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Increasing Nurses' Knowledge Regarding Beers Criteria and Polypharmacy in Elderly, Non-institutionalized Patients

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Walden University
2024

Abstract

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MS, Bowie State University, 2014

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

The elderly population, comprising individuals ages 65 years and above, accounts for 12% of the total population in the United States. Many elderly individuals residing in noninstitutionalized communities continue to experience the effects of polypharmacy despite efforts to employ evidence-based practices for medication reconciliation. Preventing polypharmacy among people ages 65 and older is crucial to avoid unintended drug abuse and subsequent adverse drug effects in this vulnerable patient group. One significant strategy to prevent drug-related problems and negative effects of medications is using the Beers criteria. The gap in practice in a post-acute care and rehabilitation facility addressed in this project was the low awareness of the Beers criteria among nursing staff. Consequently, this project involved the planning, developing, and implementing an evidence-based educational intervention targeted at nurses. The primary goal was to increase nurses' knowledge about the Beers criteria and its application in older adults. Twenty staff nurses attended a 2-hour session on polypharmacy and the Beers criteria. Knowledge assessment occurred through a pretest-posttest administered before and after the educational intervention. The pretest mean score of 5.7 improved to 8.9 on the posttest, demonstrating a 56.14% increase in knowledge gained. An increased understanding of the use of Beers criteria by nursing staff will improve healthcare outcomes and prevent unintended harm to elderly patients due to multiple medications. The findings of this project have potential implications for positive social change that include improved knowledge among nursing staff members and improved health outcomes among this patient population.

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Dedication

This degree is dedicated first and foremost to the Almighty God, who in His infinite mercies has brought me this far in my life. I also dedicate this project to my lovely husband, Mr. Lawrence Ukenye, for his encouragement and to my four children. Also, to my siblings and my late parents.

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I wish to acknowledge the support of my academic instructors who assisted me in achieving this great milestone in my life. Also, practicum preceptor Damian Crawford, MD.

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Section 1: Nature of the Project

Introduction

Individuals age 65 years and above account for 12% of the total population in the United States. Despite the availability of practice guidelines for safe medication management, recent studies have revealed that at least 25% of older adults residing in the community, but not in hospitals, receive inappropriate prescriptions from their healthcare providers. This highlights the concerning prevalence of medication-related issues in this population. To address this, there is a growing emphasis on the importance of medication reconciliation and interprofessional collaboration to increase awareness and ensure safety in medication management for older adults in the community (Sun et al., 2021). Many elderly individuals residing in noninstitutionalized communities continue to experience the effects of polypharmacy despite efforts by health care organizations to employ evidence-based practices for medication reconciliation to reduce polypharmacy.

Numerous researchers have explored the polypharmacy concept and its health implications. Similarly, a substantial body of evidence highlights nurses' positive contributions in providing care. However, there needs to be more knowledge in the context of caring for older adults and management of polypharmacy (Pariseault et al., 2020). The purpose of this project was to provide an educational intervention to increase nurses' knowledge about reducing polypharmacy in the elderly population. A focused educational program using Beers criteria can assist nurses in minimizing these gaps.

Polypharmacy is typically understood as the use of multiple medications in a patient, commonly an older adult; however, a standard definition for this term does not

exist. Polypharmacy has been described as the co-prescribing of multiple medications, the inappropriate use of drugs, using medication without a clinical indication, visiting various pharmacies, and the use of five or more medications, among many other things (Nguyen et al., 2020). Halli-Tierney et al. (2019) also defined polypharmacy as the regular use of at least five medications, which they argue is common in older adults and younger at-risk populations and increases the risk of adverse medical outcomes.

Several risk factors can lead to polypharmacy. Patient-related factors include having multiple medical conditions managed by numerous subspecialist physicians, having chronic mental health conditions, and residing in a long-term care facility. Systems-level factors include poorly updated medical records, automated refill services, and prescribing to meet disease-specific quality metrics (Halli-Tierney et al., 2019). Despite evidence-based practices and medication reconciliation practices intended to reduce polypharmacy in elderly populations, many older individuals living in noninstitutionalized communities still experience the effects of polypharmacy. Inappropriate polypharmacy increases the risk of adverse drug effects, including falls and cognitive impairment, harmful drug interactions, and drug–disease interactions, in which a medication prescribed to treat one condition worsens another or causes a new one, according to the National Institute of Aging (NIA, 2021). Patients may be prescribed medicines that are unlikely to help, are potentially harmful, or are misaligned with the patient's health goals. Polypharmacy also creates a tremendous burden for patients and their families, who need to understand the purpose of the many prescriptions written by

multiple providers, obtain refills, take each medication at the correct time of day, and recognize side effects.

In addition, polypharmacy is associated with functional decline in older patients. Among community-dwelling older adults, increased prescription medication use is associated with diminished ability to perform instrumental activities of daily living and decreased physical functioning, according to Maher et al. (2013). In patients who have reported falling in the past year, higher medication use was found to be associated with functional decline. Cognitive impairment, seen with both delirium and dementia and urinary incontinence, has been associated with polypharmacy. Notably, falls are associated with increased morbidity and mortality in older adults and may be precipitated by certain medications (Maher et al., 2013).

Several studies have been conducted to examine the relationships among polypharmacy, cost, morbidity, and mortality rates. The estimated annual cost of prescription drug-related morbidity and mortality resulting from non-optimized medication therapy in 2016 in the United States ranged between $495.3 billion to $672.7 billion (Watanabe et al., 2018). The average cost of an individual experiencing treatment failure after initial prescription use was $2,481 (range: $2,233–$2,742), a new medical problem after initial prescription use was $2,610 (range: $2,374–$2,848), and treatment failure and new medical problem combined was $2,572 (range: $2,408–$2,751; Watanabe et al., 2018). The estimated annual cost of drug-related morbidity and mortality resulting from non-optimized medication therapy was $528.4 billion, equivalent to 16% of total U.S. health care expenditures in 2016 (Watanabe et al., 2018).

The Beers criteria are named after geriatrician Mark H. Beers who worked with a panel of experts on a list of potentially inappropriate medications (PIMs) for older adults. In 1991, Beers and colleagues expanded their work to develop explicit criteria defining inappropriate medication use in older adults. These criteria are periodically updated by the American Geriatrics Society (AGS). At the time of the development of the Beers criteria, residents of skilled nursing facilities were prescribed eight medications on average, and more than 50% of them received psychoactive medication. The Beers criteria were applied to older residents in nursing homes, representing the frailest of the population. The expert panel defined inappropriate medications as those that should be avoided except under unusual clinical circumstances. This was because of the lack of effectiveness, risks outweighing the benefits, or safer alternatives. The criteria were developed to be assessed from easily identifiable pharmacy records using minimal clinical data. This made it feasible as a quality improvement initiative in skilled nursing facilities.

The Beers criteria were subsequently updated so they could be applied to all older patients regardless of their residence. An 11-member panel with expertise in geriatric medicine, nursing, pharmacy, research, and quality measures developed the most recent version from the AGS. Each criterion for medication or class includes a quality of evidence rating and strength of recommendation, serving as a valuable resource for clinicians involved in caring for older adults (Walls, 2018). Increasing nurses' knowledge regarding using the Beers criteria in an elderly population will result in a positive social change.

Problem Statement

People ages 65 and older make up 12% of the U.S. population, but account for 34% of all prescription medication use and 30% of all over-the-counter medication use (Dagli & Sharma, 2014). When appropriately prescribed, administered, and monitored, medications are a cost-effective way to help older adults maintain health, recover from illness, or control symptoms of chronic disease. However, given the multiple drugs these patients take, polypharmacy has become more prevalent and concerning in older adults, especially in non-institutionalized elderly individuals. Several reasons exist for this increased concern about polypharmacy, including greater risk for adverse drug reactions due to metabolic changes and reduced drug clearance associated with aging. This risk is further exacerbated by the number of drugs taken and the potential for drug–drug interactions (Dagli & Sharma, 2014).

