental assessments of residents, monitored and adjusted medications and treatment, including chronic illness management. The NPs worked in collaboration with the physicians to prioritize and provide optimal care to the residents. The NPs also provided guidance to the healthcare teams to use their assessment skills and clinical judgement to formulate interprofessional care plans for the residents. NPs spoke with family members to keep them informed on the conditions of their loved ones, and to inform them of any changes in the treatment plans.

Outcomes

In all of the studies, the researchers concluded that the interventions were effective at reducing falls. However, the measurement of falls varied across studies.

In Juola et al. (2015), the outcomes of interest were the use of harmful medication (based on the Beers' Criteria), falls, and cognition. Data on all three outcomes were measured for 12 months post-education of the nursing staff. Cognition was measured using the Mini Mental State Exam (MMSE). At 12 months post-education, the use of harmful medications was significantly lower in the intervention group compared to the control ($p = .022$). When the residents were stratified according to their baseline MMSE, those in the intervention group with MMSE scores of 10 points or greater had significantly fewer falls compared to controls. The results indicate that educating nurses about harmful medications and adverse reactions decreased the prevalence of harmful medications and thus reduced the incidence of falls among residents with decreased cognitive capacity.

In Mahlknecht et al. (2017), the outcomes of interest were changes in the appropriateness of all prescribed medications, cognitive performance, probability of developing delirium, agitation, apathy, mobility and tendency to fall, total number of drugs, number of potentially dangerous drug-drug interactions, and the appropriateness of recorded analgesics. Post-intervention, there was a significant decrease in the use of inappropriate medications ($p < 0.001$), but only among those with the highest baseline scores of inappropriate medication use ($p < 0.001$). The number of inappropriate analgesics prescribed decreased by approximately 50%. Apathy increased over baseline

(25.8% vs. 38.7%), while agitation decreased (83.9% vs. 67.8%). Cognition and signs of delirium did not change over time. The proportion of nursing home residents prescribed five medications or more increased in comparison to baseline rates (79.1% vs. 83.1%), but the total number of medications prescribed remained steady. The proportion of severe drug–drug interactions increased over baseline (14.4% vs. 20.5%) as did the number of severe drug–drug interactions per resident (0.18 vs. 0.27). However, mobility and tendency to fall decreased only slightly on post-intervention. The findings indicate that the education of clinical staff regarding various aspects of medication safety (including polypharmacy) along with improved interprofessional communication using an electronic platform was effective at reducing inappropriate medication use, a risk factor associated with falls.

In Kilpatrick et al. (2020), the primary outcomes of interest to this systematic review were trends in the average number of medications per resident, the average number of residents with polypharmacy (defined as ≥ 9 medications), and the average number of falls per month (defined as 30 days) after the implementation of the nurse practitioner program. The average number of medications dropped by 12%, the number of patients with polypharmacy decreased from 80 in the first month to zero in the 12th month, and the average number of falls per resident per month decreased from two in the first month to zero in the 12th month, while the average number of nurse practitioner interventions increased from 1.8 the first month to 8.7 in month 12. Other outcomes including restraint use, and transfer to acute care also decreased. The results indicated that implementation of nurse practitioner's role led to a decrease in the number of

harmful medications, polypharmacy, and falls. The results suggest that a wider use of NPs in long-term care facilities is a beneficial strategy to improve resident care.

In Tricco et al. (2019), the outcomes of interest were decrease in the number of injurious falls and a decrease in the number of fallers. A meta-analysis of a subset of 29 RCTs found that team changes such as nurse assessment were better at reducing the risk of injurious falls relative to usual care (*OR* = 0.57, 95% CI [0.33, 0.99]; absolute risk difference [ARD] −0.11, 95% CI [−0.18, −0.002]). Combined case management, patient reminders and staff education (*OR* = 0.18, 95% CI [0.07, 0.47]; ARD −0.27, 95% CI [−0.33, −0.15]) and combined case management and patient reminders (*OR* = 0.36, 95% CI [0.13 to 0.97]; ARD −0.19, 95% CI [−0.30, −0.01]) were superior compared to usual care in reducing the number of fallers. The results of this meta-analysis provide strong evidence across studies that the education of clinical staff (including nurses), and increased involvement of nurses in the assessment, care management, and education of patients contributes significantly to the fall prevention in LTCs and nursing homes.

