Medication Deprescribing at End of Life in the Long-Term Care Population

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Dedication

For Mom

Thank you for always believing the best of me, teaching me to reach for my dreams, and for giving me a rich heritage of faith. You are a Proverbs 31 woman. I love you.

Abstract

Polypharmacy, generally defined as taking five or more medications, is the leading cause of adverse drug events for older patients and affects as many as 95% of patients residing in long-term care. Nearly half of all patients nearing the end of their life takes ten or more medications per day. Deprescribing is the systematic reduction of inappropriate, unnecessary, or harmful medications by healthcare providers. Goals for deprescribing include improved patient outcomes, increased patient satisfaction, and enhanced patient safety. The purpose of this quality improvement project was to develop a systematic approach to medication reduction through deprescribing. The target population was hospice patients who reside in long-term care, as this patient population is at the highest risk for polypharmacy and adverse drug events. The project author educated the long-term care facility providers and pharmacists on the prevalence of polypharmacy and the benefits of deprescribing for this vulnerable population. Through interagency collaboration, the hospice nurse practitioner, hospice nurse, and facility pharmacist developed a system of regular medication reviews for the target patient population. This multidisciplinary team then made recommendations for deprescribing to the facility physician and nurse practitioner. The Doctor of Nursing Practice student collected data at regular intervals throughout the project implementation regarding the number of medications prescribed to each hospice patient. The outcome goal was a ten percent reduction in medications for hospice patients living in long-term care. Project outcomes showed a decrease in medications of sixteen percent from initial data collection to the end of the project.

Key words: deprescribing, polypharmacy, long-term care, hospice, end of life

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Chapter One: Overview of the Problem of Interest

Polypharmacy, defined as taking five or more medications (McNeil, Kamal, Kutner, Ritchie, & Abernethy, 2016), is the most common cause of adverse drug events (ADEs) for older patients, particularly those who reside in long-term care (LTC) facilities (Palagyi, Keay, Harper, Potter, & Lindley, 2016). Studies show that nearly half of patients who are nearing the end of life take ten or more medications (Morin, Vetrano, et al., 2017). Polypharmacy reduces perceived quality of life in the elderly population due to pill burden, early satiety, and medication side effects due to altered pharmacokinetics and pharmacodynamics (Morin, Vetrano, et al., 2017). The financial burden of polypharmacy extends to the cost of adverse events such as falls, hospitalization, and premature death (McGrath, Hajjar, Kumar, Hwang, & Salzman, 2017). Deprescribing, defined as the systematic reduction of inappropriate or unnecessary medications by a healthcare professional, leads to a decrease of ADEs, unwanted side effects, and financial burden, and improves outcomes for patients with life-limiting illness who reside in LTC (Reeve, Gnjidic, Long, & Hilmer, 2015).

Background Information

Problem identification. Polypharmacy is associated with adverse outcomes for patients of all ages and in all settings, but the frequency of ADEs nearly doubles for older patients residing in LTC (Garfinkel, Ilhan, & Bahat, 2015). Palagyi et al. (2016) note that patients who live in long-term care facilities comprise a “frail population with often complex health conditions” (Background section, para. 1), leading to polypharmacy for as many as 95% of these residents. Patients at the end of life are more likely to have an increased pill burden due to the accumulation of medications for the prevention of illness, treatment of acute and chronic diseases, and those prescribed for symptom management (McNeil et al., 2016). Garfinkel et al.

(2015) use the term inappropriate medication use (IMU) interchangeably with polypharmacy. They note that the number of medications prescribed to a patient may increase due to a prescription cascade, where prescribers give patients additional medications to combat the side effects of drugs they are already taking. There may also be a duplication of therapy that results from multiple specialists treating patients with complex and comorbid conditions (Garfinkel et al., 2015). Elderly patients with polypharmacy are nearly 20% more likely to be hospitalized for drug-related issues and have double the incidence of cognitive impairment when compared to patients taking less than five medications (Garfinkel et al., 2015). Palagyi et al. found that, for patients over the age of 75, medication-related events comprised 30% of all emergent hospital admissions, further compounding the issue of polypharmacy for those patients.