Purpose Statement

Proving adequate nursing education using the Beers criteria to aid in identifying polypharmacy and optimizing medication regimens in elderly patients is a critical element in their comprehensive care. This will help to reduce preventable adverse drug events (ADEs) like falls, drug–drug interactions, impaired cognition, hip fractures, rate of hospitalizations, and overall health care costs. Nursing education will improve patients' overall health status, quality of life, and patient and caregiver satisfaction (Dahal & Bista, 2022). Given that healthcare professionals' experiences, attitudes, and perceptions of polypharmacy may impact patient management, an increasing number of studies have been conducted within the area of polypharmacy from the perspectives of general

practitioners, pharmacists, and mixed healthcare professionals. However, evidence documenting nurses' education and experiences with polypharmacy is scarce. Thus, this study provides nurses with educational materials using Beers criteria to identify and prevent elderly polypharmacy (see Cheng et al., 2023).

Practice-Focused Question

The practice-focused question guiding this project was: Can an evidence-based educational intervention increase nurses' knowledge and awareness of the AGS Beers criteria for PIM use in older adults? This project aims to plan, develop, and implement an evidenced-based educational intervention to increase nurses' knowledge and awareness of the 2012 AGS Beers criteria for PIM use in non-institutionalized older adults. Using evidence-based Beers criteria to provide nursing education to improve polypharmacy effectively can reduce medication-related problems in older adults. The analysis, design, development, implementation, evaluation (ADDIE) criteria and the Walden University guidance on staff education guided the project.

Nature of the Doctoral Project

The source of evidence for this project was a literature review. According to the literature review, polypharmacy has recently become an important public health problem due to its far-reaching consequences, such as possible adverse effects on individual health and increased use of healthcare services and costs. Polypharmacy is known to cause a higher risk of ADEs and drug–drug interactions. Polypharmacy also often leads to medication nonadherence. All these provide adverse health outcomes and increased risk of geriatric syndromes (e.g., cognitive impairment or falls). This, in turn, leads to an

increased risk of hospitalization and institutionalization and much more significant healthcare expenditures (Kurczewska-Michalak et al., 2021).

The consequences of polypharmacy serves as an indicator of adverse clinical outcomes in the elderly population. An online literature review was conducted. Online databases searched for the project included Medline, EBSCO, PubMed, and Cochrane. In the search for peer-reviewed scholarly articles and journals, the following keywords were used: *elderly polypharmacy, adverse drug effects, prescribed and over-the-counter geriatric medication, hospital readmission cases*, and *patient education*. There is mounting evidence between polypharmacy and negative clinical consequences. Polypharmacy poses several issues of concern for patients and the health care system (Dahal & Bista, 2022). Using evidence-based Beers criteria to provide nursing education to improve polypharmacy effectively can reduce medication-related problems in older adults. Also, in this project, I will evaluate the appropriateness and effectiveness of this nursing education intervention in reducing polypharmacy in older people.

Polypharmacy among elderly patients is a significant public health consideration worldwide. A focus on increasing nurses' knowledge through nursing education can assist in decreasing polypharmacy in the elderly patient population. According to the Centers for Disease Control and Prevention (CDC, 2022), the association between polypharmacy and low health-related quality of life has been documented for single health conditions such as end-stage kidney disease, arthritis, and cardiometabolic risk factors. Healthcare professionals should assess the potential benefits and harms of prescribing multiple drugs to achieve ideal pharmacotherapy and to define the medicines

that can improve patients' health-related quality of life. Evidence-based guidelines for patients with multimorbidity can help inform deprescribing decisions, defined as the withdrawal process of an inappropriate medication, supervised by a health care professional to manage polypharmacy and improve outcomes. The educational program in this project included this content.

Significance

The following stakeholders were actively involved in program development: the medical surgical director, the unit manager director, the nurse educator, the clinical nurse specialist, and the clinical pharmacy staff. The success of this project largely depends on the commitment and willingness of the participating stakeholders to cooperate, fully participate, and effectively carry out the project. There is a universal acknowledgment that the clinical care provided to individuals should be based on the best available evidence. Translating research evidence to clinical practice is essential to safe, transparent, effective, and efficient healthcare provision and to meeting the expectations of patients, families, and society. More nurses are on the frontline of healthcare than any other healthcare profession. As such, nurse-led research/projects are increasingly recognized as a critical pathway to practical and effective ways of improving patient outcomes (Curtis et al., 2016).

In this project, I aimed to teach nurses how to use the Beers criteria in reducing polypharmacy in hospitalized patients. The findings from this project would help in the comprehensive care of elderly patients. This will help to reduce preventable ADEs like falls, drug–drug interactions, impaired cognition, hip fractures, rate of hospitalizations,

and overall health care costs. This education can improve patients' overall health status and quality of life and patient and caregiver satisfaction (Dahal & Bista, 2022).

Inappropriate polypharmacy is a particular concern in older people and is associated with adverse health outcomes. Choosing the best interventions to improve appropriate polypharmacy is a priority, hence interest in appropriate polypharmacy (Rankin et al.,2018). Potential benefits of medical therapies to treat disease, cure it, slow progression, and reduce symptoms should be supported (Dahal et al.,2022). The care of older adults can be challenging because they may require multiple medications to manage their complex medical problems. Optimizing their medication regimen is a critical element in comprehensive geriatric care. Preventable ADEs are one of the profound consequences of polypharmacy, and this possibility should always be considered when evaluating an older patient with a new symptom until proven otherwise. This strategy can prevent prescribing cascades and even the risk of hospitalizations. Also, being cognizant of specific issues related to polypharmacy, like increased risk for hip fractures and falls and decreased cognitive functions, can help avoid a lot of adverse outcomes and reduce health care costs (Varghese, 2022).

Polypharmacy serves as an indicator of adverse clinical outcomes. Polypharmacy can lead to a delayed return to work, increased drug costs, and drug–drug interactions. Polypharmacy significantly impacts elderly individuals, leading to poor compliance, drug interactions, medication errors, and avoidable ADEs among various complications. An ADE is a harm caused by usual drug doses leading to increased morbidity and mortality. ADEs also have remarkably high financial implications. This is recognized as an

expensive practice, costing the Centers for Medicare and Medicaid Services (CMS) around $50 billion annually (Dahal & Bista, 2022). Also, over-the-counter medications and herbal supplements used by elderly patients may interact with these prescriptions and lead to adverse drug reactions.

Summary

Healthcare providers are responsible for reducing the number of medications an older adult takes, particularly during the transition of care, such as from hospital to subacute rehabilitation or nursing home. Medication errors and heightened risk of polypharmacy increase during this time. Most medications stopped in the acute settings are continued in the rehabilitation or nursing home without orders or indications for the medications. Additionally, antibiotics started in the hospital before the transition to subacute or nursing home transfer need to have a clear endpoint to avoid adverse side effects from polypharmacy. All these can cause medication errors and negative outcomes. A program for nurses on this topic can assist in mitigating the consequences of polypharmacy in older people.

In the next section, I review the theoretical frameworks, concepts, and models that supported the translation of evidence to address this gap in practice, the relevance of the literature to nursing practice, the local background and context, the role of the DNP student, and a summary.

Section 2: Background and Context

Introduction

Polypharmacy in older people is a significant public health concern. There is an urgent need for healthcare professionals to address this growing problem in the elderly population. Polypharmacy for elderly patients has been an increasing concern for decades. In the late 1990s, the CMS considered this an important issue and implemented a quality-indicator measure targeting patients taking nine or more medications (Manouchehr, 2019). Staff nurses in hospitals are in a better position to help older patients manage their medications and prevent polypharmacy.