Unanticipated Limitations and Potential Impacts on Findings

There were limitations across the reviewed articles. In Tricco et al. (2019), most of the articles did not address contamination and outcome reporting. This means that the overall quality of the studies reviewed might be lower than documented. Another unexpected finding for the Tricco et al. study was that some quality improvement strategies actually increased falls instead of reducing them. However, this may have been the result of staff's increased awareness and greater reporting of falls due to having received falls prevention education as part of many interventions. In the Juola et al.'s

(2015) RCT study, the researchers did not assess the nurses' knowledge about medications before and after the educational intervention. Because no baseline medication knowledge was assessed, the effect of the education on nurses' medication knowledge could not be quantified. In the Kilpatrick et al. (2020) study, the researchers were not able to access data for the year prior to the implementation of the nurse practitioners' role. This limited the ability to compare resident outcomes before and after implementation. The potential impact these limitations have on the findings is the effect on the generalizability. The Mahlknecht et al. (2017) study was a single-arm study without a control group. This made it difficult to know for certain whether changes over time were due to the intervention or some other factor. Mahlknecht et al. found that the risk factors for falls were decreased but actual falls were not significantly decreased. This was an unexpected finding that may have been due to a reported decline in independent functioning among study patients over time, but the relationship of functional decline to the occurrence of falls was not investigated. The limitations affect the ability to generalize the findings.

Implications of the Findings

Patient safety should be the number one priority in healthcare organizations. The CMS (2018) is committed to ensuring nursing home residents are safe and receive quality care. The findings of the studies included in this doctoral project have several implications for practice that would improve patient safety through improvements in medication management and the prevention of falls. First, the findings indicated nursing staff can be trained to recognize the adverse and side effects of medications and

polypharmacy, and thus improve patient safety through improved assessment and monitoring (Juola et al, 2015; Mahlknecht et al., 2017; Tricco et al, 2019). Involving nurses, as well as members of other healthcare professions, in the development of the education provides the additional benefit of enhancing interprofessional communication and collaboration (Mahlknecht et al., 2017), which are important hallmarks of patient safety. Second, when the role of nurses in the assessment of patient risk factors and the management of polypharmacy was expanded, falls decreased (Kilpatrick et al, 2020; Tricco et al., 2019). A recent systematic review found that in facilities where nurses were charged with completing fall risk assessments, between 10.8% and 48.7% of them failed to comply, but where management support of the process was maintained, compliance improved (Nadia & Permanasari, 2018). Thus, successful nurse-led fall risk assessment programs require ongoing organizational oversight and support. One study found that implementing the nurse practitioner role with broader discretion over medication changes was an effective intervention in reducing polypharmacy and falls (Kilpatrick et al, 2020). This was achieved through additional training on how to work with residents of LTC facilities including medication optimization and management (Kilpatrick et al, 2020). However, the costs associated with such training may be a deterrent for some organizations. More research is needed to determine the most effective and economically sound solutions to population specific medication management education for NPs and nurses at all levels. Expanding the use of non-clinical roles for nurses, specifically in case management reduced the risk of injurious falls (Tricco et al., 2019). This finding highlights the complex nature of the factors that contribute to falls with injuries and the

need for intense care coordination of patients at risk for falls. Two studies demonstrated that improvements in interprofessional communication with or without the use of an electronic communication system reduced the use of inappropriate medications and polypharmacy (Mahlkenecht et al., 2017; Kilpatrick et al., 2020). There is strong evidence of both the need to improve communication and collaboration among healthcare professionals, and of the effectiveness of such improvements at increasing patient safety (Wang et al., 2018), particularly between physicians and nurses. While the use of electronic communication among healthcare professionals is increasing, improvements in interprofessional collaboration are more complex and subject to factors such as organizational culture, role clarity, and mutual respect (Collette et al., 2017) and thus, likely to require more attention and effort to achieve at any given organization.