Quality of life is a crucial factor when evaluating IMU and polypharmacy, particularly for patients at the end of life who reside in long-term care. Patients with polypharmacy report poor quality of life related to pill burden and anxiety due to a higher risk of falls (Garfinkel et al., 2015). Morin, Todd, et al. (2019) note that terminally ill patients often take preventative medications into the last month of life, including antihypertensives, anticoagulants, statin medications, and oral hypoglycemics. The continuation of maintenance medications leads to a 30% increase in the average number of drugs taken in the final year of life and the proliferation of polypharmacy (Morin, Todd, et al., 2019). The financial burden of polypharmacy for patients with a terminal cancer diagnosis can be as high as $490 per patient for preventative medications alone (Morin, Todd, et al., 2019).

Description of problem. Deprescribing has emerged as a process of systematically identifying and discontinuing medications that are no longer necessary, effective, or appropriate to mitigate their negative impact on patient outcomes and quality of life (McGrath et al., 2017).

Deprescribing is a new phenomenon that is undergoing metamorphosis but is grounded in evidence-based research. Systematic reviews and meta-analysis of the concept have shown that patients who take fewer medications have improved cognition, reduced incidence of falls, and reduced ADEs while enjoying an increase in survival rates, medication adherence, and improved patient satisfaction (McGrath et al., 2017). Also, deprescribing reduces health care costs without increasing morbidity and mortality (McGrath et al., 2017).

Providing quality care for patients nearing the end of life is the mission of a non-profit hospice agency in southwestern North Carolina (NC). On average, 5% of the patients served by this agency reside in LTC facilities. These patients remain under the care of the facility provider, who may or may not have experience in end-of-life care. According to the independent pharmacy provider for the hospice agency, patients who reside in long-term care under hospice services take an average of 12 medications each, which is nearly twice that of patients living at home. Hospice providers do not have prescriptive authority in these facilities, and patients continue to bear the risk of ADEs and poor outcomes associated with polypharmacy.

Goals for deprescribing include improved patient outcomes, increased patient satisfaction, and enhanced patient safety for this specific patient population. As a non-profit community agency, the hospice organization must be diligent in maximizing cost savings wherever possible. The hospice agency currently pays a per diem rate for services provided by a contracted pharmacy based on each patient's medication profile. The reduction of inappropriate medications through deprescribing will offer savings to the organization through lower medication costs. Medication reduction also provides leverage for negotiating lower per diem rates with the pharmacy provider with a potential for as much as $5,000 in annual cost savings. The hospice agency and the long-term care facility may realize further cost savings with the

reduction of ADEs, including falls and unnecessary hospitalizations. The reduction of medications for this vulnerable population aligns with the goals of the Healthy People 2020 initiative to reduce the number of medicines taken by disabled older adults (U.S. Department of Health and Human Services [HHS], 2019). Finally, The Institute for Healthcare Improvement's (IHI) triple aim calls for improvement of the health of the general population, increased patient satisfaction with healthcare, and cost reduction, which is all accomplished through deprescribing (IHI, 2019b).

Significance of Clinical Problem

The purpose of this project is to reduce the number of medications prescribed for patients at the end of life who reside in LTC. Polypharmacy is a causative factor for ADEs, particularly for this vulnerable population. There is a sense of urgency to identify and eliminate inappropriate, unnecessary, and ineffective medications for patients under the care of hospice services who reside in LTC. Deprescribing is a useful tool to achieve improved patient outcomes, provide cost savings for both the hospice organization and the LTC facility, and adhere to government goals and maintain facility compliance with regulatory mandates.

Currently, there is no mechanism for collaboration between the facility providers and pharmacists and hospice providers. Patients and community partner organizations benefit from the development of an interagency, multidisciplinary, collaborative team focused on medication deprescribing. This project will provide a low-cost, high impact program that will be sustainable and reproducible for use in facilities and organizations beyond the project focus.