The practice-focused question guiding this project was: Can an evidence-based educational intervention increase nurses' knowledge and awareness of the 2012 AGS Beers criteria for PIM use in older adults? In this project, I sought to plan, develop, and implement an evidenced-based educational intervention to increase nurses' knowledge and awareness of the 2012 AGS Beers criteria for PIM use in non-institutionalized older adults.

Nursing theory guided practice helps improve the quality of nursing care because it allows nurses to articulate what they do for patients and why they do it (Younas & Quennell, 2019). In today's healthcare landscape, applying theories helps improve patient outcomes and consequently helps hospitals achieve magnet status. Theories and models are used in healthcare practice to support health promotion and disease prevention and to plan programs, understand and explain health behavior, and guide the identification,

development, and implementation of interventions. Healthcare promotions and disease prevention usually draw from one or more theories or models.

Theories are at the heart of practice, planning, and research. Theories powerfully influence how evidence is collected, analyzed, understood, and used, and examining them is practical and scientific. Theories are integral to healthcare practice, promotion, and research. The choice of theory, although often unacknowledged, shapes the way practitioners and researchers collect and interpret evidence. Theories range from explicit hypotheses to working models and frameworks of thinking about reality. It is essential, scientifically and practically, to recognize implicit theories as they powerfully influence the understanding of health care (Alderson, 1998). Lewin's three-step model of change management is highlighted throughout nursing literature as a framework to transform care at the bedside and was used to guide this project (Wojciechowski, 2016).

Concepts, Models, and Theories

The expected outcomes of a nursing educational intervention in reducing polypharmacy and improving patient outcomes are related to overprescribing patterns and the interaction and relationship between internal and external factors. In this project, I applied Lewin's model of change. Recognizing the different educational needs of various nurses and acknowledging the varying attitudes and stresses nurses might have is essential. Using Lewin's change management theory as a framework can strengthen the probability of successfully applying evidence-based Beers criteria to improve polypharmacy and adverse effects in the elderly population (Sutherland, 2013).

All healthcare providers, from the bedside to the boardroom, have a role in ensuring effective change. Using best practices derived from change theories can help improve the odds of success and subsequent practice improvement (Barrow et al., 2021). Lewin indicated:

> If one could identify, plot, and establish the potency of (driving and restraining) forces, then it would be possible not only to understand why individuals, groups, and organizations act as they do but also what forces would need to be diminished or strengthened to bring about change. (Shirey, 2013, p. 69–72)

Lewin's theory of planned change includes the following change stages: (a) unfreezing, understanding change is needed; (b) moving, the process of initiating change; and (c) refreezing, establishing a new status quo.

Unfreezing, the first stage, involves preparing for change. This stage entails a change agent, such as a nurse leader, recognizing a problem, identifying the need for change, and mobilizing others to see the need for change. Unfreezing may begin with nurse leaders conducting a gap analysis illustrating discrepancies between the desired and current state. Creating a sense of urgency for change is part of unfreezing. A solution is then selected, and preparation for moving away from a current reality or equilibrium ensues. In this project, the first stage was identifying polypharmacy in the elderly population 65 years and older. Polypharmacy, which is referred to as prescription and nonprescription medications that elderly adults take where the intended benefits are not realized and adverse effects outcomes are higher than expected benefits.

Moving or transitioning, the second stage of Lewin's theory, entails looking at change as a process rather than an event. Transitioning is the inner movement that individuals make in reaction to change and requires unfreezing or moving to a new way of being. This stage necessitates creating a detailed plan of action and engaging people to try out the proposed change. The second stage of this theory emphasizes the detailed plan to address the identified plan. In this project, the evidence on AGS Beers criteria was presented to nursing staff in an educational intervention to increase nurses' awareness and knowledge regarding polypharmacy with the intent to reduce polypharmacy and reduce adverse drug reactions.

More than 90% of older people have at least one prescription, and more than 66% have three or more. The AGS Beers criteria can assist in decreasing the adverse events associated with multiple medication use as it is a compendium of medications to avoid or consider with caution because they often present an unfavorable balance of benefits and harms for older people. These criteria play a vital role in helping health professionals, older adults, and caregivers work together to ensure medications are appropriate (AGS, 2019).

Numerous studies support adequate nursing education using Beers criteria in addressing polypharmacy. The AGS Beers criteria increases awareness of inappropriate medication use in older adults and assists nurses and interprofessional team members in medication reviews and ongoing monitoring. According to AGS (2019), education programs will encourage bedside and nurse managers to develop and document a plan in partnership with their patients. Nurses have always played a vital role in recognizing

medication-related problems in older people, particularly in identifying those who are at a high risk of encountering problems.

Refreezing, the third stage of the theory, stresses stabilizing the change so that it becomes embedded into existing systems, cultures, policies, and practices. In refreezing the change, nurse leaders consider the force field analysis to accentuate the driving forces facilitating change and counteract the restraining forces getting in the way. By refreezing the new change, this dynamic produces a new equilibrium, which is then recognized as the new norm or higher level of performance expectation (Shirey, 2013).

I developed the education program using the ADDIE model. This model enables educators to create programs using a systematic approach designed to meet learners' needs and can aid in refreezing. The ADDIE model can be an effective tool in nursing education, offering an established structure for developing educational programs (Kim et al., 2020). The five-phase ADDIE model outlines crucial steps in providing practical education on the importance of avoiding polypharmacy in elderly patients. This model was applied in polypharmacy education for nursing staff in five phases.

Phase 1, the first phase of the model, is analysis. In this phase, a problem is identified and clearly defined. The analysis phase can be identified as goal setting. The identified problem for this project was polypharmacy among elderly patients.

Phase 2 is the design phase. For this phase, I created systematic and specific learning objectives for staff nurses. In the design phase of the ADDIE model, instructional designers map out how learners will achieve the desired learning objectives (Research.com, 2022). The teaching plan aimed to provide staff with the knowledge to

use evidence-based Beers criteria to assess for potentially adverse drug effects in elderly persons on multiple medications. Specially, at the end of the program, participants should be able to: (a) explain polypharmacy in elderly patients, (b) identify risk factors for polypharmacy in elderly patients, (c) describe reasons for identifying and managing polypharmacy in elderly patients, and (d) describe strategies that can help minimize polypharmacy.

Phase 3 is the development phase. This phase consisted of organizing and creating the learning materials used during the educational session. The program in this project was delivered in person and was planned to be a 1-hour PowerPoint presentation. A pretest and posttest were given to participants to determine knowledge increase, and participants were asked to evaluate the content of the educational materials provided.

Phase 4 is the implementation phase of the ADDIE model and deals with the actual delivery of the program or course to learners. While learners consume the materials developed in the previous phases, instructors must ensure learners understand the material and achieve the learning objectives (Research.com, 2022). Also, in this phase, a nurse educator and informational technology uploaded the program into the learning management system so content could be made available.

Phase 5 is formally evaluating the program's educational content. Training evaluation is the systematic process of collecting and using that information to improve the training. Evaluation provides feedback to help identify if the training achieved the intended outcomes and enables a researcher to decide about future training (CDC, 2022).

Relevance to Nursing Practice

Inappropriate polypharmacy is a particular concern in older people and is associated with adverse health outcomes. Choosing the best interventions to improve appropriate polypharmacy is a priority in nursing (Rankin et al., 2018). Nurses are better able to minimize the use of PIMs. Multiple evidence-based tools are available to guide nurses and other healthcare providers in making appropriate pharmacological decisions to meet the needs of older adults relating to their medications. In this project, I sought to plan, develop, and implement an evidenced-based educational intervention to increase nurses' knowledge and awareness of the 2012 AGS Beers criteria for PIM use in non-institutionalized older adults. The Beers criteria are a valuable tool for nurses and other clinical care providers to improve patient quality care. The AGS Beers criteria increase awareness of inappropriate medication use in older adults and assists nurses and interprofessional team members in medication reviews and ongoing monitoring. Additionally, the criteria inform prescribers and clinical decision support providers as they work to improve patient outcomes (AGS, 2019).