Implications to Positive Social Change

Fall reduction may enhance the physical and emotional wellbeing of the older adults and their families, resulting in a healthier and more stable community. Fall reduction as a result of implementing the findings of this project can positively affect healthcare system because of decrease in cost. The ultimate goal is to improve the quality of care, save lives and reduce healthcare costs, and all these will contribute to positive social change. The findings of this project will be made available to the local organization, and may be included in their fall prevention protocol. When implemented, the findings could reduce falls, fall-related injuries, hospitalizations and deaths. Implementing the findings will therefore save lives, reduce healthcare cost thereby contributing to positive social change.

Recommendations

The studies reviewed for this doctoral project presented strong insights on interventions that are needed to reduce falls among older adults 65 and over in nursing homes and long-term care facilities. The local organization may use these findings to update their fall prevention protocols. The following recommendations are made based on the findings: 1. Educate nurses on the harmful effects of medications and polypharmacy. To support the consistent integration of knowledge into practice, it is recommended that the training occur during initial orientation and through a refresher course as part of annual training. 2. Train the nurse practitioners to work with LTC residents and on optimizing medication management. 3. Consider expanding NP autonomy regarding medication management using evidence-based protocols. 4. Increase awareness among case managers of the importance of polypharmacy and of avoiding inappropriate medications in fall and injury prevention. 5. Evaluate opportunities to use technology that improves interprofessional communication, especially between physicians and nurses.

Strength and Limitation of the Project

This systematic review has quite a number of strengths and limitations. The strengths include: that all of the articles reviewed were of high quality, and that the information uncovered has the potential to contribute to practice changes that will keep residents in nursing homes and long-term care facilities safer. It focused specifically on the role of nurses in interventions that address the common and often ignored problem of the contribution of polypharmacy to falls among older adults. Another strength is that the

findings and recommendations of this systematic review can be easily adapted for implementation at the local LTC setting. The findings may also help healthcare administrators to evaluate their fall prevention protocols, and provide the basis to support nurse-led projects addressing polypharmacy's contributions to fall incidence in these settings. The project was limited by the scarcity of studies focusing on nursing interventions. It uncovered the fact that not enough research is available in the literature to definitively determine the best practices to fully address this gap in care. Lastly, the systematic review focused only on articles written in English language. There could have been articles that addressed nursing intervention to prevent falls due to the side effects of polypharmacy that were written in other languages.

Recommendations for Future Project

This systematic review revealed that this is not a well-researched area, and that the few studies that have been conducted, were done outside of United States. Further, most studies did not provide detailed descriptions of nurses' contributions, but rather nurses' role as a member of a group intervention team. Thus, more primary research that focuses directly on investigating how nursing interventions prevent falls related to polypharmacy is needed. Without such research we will not be able to identify specific nursing actions that can be taken to help ensure the safety of patients within LTC facilities living with comorbidities requiring multiple medications. A systematic literature review of the same topic is not recommended at this time.

Section 5: Dissemination Plan

Research findings are of no use if they are not made available to the end users to be applied in evidence-based nursing practice for the improvement of organizational and patient outcomes. The audience for the dissemination of the project findings within the local setting will consist of the nursing staff, the nurse manager, and the chief nurse executive. The findings will be presented during the next bimonthly quality improvement council meeting at the local setting. The findings of the project as well as the recommendations will be presented. Beyond the local facility, nurses and nurse practitioners working in LTCs, along with nursing managers and administrators of LTCs, and anyone interested in improving patient safety are the target audiences for dissemination of the findings of this doctoral project. Thus, I also hope to submit a manuscript describing this project for publication in a professional nursing journal, and later submit articles summarizing the findings to nursing magazines covering the states of Maryland, Virginia, and the District of Columbia to reach a wider audience.