Question Guiding Inquiry (PICO)

An independent, non-profit hospice organization in southwestern NC has identified that their patients who reside in LTC are currently prescribed twice the number of medications, on

average, as homecare patients. These patients are at risk for ADEs related to polypharmacy. Additionally, the hospice organization and LTC facility bear the costs associated with the purchase and dispensing of medications used by their mutual patients. This cost may be higher than necessary if patients take medicines that are unnecessary or inappropriate. The hospice organization is interested in developing an educational program on deprescribing that facilitates collaboration and communication between the facility providers and pharmacist and hospice providers. The goal of this collaboration is to establish a system of appropriate deprescribing for hospice patients residing in LTC and reduce the number of medications prescribed to patients nearing the end of life in these facilities.

Population. The population selected for this project included the physician, nurse practitioner, and pharmacists who are employed by the LTC facility. The physician and nurse practitioner have prescribing privileges, and the pharmacist conducts medication reviews as a regular part of her workday. These healthcare professionals are experts in long-term care but do not necessarily have experience in end of life care.

Intervention. The intervention was an educational session in which the hospice provider presented evidence-based research on the risks of polypharmacy and the benefits of deprescribing. The DNP student gave the presentation at the LTC facility, with a light snack provided for participants. Each participant received a professionally bound resource manual containing the information presented at the session in addition to a guideline for deprescribing and contact information for the presenter. Participants were given a project data collection tool at the start and conclusion of the educational session to assess each participant's willingness to deprescribe based on the information presented.

Comparison. Currently, hospice patients who reside in LTC facilities are prescribed twice the number of medications as homecare patients, according to the pharmacy vendor contracted by the hospice organization. Greater than 90% of all the patients under the care of the hospice organization have medication regimens that qualify as polypharmacy. Healthy People 2020 had a goal of a 10% reduction of inappropriate medications for disabled older adults (HHS, 2019). The IHI (2019b) Triple Aim addressed improved experience with healthcare while improving the health of a population and reducing the costs of healthcare. This project assisted the facility providers and pharmacist in identifying medications that were appropriate for deprescribing and facilitated the LTC agency in complying with governmental mandates and goals. This DNP project also contributed to risk avoidance and financial benefit related to a reduction in ADEs and their associated costs. Finally, medication reduction through deprescribing has the potential to promote cost savings for the hospice organization through both a decrease in the number of medications provided and contracted savings with the pharmacy vendor.

Outcomes. The benefit of the successful implementation of this project was three-fold: First, it demonstrated a 10% reduction in unnecessary, inappropriate, or ineffective medications for the hospice patient residing in the LTC facility. The reduction of polypharmacy leads to improved patient satisfaction, perceived improvement in quality of life, and avoidance of unnecessary suffering related to ADEs. Second, the project strengthened community partnerships and provided for interagency/interprofessional collaboration. Finally, the project assisted the LTC facility and the hospice agency in meeting government goals set forth by the IHI and Healthy People 2020 and contributed to overall cost savings related to the reduction in medications and ADEs.

Summary

Polypharmacy and deprescribing are essential concepts for patients who are at the end of life, particularly for the long-term care population. Polypharmacy, described as taking five or more medications, predisposes patients to a higher risk of adverse drug events, including falls, cognitive impairment, unplanned hospitalization, and premature death. Deprescribing is a systematic reduction of unnecessary, inappropriate, or ineffective medications. There is a growing body of evidence regarding the importance of deprescribing, particularly for patients with complex health issues who are nearing the end of life. Reducing medications leads to improved quality of life by minimizing pill burden and reducing drug to drug interactions. The reduction of ADEs benefits the patient through risk avoidance and the facility through cost savings. A well-structured, evidence-based presentation offered to facility providers and pharmacists on deprescribing for patients residing in LTC who are at the end of life provided a platform for interprofessional collaboration. A project data collection tool assessed the willingness of project participants to deprescribe identified specific medication categories appropriate for deprescribing and developed a channel for ongoing communication and education between the participating agencies. The project goal was to educate 100% of the LTC facility providers and pharmacists, with a secondary goal of a 10% reduction in unnecessary medications prescribed to hospice patients residing in the LTC facility. The benefits of the project included cost savings and regulatory compliance for the LTC facility through a reduced number of ADEs and cost savings for the hospice organization through a reduction in the actual number of medications purchased for our mutual patients. The real winner in this project is the patient, who will realize improved outcomes and a better quality of life as a result of appropriate deprescribing.