The Beers criteria serve as a warning light for nurses to identify medications that have an unfavorable balance of benefits and harms in many older adults, particularly compared to pharmacologic and nonpharmacologic alternatives. However, there are situations where the use of medications included in the criteria can be appropriate. As such, the 2012 AGS Beers criteria work best when they identify PIMs and educate clinicians and patients about why those medications are included and the situations in

which their use may be problematic. The criteria are designed to support, rather than supplant, good clinical nursing judgment (Steinman et al., 2015).

The AGS (2019) updated Beers criteria include the same five main categories as in 2015: (a) PIMs in older adults, (b) PIMs to avoid in older adults with certain conditions, (c) medications to be used with considerable caution in older adults, (d) medication combinations that may lead to harmful interactions, and (e) a list of medications that should be avoided or dosed differently for those with poor renal function. The AGS Beers criteria are to be used in caring for older adults 65 years of age and older in all ambulatories, acute, and institutional care settings. The overall intent is to improve outcomes, such as medication selection and education of interprofessional, older adults and caregivers, while preventing unintended harms, such as the use of PIMs and ADEs.

The 2019 AGS Beers criteria update is the third update by the AGS and the fifth update of the AGS Beers criteria since its original release. This update contributes to the critically important evidence base and discussion of medications to avoid in older adults and the need to improve medication use in older adults. The 2019 AGS Beers criteria include 30 individual criteria for medications or medication classes to be avoided in older adults and 16 criteria specific to more than 40 medications or medication classes that should be used cautiously or avoided in certain diseases or conditions. As in past updates, there were several changes to the 2019 AGS Beers criteria, including modified or dropped criteria, a few new criteria, and some changes in the level of evidence grading

and clarifications in language and rationale (AGS, 2019). Medications nurses must pay

close attention to and use with caution are presented in Table 1.

Table 1

List of Medications to Avoid for Elderly Patients

Drug	Risk
Meperidine	Delirium
Tramadol	SIADH
Opioids	Respiratory depression
Tricyclic antidepressants	Sedation
Anticholinergics	Confusion
Anticoagulants	Gastrointestinal bleeding
Antipsychotics	Falls
Amiodarone	Bleeding
Calcium channel blocker	Cardiac symptoms, such as hypotension, bradycardia, and constipation
Spironolactone	Dehydration, renal failure
Proton pump inhibitors	Clostridium difficile infection
Glyburide	Hypoglycemia
Estrogens and testosterone	Cancer
Corticosteroids	Delirium
Aspirin	Gastrointestinal bleeding
Metoclopramide	Tardive dyskinesia

Source: REF: Drugs to be used with caution. (Mo, 2022).

The screening tool of older persons' prescriptions (STOPP) criteria is an

alternative criterion developed in 2008 by a European consensus group (Brown et al.,

2016). The STOPP criteria are organized by physiological system and include drugs to

avoid, drug–drug and drug–disease interactions, and therapeutic duplication to define

PIMs. These criteria are purported to be more effective in a European population where

many medications considered inappropriate by the Beers criteria are unavailable. Brown

et al. (2016) reported low agreement and no significant differences between the two

iterations of the Beers criteria and the STOPP criteria in the level of discrimination for

ADEs, emergency department visits, and hospitalizations, though each was moderately prognostic of these outcomes. Future evidence-guided updates of these widely used tools should identify medications and medication classes that may increase the predictive ability of the criteria. These criteria can be used complementary to enhance the sensitivity of detecting ADEs to decrease ADEs in older patients.

Local Background and Context

At the project site where this evidenced-based educational intervention using Beers criteria to reduce adverse side effects of medications in elderly patients due to polypharmacy will be implemented, there have been reported adverse effects of polypharmacy in elderly patients such as falls, prolonged hospital stays, delirium and many more (personal communication, 2023). A recent review of medical records of elderly patients on the unit revealed that 30 patients were admitted due to complications from elderly polypharmacy and experienced complications of polypharmacy while an inpatient. There have been many conversations about the best way to reduce polypharmacy in elderly patients at the site. Educating nurses using BEER criteria is required to understand the relationship between polypharmacy and adverse effects in the elderly populations. The project was conducted in a local hospital's medical-surgical and neurology unit, lasting approximately two weeks to allow the most significant number of staff to participate.

Most studies on this topic examined the effect of polypharmacy on hospitalization due to a fall, using a large, nationally representative sample of older adults. According to Zaninotto et al. (2020), data from the English Longitudinal Study of Ageing (ELSA)

were used in their study. This included 6,220 participants aged 50+ with valid data collected between 2012 and 2018. The primary outcome measure was hospital admission due to a fall. They found that the risk of hospitalization due to a fall increased with polypharmacy status. The increased risk was apparent among those reporting polypharmacy and heightened polypharmacy but also among those reporting the concurrent use of one–four medications. It is advisable that drug prescriptions in older people be revised regularly and that the number of medications should be kept to the minimum possible as it might reduce the risk of fall-related hospital admissions.

Polypharmacy is a serious concern among elderly adults and especially among seniors admitted to hospitals. Although polypharmacy is preventable, it is a significant contributor to decreasing health-related quality of life, morbidity, and mortality. Given increased numbers of comorbid conditions, longevity, newer medications that are supposed to treat more medical conditions effectively, and many practice guidelines that often recommend multidrug regimens, elderly populations have a higher occurrence of polypharmacy use. Elderly populations take more medications to control multiple chronic diseases; these medications thereby produce unfavorable adverse effects. At hospital discharge of elderly patients, polypharmacy is often even more pronounced than at admission (Grischott et al.,2018).

Elderly patients with dementia who were prescribed more than five medications were at greater risk of long-term functional decline (Agency for Healthcare Research and Quality, n.d.). There is a need to provide evidence-based education to increase nurses'

knowledge in reducing polypharmacy in elderly patients using the 2012 AGS Beers criteria for PIMs.

Definitions of Terms

The following definitions of terms are used in this project:

Beers criteria: The Beers criteria for PIM use in older adults (i.e., at least 65 years of age), initially developed by Mark H. Beers in 1991, continue to be used by the AGS to guide medications that should be avoided in most older patients or specific situations (Croke, 2020).

Centers for Disease Control and Prevention (CDC): The CDC (2022) is the nation's leading science-based, data-driven service organization that protects the public's health.

Centers for Medicare and Medicaid Services (CMS): The CMS is part of the U.S. Department of Health and Human Services.

National Institute of Aging (NIA): NIA (2022) was established in 1974 to improve the health and well-being of older adults through research.

Potentially inappropriate medications (PIMs) and adverse drug reactions: PIMs can be defined as drugs for which use among older adults should be avoided due to the elevated risk of adverse drug reactions for this population (Zhang et al.,2017).

State/Federal Context Applicable to the Problem

Polypharmacy is considered as something to be avoided, especially in the elderly populations. There is mounting evidence that polypharmacy increases falls in hospitalized elderly patients and causes prolonged hospitalization. According to

Zaninotto et al. (2020), the risk of hospitalization due to a fall increased with polypharmacy. It is suggested that prescriptions in older people should be revised on a regular basis and that the number of medications prescribed be kept to a minimum to reduce the risk of fall-related hospital admissions. Inpatient falls and fall-related injuries are part of quality measures. Quality health care is a high priority for the president, the U.S. Department of Health and Human Services, and the CMS. CMS implements quality initiatives to assure quality health care for Medicare beneficiaries through accountability and public disclosure. CMS uses quality measures in its various quality initiatives, including quality improvement, pay for reporting, and public reporting (CMS, n.d.).