Analysis of Self

The decision to pursue the doctoral degree in nursing practice was driven by my desire to be empowered by education in order to give my best to the advancement of nursing profession. As a nurse, I have always been concerned about polypharmacy and its effects on the older population on the unit I work in. As an assistant nurse manager and team leader on the unit, I have a professional obligation to work with my team to provide the optimal care to our patients, which includes ensuring their safety by preventing them from falling. The road to completing this project was not an easy one but I drew

inspiration from my coworkers and nurse manager. They believe that my findings will be of immense help to improve patient outcomes, increase our job satisfaction, and enhance the image of the unit in particular and the hospital in general.

Completion of the project was very challenging, the main challenge being the limited information on the topic. It is not a well-researched topic, which made it difficult to obtain the needed information. I was able to overcome this challenge through perseverance and by utilizing the feedback and guidance provided by my chair. As a scholar, I never imagined that out of 1,728 articles returned in the literature search, only four would meet the inclusion criteria. The knowledge and skills I acquired from this systematic review project will help me in the future should I decide to into nursing research and teaching.

Summary

This doctoral project focused on conducting a systematic review of the literature to uncover the nursing interventions that have been used to reduce falls related to the side effects of polypharmacy among older adults aged 65 and over living in nursing homes and long-term care facilities. The findings indicated that few studies have described the nursing role in interventions designed to address polypharmacy to prevent falls or reduce fall rates. Of the few studies found, none were carried out here in the United States. More research is needed to fully understand how nurses can intervene to mitigate polypharmacy and its effects on falls. Based on the findings, the recommendations are to (a) educate the nursing staff on the harmful/side effects of the medications, (b) train nurse practitioners to work within long-term care setting, (c) consider expansion of the NP role

in medication optimization, (d) increase awareness among case managers of fall prevention and the role of inappropriate medications, including polypharmacy, and (e) evaluate the potential use of technology to improve interprofessional communication. The findings of this project will be disseminated to the nursing staff, nurse manager and the chief nurse executive at the local setting. A manuscript describing this project will be submitted for publication in a professional nursing journal, and later a summary of the findings to nursing magazines to reach a wider audience.

References

Agency for Healthcare Research and Quality. (2013). *Preventing falls in hospitals*. https://www.ahrq.gov/professionals/systems/hospital/fall px toolkit/fallpxtk5.html

American Geriatrics Society. (2019). American Geriatrics Society 2019 updated AGS Beers Criteria for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society*, *67*(4), 674–694. https://doi.org/10.1111/jgs.15767

Bor, A., Matuz, M., Csatordai, M., Szalai, G., Bálint, A., Benkő, R., & Doró, P. (2017). Medication use and risk of falls among nursing home residents: A retrospective cohort study. *International Journal of Clinical Pharmacy, 39(2*), 408–415. https://doi.org/10.1007/s11096-017-0426-6

Cameron, E. J., Bowles, S. K., Marshall, E. G., & Andrew, M. K. (2018). Falls and long-term care: a report from the care by design observational cohort study. *BMC Family Practice, 19*(1), 73. https://doi.org/10.1186/s12875-018-0741-6

Chojar, H., & Kaur, G. (2019). Assessment of balance and risk for falls in a sample of community-dwelling adults aged 60 and older. *Indian Journal of Physiotherapy & Occupational Therapy, 13*(2), 33–37. https://doi.org/10.5958/0973-5674.2019.00041.8

Clancy, A., & Mahler, M. (2016). Nursing staffs' attentiveness to older adults falling in residential care - an interview study. *Journal of Clinical Nursing*, *25*(9–10), 1405–1415. https://doi.org/10.1111/jocn.13240

Collette, A. E., Wann, K., Nevin, M. L., Rique, K., Tarrant, G., Hickey, L. A., Stichler, J. F., Toole, B. M., & Thomason, T. (2017). An exploration of nurse-physician perceptions of collaborative behavior. *Journal of Interprofessional Care, 31*(4), 470–478. https://doi.org/10.1080/13561820.2017.1301411

Dang, D., & Dearholt, S. (2017). *Johns Hopkins nursing evidence-based practice: Model and guidelines* (3rd ed.). Sigma Theta Tau International.