Chapter Two: Review of the Literature

The foundation of effective change in healthcare is to identify gaps for which there is clear evidence of need followed by specific interventions with demonstrated benefit to address the deficit. Polypharmacy, defined as taking five or more medications, has been shown to affect over 80% of patients aged 65 or older residing in LTC (Paque, Elseviers, et al., 2019). The goal of deprescribing for patients who live in LTC facilities and are under hospice care is to improve quality of life for the patient, reduce the risk of ADEs, and reduce costs for the facility and the hospice organization.

A comprehensive literature search revealed the current body of knowledge regarding polypharmacy and deprescribing, specifically as it applies to patients who are nearing the end of life and reside in LTC. There is a rich body of research documenting the significant risks associated with unnecessary and inappropriate medication use, yet guidelines for deprescribing are just beginning to emerge in the literature. The most complex patients, including LTC patients in hospice, pose additional challenges for deprescribing. There is currently no consensus as to the most appropriate way to achieve medication reduction for this population.

Literature Appraisal Methodology

Sampling strategies. Using East Carolina University's Laupus Health Science library's one-search feature, the author searched PubMed, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Google Scholar databases. The terms polypharmacy, deprescribing, medication reduction, guidelines, preventative medications, inappropriate medications, end of life, hospice, long term care, and nursing home were used for the initial search, yielding 4,279 items, 3,525 of which were journal articles. The author narrowed the search using medical subject headings (MeSH) terms including medicine, pharmacy, therapeutics, pharmacology,

public health, nursing, and anatomy/physiology and further restricted using criteria of scholarly/peer reviews and English language, with 268 items remaining. The final criteria used to limit the search was five-year recency, yielding 180 publications. Ongoing search strategies include the use of PubMed's NCBI for relevant resources to be sent to the provided email address.

Evaluation criteria. The author used the preferred reporting items for systematic reviews and meta-analysis (PRISMA) model to organize publications for inclusion and exclusion in the literature review (Moher, Liberati, Tetzaff, & Altman, 2009). In addition to the 180 articles found in the search described above, there were 18 publications included from other sources. In all, there were eight duplicate articles, for a total of 190 articles that met the criteria for screening. Of these 190 articles, 143 were excluded based on title and abstract, with exclusion criteria focusing on participants residing in the community rather than LTC. Some studies were excluded based on their focus on community primary care providers instead of providers caring for patients in facilities. Of the 47 articles remaining, 22 were too narrowly focused on a single disease process, specific adverse events, or attitudes of members of the healthcare team and therefore excluded. The project author excluded four articles that were study protocols for incomplete research. A total of 21 articles met the criteria for inclusion in the literature review, with the focus on patients residing in LTC with life-limiting disease and polypharmacy (see Appendix A).

Next, the author sorted articles by the strength of evidence using Melnyk Levels of Evidence (Melnyk & Fineout-Overholt, 2015). The highest level of evidence, denoted as level 1, is reserved for systematic reviews and meta-analysis of randomized controlled trials (RCTs) (Melnyk & Fineout-Overholt, 2015). Subsequent levels of evidence include level 2 indicating a

study based on one or more RCTs, level 3 denoting controlled trials without randomization, and level 4 evidence given to case-control or cohort studies (Melnyk & Fineout-Overholt, 2015). Systematic reviews of qualitative or descriptive studies are found in level-5 evidence, according to Melnyk and Fineout-Overholt (2015), with level 6 evidence given to a single qualitative or descriptive study. The final level of evidence, as described by Melnyk and Fineout-Overholt, is reserved for articles based on expert opinion.

Of the 21 articles included in the literature review, two met the highest level of evidence, level 1, as systematic reviews with meta-analysis. One study was a controlled trial without randomization, which reached the evidence criteria for level 3. Two studies were level 4 evidence, one a case-control, and one a cohort study. Six of the 21 articles selected were systematic reviews of qualitative studies, making them a level 5 for the strength of evidence. Five articles were based on a single qualitative or descriptive study, reflecting level 6 evidence, according to Melnyk and Fineout-Overholt. The last five articles, based on expert opinion, were assigned level 7 in the hierarchy of evidence (see Appendix B).