Role of the DNP Student

During this DNP project, I assumed the leadership position for the education program. This included planning, implementing, and evaluating the evidence-based change. This hospital does not employ me; I have gained access to this site through my clinical preceptor, who supervises my clinical project. I coordinated the timelines for all implementation associated with this project. This involved managing and implementing this project; I provided the best evidenced-based practices literature available and developed education and tools for translation into practice. I also supported ensuring that specific training for reducing polypharmacy was used in the evaluation.

Motivation for this Doctoral Project

Working with elderly adults in an acute setting for the past 20 years and paying close attention to the reason for admission, including adverse drug reactions and polypharmacy, has motivated me to pay very close attention to polypharmacy and the gap

in practice either in the acute setting or the community. This motivation and providing nurses with evidence-based education to reduce polypharmacy may lead to effective deprescribing.

Potential Biases

Potential biases that may occur with this project include a selection bias. Selecting nurses only from a medical surgical unit for polypharmacy education will limit such education for other nurses working in other units in the hospital. In this case, nurses would be selected from units that admit and manage the care of elderly patients 65 years and above. Secondly, procedural bias may occur given the duration of the education and for evaluation. The result is that participants end up providing half-thoughts and incomplete information that does not represent their thoughts. Participants who require additional time to complete pre and post-tests will be permitted to do so.

The need to decrease polypharmacy burden in acute, subacute, and long-term facilities has been well recognized. Nurse practitioners effectively meet the complex healthcare needs of older adults in long-term care facilities. Nurse practitioners acting as primary care providers in long-term care facilities have been shown to achieve positive outcomes, including improved chronic disease care, promoted functional health, and decreased polypharmacy, falls, restraint use, and transfers (Bergman, 2020). Nurse practitioners in the healthcare industry have the knowledge and skill sets to take leading roles in reducing polypharmacy in elderly patients. I set up an interdisciplinary committee that included the pharmacist and other providers to minimize polypharmacy. Also, I played a vital role in creating an interdisciplinary virtual medication management

huddle that coincides with and augments the consulting pharmacist reviews and requirements that were beneficial and helped to meet both time challenges and COVID-19 guidelines related to social distancing and personal contact. Clear guidelines for member expectations and deliverables were needed, including standardized tools such as the Beers criteria (Bergman, 2020). Nurse practitioners serve as gatekeepers in the healthcare setting, play a vital role in patient care, and are positioned to implement the deprescribing process.

Role of the Project Team

The following process was used for the project: The lead stakeholder, the DNP student, developed, coordinated, and implemented the project education using a PowerPoint presentation. The project team consisted of a multidisciplinary staff, including the nurse educator, clinical nurse specialist (CNS), staff nurse, pharmacist, physician's assistant, nurse practitioner, and two physicians. This team contributed their expertise to the development of the above educational module.

Team meetings were held to allow the teams to share knowledge on the presented topic. I led these meetings as a meeting roundup to help the teams share more insight on the subject. During the sessions, each team member reviewed a hard copy of the teaching materials and evaluation/validation forms and was requested to complete the anonymous evaluations within a week.

A timeline was developed. Timelines kept the project team on target with predicted goals and consistent evaluations. Also, a timeline ensured that the entire team worked together toward the completion of the project. The staff education was designed

to last 60 minutes for each section and would require two sections to allow for more participation.

Summary

The purpose of this project was to increase staff nursing knowledge about polypharmacy using the Beers criteria, thereby preventing adverse drug effects in the elderly populations. This was expected to increase the nurse's understanding of polypharmacy. Preventing polypharmacy in elderly patients is a priority due to the increase in adverse effects such as falls. Polypharmacy paves the way for non-adherence, adverse drug reactions, negative health outcomes, increased use of healthcare services, and rising costs. Since it is most prevalent in older adults, there is an urgent need to introduce effective strategies to prevent and manage the problem in this age group (Kurczewska-Michalak et al., 2021). In Section 3, I will discuss the project question and the source of evidence to support this project.

Section 3: Collection and Analysis of Evidence

Introduction

Implementing evidence-based practice using Beers criteria to increase nursing knowledge about polypharmacy in non-institutionalized elderly patients has been identified as a challenge by nursing staff in a post-acute care and rehabilitation facility. This project aimed to plan, develop, and implement an evidenced-based educational intervention to increase nurses' knowledge and awareness of the 2012 AGS Beers criteria for PIM use in non-institutionalized older adults. Using polypharmacy tools, such as the Beers criteria list, to screen for and assess potentially problematic medications is an excellent first step in preventing unintended iatrogenic adverse effects, hospitalizations, and death (Kenenth, 2021).

Practice-Focused Question

The practice-focused question guiding this project was: Can an evidence-based educational intervention increase nurses' knowledge and awareness of the AGS Beers criteria for PIM use in older adults?

Sources of Evidence

To inform the educational program, I conducted a literature search to identify evidence to support the development of the Beers criteria staff educational program. This evidence was derived from peer-reviewed articles published since 2015 from Medline/PubMed, CINAHL, Google Scholar/MedNar, and the Cochrane Library. Also, I used currently published clinical guidelines for Beers criteria to support the program's

development further. Pretest and posttest results and program evaluations were used to determine program success.

Participants/Stakeholders and Their Roles

Participants included a unit nurse manager, two unit-based nurse clinical specialists, one pharmacist, and one nurse practitioner. Each member had a specific assigned role to play. The nurse manager was tasked with identifying polypharmacy's adverse effects among patients, such as falls, and the two clinical nurse specialists were tasked with collecting data on the adverse effects of polypharmacy. The pharmacist's role was to review all medication orders to identify polypharmacy, be available for physician consultation, and educate physicians and nursing staff on polypharmacy. I developed and presented the evidenced-based staff education program to the nurse manager for approval before offering it to staff nurses.

ADDIE Model

This doctor of nursing practice staff education project followed the ADDIE framework (Jeffery et al. 2016) and the Walden University staff education manual. The ADDIE model is an instrument designed for educational and training purposes. This model enables educators to create programs using a systematic approach designed to meet learners' needs. The ADDIE model can be an effective tool in nursing education, offering an established structure for developing educational programs (Kim et al., 2020). The five-phase ADDIE model outlined the crucial steps in providing practical education on the importance of avoiding polypharmacy in elderly patients. This model was applied in polypharmacy education for nursing staff. The ADDIE tools aligned with this project

by identifying the knowledge gap, who the learners are, how the gap can be closed, and what is the time frame for the course. The framework's five phases were as follows:

- Analyze: The project was presented to the management of the practice site. The management team reviewed the gap in practice and gave input into the development of the education program.

- Design and develop: The project design and development were based on the identified gap in knowledge and the literature review.

- Implementation: The stakeholders were asked to identify the outcomes they would like to see from this project. Recommendations from the management team were incorporated into the overall educational program. The program was offered as a 2-hour session. This program was provided on-site away from clinical areas. The program involved a discussion of the current problem of polypharmacy at the facility and the use of the Beers criteria.

- Evaluation: A pretest and posttest assessed nurses' knowledge before the educational program and the knowledge gained from the education. Descriptive statistics were used to evaluate the knowledge gained by the participants using the mean and standard deviation.

Ethical Procedures

In conducting this doctoral project, I abided by the ethical and legal procedures according to Walden University. First, I obtained permission from the Walden University Institutional Review Board (IRB) via application, and then I received permission from the facility signed by the facility director of nursing quality. Then, I contacted the

participants for the project. Ethical measures taken to ensure the protection of participants included providing participants with a full understanding of the project, including the risks and benefits, and obtaining informed consent from participants. The consent form also indicated that participants could withdraw at any time without any penalty. In addition, ethical principles of no harm to the participants were maintained, and participants were assured that confidentiality would be maintained. Their responses were held in confidence, and participants were not identified by their names. Incentives and benefits were provided to participants through continuing education credit.