Haddad, Y. K., Shakya, I., Moreland, B. L., Kakara, R., & Bergen, G. (2020). Injury diagnosis and affected body part for nonfatal fall-related injuries in community-dwelling older adults treated in emergency departments. *Journal of Aging and Health*, *32*(10), 1433-1442. https://doi.org/10.1177/0898264320932045

Halli-Tierney, A. D., Scarbrough, C., & Carroll, D. (2019). Polypharmacy: Evaluating risks and deprescribing. *American Family Physician, 100*(1), 32–38.

Hill, A.-M., McPhail, S. M., Waldron, N., Etherton-Beer, C., Ingram, K., Flicker, L., Bulsara, M. & Haines, T. P. (2015). Fall rates in hospital rehabilitation units after individualized patient and staff education programs: A pragmatic, stepped-wedge, cluster-randomized controlled trial. *Lancet, 385*(9987), 2592–2599. https://doi.org/10.1016/s0140-6736(14)61945-0

Institute of Medicine. (2010). *The future of nursing: Leading change, advancing health.* National Academies Press.

Johnston, M., Magnan, M. A. (2019). Using a fall prevention checklist to reduce hospital falls: Results of a quality improvement project. *The American Journal of Nursing, 119*(3), 43–49. https://doi.org/10.1097/01.naj.0000554037.76120.6a

Johnson, T. P. (2020). The effects of a diabetic-focused discharge educational intervention on the incidence of mediastinitis after coronary artery bypass graft (CABG) Surgery. *ABNF Journal, 31*(1), 5–11.

Joseph, A., Kumar, D., & Bagavandas, M. (2019). A review of epidemiology of fall among elderly in India. *Indian Journal of Community Medicine, 44*(2), 166–168.

Juola, A.-L., Bjorkman, M., Pylkkanen, S., Finne-Soveri, H., Soini, H., Kautiainen, H., Simon Bell, J., & Pitkala, K. H. (2015). Nurse education to reduce harmful medication use in assisted living facilities: Effects of a randomized controlled trial on falls and cognition. *Drugs & Aging*, *32*(11), 947–955. https://doi.org/10.1007/s40266-015-0311-8

Kilpatrick, K., Tchouaket, E., Jabbour, M., & Hains, S. (2020). A mixed methods quality improvement study to implement nurse practitioner roles and improve care for residents in long-term care facilities. *BMC Nursing, 19*(1), 1–14. https://doi.org/10.1186/s12912-019-0395-2

Lavenberg, J. G., Cacchione, P. Z., Jayakumar, K. L., Leas, B. F., Mitchell, M. D., Mull, N. K., & Umscheid, C. A. (2019). Impact of a hospital evidence□based practice center (EPC) on nursing policy and practice. *Worldviews on Evidence-Based Nursing, 16*(1), 4–11. https://doi.org/10.1111/wvn.12346

Mahlknecht, A., Krisch, L., Nestler, N., Bauer, U., Letz, N., Zenz, D., Schuler, J., Fährmann, L., Hempel, G., Flamm, M., & Osterbrink, J. (2019). Impact of training and structured medication review on medication appropriateness and patient-related outcomes in nursing homes: Results from the interventional study

InTherAKT. *BMC Geriatrics*, *19*(1), Article 257. https://doi.org/10.1186/s12877-019-1263-3

Melnyk, B. M., Fineout-Overholt, E., Stillwell, S. B., & Williamson, K. M. (2010). Evidence-based practice: step by step: the seven steps of evidence-based practice. *The American Journal of Nursing, 110(1),* 51–53.

Moncada, L. V. V., & Mire, L. G. (2017). Preventing falls in older persons. American *Family Physician, 96(4),* 240–247.