Literature Review Findings

The body of evidence surrounding polypharmacy and deprescribing has grown exponentially in the past several years. There are now systematic reviews and meta-analyses of multiple RCTs looking at polypharmacy in older patients, specifically those residing in long-term care (Kua, Mak, & Lee, 2019; Page, Potter, Clifford, & Etherton-Beer, 2016). These patients often have complex health issues, multiple comorbid conditions, and are nearing the end of life. For this patient population, the correlation between polypharmacy and adverse drug events is well documented and reduces the quality of life (Schenker et al., 2019).

In their systematic review and meta-analysis on deprescribing for older residents of nursing homes, Kua et al. (2019) evaluated 41 RCTs looking at polypharmacy and associated adverse events, including mortality, falls and hospitalizations and the impact of deprescribing on patient outcomes. Fourteen studies included discontinuation of medications by various health care team members, namely physicians, pharmacists, and nurses. Eleven studies involved the use of evidence-based criteria, such as the Beers criteria, or tools such as the Screening Tool to Alert doctors to Right Treatment/Screening Tool of Older Person's Prescriptions (START/STOPP) for medication reduction (Kua et al., 2019). The authors concluded that a systematic approach to deprescribing, whether done by providers or pharmacists, reduced the risk of ADEs for elderly patients residing in LTC (Kua et al., 2019).

Deprescribing for the older population was the focus of the systematic review and meta-analysis performed by Page, Potter, Clifford, and Etherton-Beer (2016). These researchers were interested in identifying a balance between the risks and benefits achieved through a systematic approach to deprescribing for this particularly vulnerable population (Page et al., 2016). The negative impact of polypharmacy found by the authors of this study included frailty, exhaustion, falls, cognitive impairment, disability, reduction in functional status, and death (Page et al., 2016). The authors included a total of 116 studies in their review, with the findings reported as minimal adverse effects from deprescribing, with a reduction in the number of ADEs for patients taking few medications (Page et al., 2016).

The controlled trial conducted by Farrell, Richardson, et al. (2018) utilized a survey to assess the effectiveness of evidence-based guidelines in assisting physicians, nurse practitioners, and pharmacists to develop the practice of deprescribing for their patients in LTC. Four surveys were distributed to the participants over time, with respondents indicating the level of

effectiveness the deprescribing guidelines had on their prescribing/deprescribing practice (Farrell, Richardson, et al., 2018). These authors concluded that offering prescribers guidelines for deprescribing assisted the individual clinician in developing a systematic approach to medication reduction (Farrell, Richardson, et al., 2018).

One of the two studies that demonstrated level 4 strength of evidence included a cohort study that looked at prescribing practices for patients residing in LTC whose goals of care changed from prevention to symptom management (van der Meer, Taxis, & Pont, 2018). Their findings demonstrated little change in the number of medications taken by patients in the last year of life (van der Meer et al., 2018). While patients had a modest increase in medications prescribed for end of life symptoms, one-third of patients remained on preventative medicines at the time of death (van der Meer et al., 2018).

The second level 4 study was a case-control study comparing the use of the Screening Tool of Older Persons Prescriptions in Frail adults with limited life expectancy (STOPPFrail) tool with systematic deprescribing done by trained geriatricians (Curtin, Jennings, et al., 2019). Using standardized clinical cases for older patients with multiple comorbidities, the authors compared the results of deprescribing completed by geriatric specialists to non-specialists utilizing the STOPPFrail tool (Curtin, Jennings, et al., 2019). The conclusion reached was that the STOPPFrail tool was a safe and effective alternative to consulting specialists to guide deprescribing in this patient population (Curtin, Jennings, et al., 2019).

Six studies included in the literature review were systematic reviews of qualitative studies. The focus of each systematic review was unique but connected to the issues of polypharmacy, deprescribing, and hospice patients who reside in LTC. Farrell, Pottie, et al. (2016) looked at the efficacy for the use of a systematic 8-step process to develop evidence-

based guidelines for deprescribing of class-specific medications. They concluded that the use of a systematic method to develop guidelines for discontinuing inappropriate medications reduces the risk of harm to the patient and aids the clinician in making complex clinical decisions regarding pharmacology (Farrell, Pottie, et al., 2016).