Analysis and Synthesis

In this project, I aimed to plan, develop, implement, and evaluate a staff education program to increase knowledge on the use of the Beers criteria to reduce polypharmacy in elderly adults 65 years and older. Beers criteria have been used frequently in the acute, subacute, and community to educate staff on how to identify and reduce polypharmacy in the elderly population. The following staff were invited to participate in the education session: nurses, nurse educators, nurse managers and directors of the medical–surgical unit, pharmacists, pharmacy technicians, physicians, nurse practitioners, and physician assistants. Educational material was presented using PowerPoint slides with the assistance of the nurse educator. The program was a two-session class and lasted for a total of 2 hours. A pretest and posttest were distributed and analyzed to ascertain increased knowledge before and after the presentation. All participants were encouraged to provide feedback after the presentation using a program evaluation survey for future

improvement. Data from the pretest and posttest from participants were analyzed using descriptive statistics and displayed in tables and charts as appropriate.

Summary

One of the first sets of explicit criteria for inappropriate drug use was developed by Beers in 1991. Beers defined inappropriate prescribing as the use of medication where the potential risks outweigh the potential benefits. For the first set of Beers criteria, a 13-member expert panel was part of a two-stage Delphi survey in which consensus was reached regarding 30 therapeutic classes/medications that should be avoided in elderly patients residing in nursing homes (Marcum & Hanlon, 2012).

A significant problem specific to most health care is that almost one third of all change projects are known to fail for many reasons, such as poor systems failing to change and stakeholders refusing to adopt change. Using the best practices derived from change theories has been proven to improve the odds of success and subsequent practice improvement. A program developed for nurses using the ADDIE model sought to improve processes and outcomes for the greater good of patient outcomes and the healthcare industry (*Online Journal of Issues in Nursing*, 2016). In the following section, Section 4, I present findings from the project and recommendations.

Section 4: Findings and Recommendations

Introduction

Polypharmacy refers to the use of multiple medications in a patient, commonly an older adult. There is a lack of a standard definition for such a term. Polypharmacy has been described as the coprescribing of multiple medications, the inappropriate use of medications, using medications without a clinical indication, visiting various pharmacies, and the use of five or more medications and includes a variety of other elements (Nguyen et al., 2020). A gap in research exists at the intersection of the value of nurse practitioners in caring for older adults and their management of polypharmacy (Pariseault et al., 2020). There also has previously been a gap in the knowledge among nursing professionals concerning elderly polypharmacy, leading to multiple adverse drug effects. Some of these negative results include falls and cognitive impairment, harmful drug interactions, and drug–disease interactions, including the death of a patient, in which a medication prescribed to treat one condition worsens another or causes a new one.

Findings and Implications

After this project, a tremendous difference was noted in the knowledge of staff nurses regarding elderly polypharmacy. After the pretest, the results showed that staff nurses working in the medical–surgical unit did not have an adequate understanding of the care of elderly patients with polypharmacy. After the PowerPoint presentation, a posttest revealed significant improvement in the knowledge of staff nurses regarding the care of elderly patients with polypharmacy.

The PowerPoint presentation occurred on August 21, 2023, and August 22, 2023. A total of 20 individuals participated. Each presentation lasted for 60 minutes. Ten of the 20 participants were staff nurses. Pretests were taken before the presentation and posttests after the presentation each day.
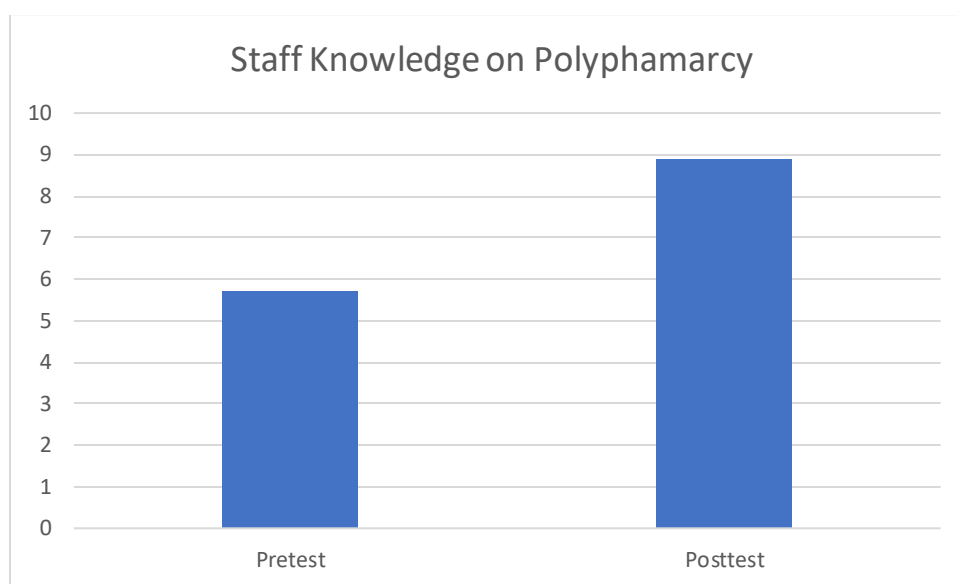
Figure 1

Staff Knowledge on Polypharmacy

Figure 1 shows that the findings suggest a need to educate staff nurses regarding polypharmacy in the elderly population. The pretest mean of 5.7 improved to 8.9 on the posttest. This represents a knowledge gain of 56.14%. The low pretest score demonstrated a significant gap in the knowledge of staff nurses caring for elderly patients with polypharmacy that, if not addressed, could worsen the adverse drug effects in the elderly population and increase the mortality rate. The posttest results demonstrate increased staff knowledge among nurses taking care of elderly patients with polypharmacy.

In addition to the pretest–posttest findings, a program evaluation was used to assess the program. The evaluation form (Appendix D) was distributed to participants following the program. Results indicate the program was effective, and staff were satisfied with the content and format.

<div align="center">**Recommendations**</div>

The purpose of this project was to increase nursing staff knowledge about polypharmacy using the Beers criteria, thereby preventing adverse drug effects in the elderly population. Preventing polypharmacy in elderly patients is a priority due to the increase in adverse effects such as falls. Addressing the knowledge gap with polypharmacy will help optimize staff knowledge about elderly polypharmacy and avoid ADEs in elderly patients. Addressing knowledge about pharmacotherapeutics, pharmacodynamics, and pharmacokinetics in elderly patients will also aid staff nurses in understanding common side effects and significant medication interactions in the elderly population. This can be part of the annual nursing competency and new hire education. Also, periodic in-service by nurse educators on elderly polypharmacy and common adverse effects, including falls. This is necessary to ensure that all the nurses taking care of elderly patients in this facility are well-trained in polypharmacy and ADEs. Recommending polypharmacy in basic nursing curricula will provide a solid foundation for staff nurses as indicated by the improvement on the posttest scores, with a mean of 8.9, compared to the pretest mean of 5.7 (a 56.14% knowledge gain). Implementing these recommendations is a step toward preventing numerous medication errors and improving patients' quality of life.

Contribution of the Doctoral Project Team

This project team consisted of me, a doctor of nursing practice student, my preceptor, and the project team, which includes the unit nurse educator and the clinical nurse specialist. I presented all the steps in identifying evidenced-based staff education to the nurse manager for approval before offering the program to staff nurses. I analyzed data based on the pretest and posttest data and provided recommendations based on the findings. This project will form the foundation for the next project that will be carried out on staff nurse education in elderly polypharmacy.

Strengths and Limitations of the Project

This project highlights the need to develop staff nurse polypharmacy education for nursing staff caring for elderly patients. The participants were ready to participate in the project and reported that the pretest was helpful in preparing them for the project. However, the participants' size of only 10 staff nurses was insufficient to influence the change. Recruiting adequate staff nurse participants was challenging because of the staff nurse shortage following the COVID-19 pandemic.