Nadia, P., & Permanasari, V. Y. (2018). Compliance of the nurse for fall risk assessment as a procedure of patient safety: a systematic review. *KnE Life Sciences*, 207-219.

National Institute on Aging (2017) *What is long-term care*? Retrieved from: https://www.nia.nih.gov/health/what-long-term-care

Ost, K., Blalock, C., Fagan, M., Sweeney, K. M., & Miller-Hoover, S. R. (2020). Aligning organizational culture and infrastructure to support evidence-based practice. *Critical Care Nurse, 40*(3), 59–63.

Peterson, A. B., & Kegler, S. R. (2020). Deaths from fall-related traumatic brain injury - United States, 2008-2017. MMWR. *Morbidity and Mortality Weekly Report, 69(9),* 225–230.

Pighills, A., Ballinger, C., Pickering, R., & Chari, S. (2016). A critical review of the effectiveness of environmental assessment and modification in the prevention of falls amongst community dwelling older people. *British Journal of Occupational Therapy, 79(3),* 133–143.

Rahn, D. J. (2016). Transformational Teamwork: Exploring the impact of nursing teamwork on nurse-Sensitive quality indicators. Journal of Nursing Care Quality, 31(3), 262–268.

Sagawa, N., Marcum, Z. A., Boudreau, R. M., Hanlon, J. T., Albert, S. M., O'Hare, C., Satterfield, S., Schwartz, A. V., Vinik, A. I., Cauley, J. A., Harris, T. B., Newman, A. B., & Strotmeyer, E. S. (2018). Low blood pressure levels for fall injuries in older adults: The health, aging and body composition study. *European Journal of Ageing, 15(3),* 321–330.

Tiefenbachová, P., & Zeleníková, R. (2019). The effect of educational intervention by nurses on home environmental risk factors for falls. *Central European Journal of Nursing & Midwifery, 10*(2), 1019–1025.

Tricco, A. C., Thomas, S. M., Veroniki, A. A., Hamid, J. S., Cogo, E., Strifler, L., Khan, P. A., Sibley, K. M., Robson, R., MacDonald, H., Riva, J. J., Thavorn, K., Wilson, C., Holroyd-Leduc, J., Kerr, G. D., Feldman, F., Majumdar, S. R., Jaglal, S. B., Hui, W., & Straus, S. E. (2019). Quality improvement strategies to prevent falls in older adults*:* A systematic review and network meta-analysis. *Age & Ageing, 48(3),* 337–346. https://doi-.org/10.1093/ageing/afy219

Walker, B. S., Collier, B. R., Bower, K. L., Lollar, D. I., Faulks, E. R., Matos, M., Nussbaum, M. S., & Hamill, M. E. (2019). The prevalence of Beers criteria medication uses and associations with falls in geriatric patients at a Level 1 trauma center. *The American Surgeon, 85*(8), 877–882. https://doi.org/10.1177/000313481908500842

Wang, Y. Y., Wan, Q. Q., Lin, F., Zhou, W. J., & Shang, S. M. (2018). Interventions to improve communication between nurses and physicians in the intensive care unit: An integrative literature review. *International Journal of Nursing Sciences*, 5(1), 81-88.

Wen-Yu HU, Wen-Wen Chang Jung-Chen Chang, Chia-Chun Tang, Judith Shu-Chu Shiao, & Yi-Hsin Lu. (2020). Global health issues and trends in nursing research. *Journal of Nursing, 67(2),* 13–21.

Whitney, J., Jackson, S. H. D., & Martin, F. C. (2017). Feasibility and efficacy of a multi-factorial intervention to prevent falls in older adults with cognitive impairment living in residential care (ProF-Cog). A feasibility and pilot cluster randomized controlled trial. *BMC Geriatrics*, 17(1), 115.

Zhao, Y. L., Alderden, J., Lind, B. K., & Kim, H. (2018). A comprehensive assessment of risk factors for falls in community-dwelling older adults. *Journal of Gerontological Nursing, 44(10)*, 40–48.

Zotero. (2020). *Your personal research assistant*. https://www.zotero.org/