Section 5: Dissemination Plan

This project was conducted to address an identified a gap in nursing staff knowledge regarding elderly polypharmacy. A staff education program on this topic increased knowledge among long-term care staff by 56.14%. These results provide an opportunity not only to close the knowledge gap in elderly polypharmacy but also to improve the health of the elderly patients encountered daily in practice. The outcome of this project is of no use if not made available to the stakeholders and subsequently to the end users: the staff nurse and pharmacy staff. The final report of this project will be available in both electronic and hard copy. Also, a PowerPoint presentation will be public to the facility and presented to relevant stakeholders. In addition, this project will be shown in the monthly nursing ground rounds to disseminate project findings rapidly. Efforts will be made to include the topic of the elderly polypharmacy project as an annual staff nurse competency and as part of new hire orientation.

Analysis of Self

As a nurse practitioner, I work in acute care settings. I have always been concerned about the numerous adverse effects of polypharmacy in the elderly population, and this motivated me to carry out this project. I sought to help close the gap in practice by providing nursing education using Beers criteria in preventing and reducing polypharmacy in the elderly population. This project aims to lay a foundation for staff nursing education to close the practice gap and incorporate it as part of routine staff nursing education to prevent polypharmacy in the elderly population. As a scholar,

translating evidence into practice and disseminating my project is an important step toward knowledge translation and practice change.

Summary

In conclusion, the literature review confirmed the prevalence of polypharmacy and its adverse effects on elderly patients, especially in acute care settings. Also, a gap in the knowledge was found among nursing professionals concerning elderly polypharmacy, leading to multiple adverse drug effects. Educating staff nurses using Beers criteria will close this knowledge gap and prevent elderly polypharmacy and associated adverse effects.

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Appendix A: Teaching Plan

Reducing polypharmacy using BEER's Criteria

Total Time: 2 hours

Objective	Content	Teaching Method	Time	Evaluation
Explain polypharmacy in the elderly. **Describe reasons for identifying and managing polypharmacy in the elderly**	**1. Polypharmacy** **2.Reasons for Polypharmacy** **3. Physiological Changes in the Elderly related to polypharmacy** **4. Complications of polypharmacy in the elderly** **5. Implications of polypharmacy to the health care system, family, and community**	**PowerPoint** **Lecture** **Discussion**	**60 min**	**Pretest** **Posttest questions**
Identify risk factors for polypharmacy in the elderly	**1.Risk factors** **2.PIMS**	**PowerPoint** **Lecture** **Discussion**	**30 min**	**Pretest** **Posttest questions**
Describe the strategies that can help minimize polypharmacy.	**1.Medication Reconciliation** **2.Post discharge calls** **3.Beer's criteria assessment**	**PowerPoint** **Lecture** **Discussion**	**30 min**	**Pretest** **Posttest questions**

Appendix B: Pretest and Posttest Evaluation Instrument

1.   What is polypharmacy?

A) The use of 1 or 2 prescription drugs.

B) Taking 3 or 4 over the counter medications

C) A patient taking 5 or more medications.

D) A and B are correct

2.   The following are reasons to identify polypharmacy in the elderly except?

A) At risk for injury from multiple drug use

B) Elderly at risk for increase adverse drug reactions

C) Increase drug interactions

D) Decrease risk for fall

3.   The following physiological changes affect the elderly with polypharmacy

except?

A) Increase drug absorption rate

B) Less body water and lean body mass

C) Decrease metabolism leading to decrease drug clearance in the liver

D) B and C is correct

4.   What are the complications of polypharmacy in the elderly? Choose all correct

answers.

A) Acute altered mental status from their baseline.

B) Fall

C) Decrease alertness

D) All of the above

5.   Polypharmacy in the elderly drives' healthcare costs due to complications?

A) True

B) False

6.   True or False: Polypharmacy increases readmission in the elderly?

A) True

B) False

7.   True or false: Nurses can decrease elderly polypharmacy by performing medication reconciliation upon admission?

A) True

B) False

8.   True or false: Post discharge nursing call can decrease polypharmacy in the elderly?

A) True

B) False

9.   True or false: The BEERs criteria are widely used by clinicians, educators, researchers, and healthcare administrators in the United States in identifying potentially inappropriate drugs in the elderly?

A) True

B) False

10.   All of the following are the goals of BEERs criteria, except?

A) To improve the care of older patients by decreasing the potentially

inappropriate medications.

B) Serves as a warning in identifying medications that has adverse drug reactions

in the elderly

C) Is a substitute to clinical judgment and individualized care

D) All of the above

Answer Key
1. C
2. D
3. A
4. D
5. A
6. A
7. A
8. A
9. A
10. C

Appendix C: PowerPoint Presentation Presented to Nursing Staff
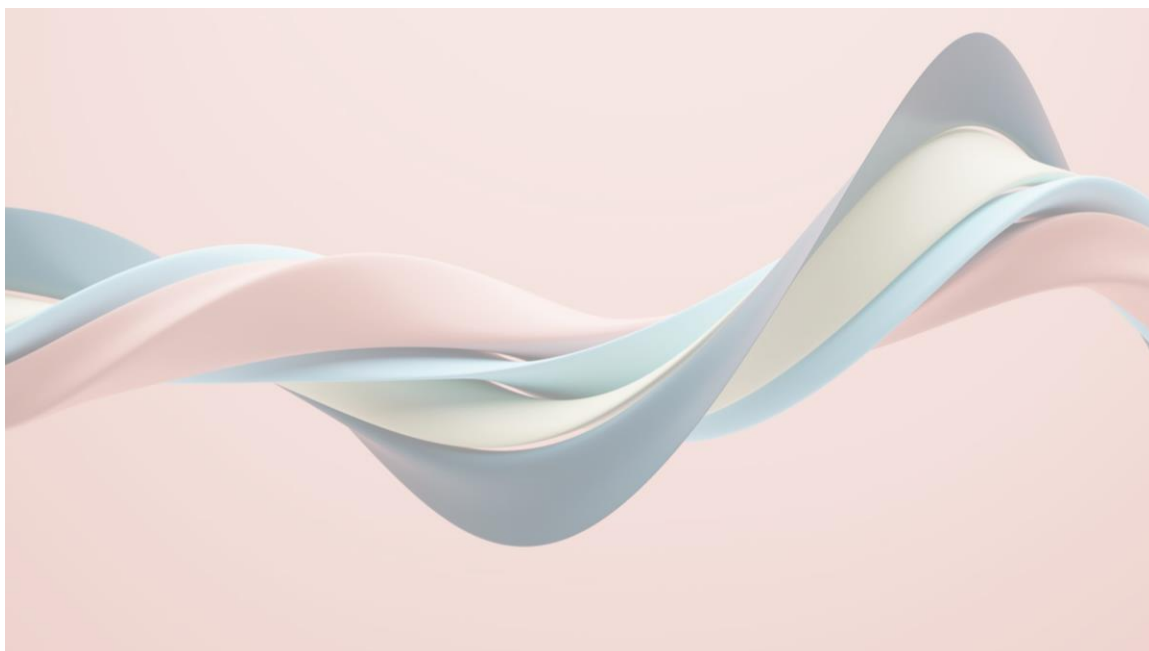
Elderly
Polypharmacy

Objective

———◇———

1. Identify what polypharmacy is in the elderly
   a. Polypharmacy
   b,. Reasons for polypharmacy
   c. Physiological changes in the elderly related to the elderly
   d. Complications of polypharmacy in the elderly
   d. Implications of polypharmacy to the healthcare system, family and community

2. Identify risk factors for polypharmacy in the elderly

   a. Risk factors

   b. PIMS

Objectives Continues

———◇———

3. Describe the strategies that can help minimize polypharmacy.

   a. Medication reconciliation

   b. Post discharge calls

   c. Beer's Criteria assessment

Objectives Continues

4. Develop collaborative plan to address patients with poor health literacy, language barrier of poor cognitive function to prevent effects of polypharmacy and adverse effects.

Definition

Polypharmacy refers to the use of multiple medications in a patient, commonly an older adult. Interestingly, there is a lack of a standard definition for such a term. Polypharmacy has been described as the co-prescribing of multiple medications, the inappropriate use of medication(s), using medications without a clinical indication, visiting multiple pharmacies, and/or the use of five or more medications, and the list goes on (Nguyen et al.,2020).

What is Beers Criteria

—◇—

The American Geriatrics Society Beers Criteria for Potentially Inappropriate Medication Use in Older Adults is a list of medication guidelines that help healthcare providers safely prescribe medications for adults over age 65.

The Beers Criteria is a list of potentially harmful medications or medications with side effects that outweigh the benefit of taking the medication.

Demographics

—◇—

Despite the existence of practice guidelines about safe medication management, researchers found that at least 25% of community dwelling, non-hospitalized, older adults experienced inappropriate prescriptions of medications from their health care providers. (Sun et al., 2021).

Effects of Physiological Changes on Medication Absorption, Distribution and Clearance

Reduced Homeostatic Mechanism and Organ Dysfunction:

–Normal physiologic changes of advancing age, such as decline in organ function and alteration in receptor response, often cause the elderly to manifest disease atypically and to have increased sensitivity to drug effects.

–In addition, these physiologic changes impact the patient's ability physically to handle drugs, which may lead to toxic accumulations for some drugs despite utilization of therapeutic dosages.

(*Polypharmacy in the elderly: Clinical challenges in emergency….* (2015, January 2). Relias Media.)

Physiological Changes Continues:

Physiologic changes with age:

–Increase body fat

–Decrease body water

–Decrease albumin

–Decrease liver metabolism

–Decrease renal function

Physiological Changes Continues:

Both pharmacokinetics and pharmacodynamics are affected by these physiologic changes

Pharmacokinetics: This is Changes on how the body acts on the drugs

Pharmacodynamics: Implies the action the drug has on the bodyElderly individuals commonly have a varied response to drugs. With aging, alterations in end-organ responsiveness occur that cause exaggerated or diminished therapeutic effects

Physiological Changes Continues:

Pharmacokinetics changes

- Pharmacokinetics describes the processes of drug absorption, distribution, metabolism, and clearance.

-Absorption: The effects of aging on the gastrointestinal system include decreases in gastric acid production, motility, and active membrane transport.

-Distribution: Distribution throughout the body is altered due to the physiological is altered in both body water and fat
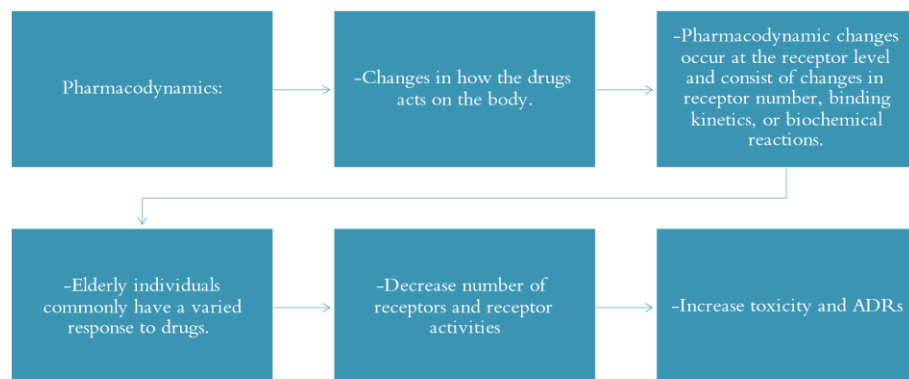
Physiological Changes Continues:

-Metabolism: Common method of drug elimination via the liver is decreased.

There is a significant decrease in hepatic oxidative enzyme activity with advancing age. This results in a prolonged half-life and greater drug accumulation for many pharmaceuticals.

-Excretion: A means of drug elimination from the body via the kidney. With aging, a significant loss of renal mass occurs, resulting in a decreased number and size of glomeruli. Renal blood flow is reduced significantly

Physiological Changes Continues:

Pharmacodynamics: → -Changes in how the drugs acts on the body. → -Pharmacodynamic changes occur at the receptor level and consist of changes in receptor number, binding kinetics, or biochemical reactions.

-Elderly individuals commonly have a varied response to drugs. → -Decrease number of receptors and receptor activities → -Increase toxicity and ADRs

Consequences Of Polypharmacy

Falls

Functional decline

Urinary incontinence

Cognitive impairment

Depression

Implications of Polypharmacy to Healthcare System, Family and Community

There is implications between polypharmacy, cost, morbidity, and mortality rates.

The estimated annual cost of prescription drug –related morbidity and mortality resulting from non-optimized medication therapy was $528.4 billion in 2016 U.S. dollars, with a range of $495.3 billion to $672.7 billion.

The average cost of an individual experiencing treatment failure (TF), new medical problem (NMP), or TF and NMP combined after initial prescription use were $2481 (range: $2233, $2742), $2610 (range: $2374, $2848) and $2572 (range: $2408, $2751), respectively.

The estimated annual cost of drug–related morbidity and mortality resulting from non-optimized medication therapy was $528.4 billion, equivalent to 16% of total U.S. health care expenditures in 2016 (Watanabe et al., 2018).

Implications continues

Increase re-admission and stress to family and care givers

Risk Factors for Elderly Polypharmacy

Factors that contribute to
polypharmacy in the elderly includes:
• Being in the age group 65 years and above
• Comorbidity
• Being retired
• Chronic illness
• Multiple prescribers
• Lack of deprescribing
• Dietary supplements

Risk Factors for Elderly Polypharmacy: Continues

Factors that contributes to polypharmacy: Continues

- Chronic mental health conditions
- Residing in a long-term care facility
- Poorly updated medical records
- Automated refill services
- Prescribing to meet disease- specific quality metrics

Risk Factors for Elderly Polypharmacy

Potentially inappropriate medications (PIMs) are a major concern in geriatric care.

Potentially inappropriate medications (PIMs) are drugs that should be avoided whenever possible in older adults because of their potentially poor benefit -risk ratio in old age. Polypharmacy and PIMs have been associated with an increased risk of ADRs, hospitalization and higher healthcare costs.

Collaborative plan

Develop collaborative plan to address patients with poor health literacy, language barrier of poor cognitive function to prevent effects of polypharmacy and adverse effects.

- Poor health literacy: Plan, nurses to utilize a teach back mechanism during discharge
- Language Barrier: Using a language interpreter line during interaction with patient
- Poor cognitive function: Involving family members during admission and discharge.

Encouragement patient and family to participate in medication –related decisions, and aids to increase their understanding of therapeutic aims and potential harms. Addressing low health literacy can provide an alternative, patient-centered approach for reducing polypharmacy.

Summary

In summary, Polypharmacy can lead to:

-Adverse drug reactions (ADRs)

-Drug to drug reactions

-Poor quality of life

-Multiple re-admissions and cost to the economy.

Appendix D: Summative Evaluation Tool for Staff Educational Program

1. Was the learning objective and outcome adequately presented?

      Yes_____ No_____

2. Was the learning outcome met?

      Yes_____ No_____

3. Was the delivery method effective? Are there aspects that could have been done differently?

_____

4. Which element of the presentation did you like the most?

_____

5. Were you satisfied with the quality of the content?

      Yes_____ No_____

6. Please indicate your satisfaction with the presenter/speaker.

      Very satisfied_____ Satisfied _____ Neither Satisfied nor Dissatisfied_____

7. Did the content presented meet your expectation?

      Yes_____ No_____

8. Did the staff education program meet your expectation?

      Yes_____ No_____

9. Do you feel the staff education program met its goals?

      Yes_____ No_____

10. Do you believe this staff education program had a direct impact on the facility?

      Yes_____ No_____