Jokanovic, Tan, Dooley, Kirkpatrick, and Bell (2015) conducted an International, cross-sectional systematic review looking at the frequency of polypharmacy for patients residing in LTC and subsequent outcomes related to medication usage. The authors found that up to 91% of patients living in LTC took five or more medications, with as many as 65% taking ten or more (Jokanovic et al., 2015). They concluded that, although there is a wide variation of polypharmacy depending on patient location, the larger the number of prescribed medications, the higher the risk for ADEs (Jokanovic et al., 2015).

Paque, Vander Stichele, et al. (2019) conducted a systematic review of the literature to identify barriers and enablers associated with deprescribing for patients with a life-limiting disease. Five descriptive studies used in the analysis showed that reduced staffing and patient/family resistance to deprescribing were barriers to medication reduction (Paque, Vander Stichele, et al., 2019). Paque, Vander Stichele, and colleagues found that multidisciplinary teams and organizational support were the most significant enablers of deprescribing for the selected population.

The use of preventative medications for patients nearing the end of life was the focus of a systematic review done by Poudel, Yates, Rowett, and Nissen (2017). Their investigation revealed that patients continue to be prescribed medications for reasons other than symptom management at the end of life (Poudel et al., 2017). They concluded that few rigorous studies

looked at the reduction of preventative medications for patients with life-limiting illness and called for further studies to address this gap in research (Poudel et al., 2017).

One systematic review conducted by Thompson et al. (2019) looked at 15 different tools available for guiding clinicians in deprescribing medications for older patients with a life-limiting illness. There were three distinctive types of tools, including a framework for deprescribing, an outline for a comprehensive evaluation of an entire medication list, and tools that were medication-specific (Thompson et al., 2019). The authors concluded that many of the instruments were developed using expert opinion or clinical experience, and only four have undergone clinical testing with low-quality studies, revealing the need for more rigorous studies to validate the outcomes of their use (Thompson et al., 2019).

Todd et al. (2017) conducted a systematic review of qualitative studies looking at the prescribing of preventative medications for patients with life-limiting illnesses. The authors used the Beers criteria, STOPP criteria, Delphi consensus, and expert clinical opinion to assess the appropriateness of drugs prescribed to patients at the end of life (Todd et al., 2017). They found a lack of standardized guidelines for deprescribing of medications for patients with a limited life expectancy (Todd et al., 2017). Todd and his colleagues concluded that there is a need for guidelines to assist in deprescribing preventative medications for elderly patients with a life-limiting illness.

Six of the studies that met the criteria for inclusion in this literature review were single qualitative studies. Dees et al. (2018) conducted a survey of the perspectives of patients, family members, nurses, and providers regarding medication management at the end of life. The goal was to encourage patient-centered, multidisciplinary management of medications for patients with a life expectancy of three months or less (Dees et al., 2018). The authors concluded that

patient goals and preferences are central to effective medication management at the end of life and called for guidelines that incorporate a multidisciplinary, interdisciplinary approach to pharmacotherapy (Dees et al., 2018).

McNeil, Kamal, Kutner, Ritchie, and Abernethy (2016) conducted a secondary analysis of a prospective trial looking at the number and types of medications prescribed to patients at the end of life. They found that patients with limited life expectancy took, on average, 10.7 prescriptions at the time of their death (McNeil et al., 2016). The authors recognized that some of the medications were for symptom management, but that many were for the management of non-life-threatening diseases (McNeil et al., 2016).

Provider attitudes are crucial in successful medication reduction according to research on the barriers to deprescribing for patients in LTC (Palagyi, Keay, Harper, Potter, & Lindley, 2016). The authors of this study conducted focus groups and interviews with nursing staff, patients, family members, pharmacists, and providers to uncover factors that inhibit the reduction of polypharmacy (Palagyi et al., 2016). Palagyi and her colleagues concluded that provider attitudes are central to successful deprescribing for patients in LTC, as is education to promote acceptance of medication reduction by patients and their families.

Assessing the risks and benefits of medications taken by patients who reside in LTC and have a life-limiting illness will lead to appropriate deprescribing and improve quality of life, according to Paque, Elseviers, et al. (2019). In this study, the STOPPFrail criteria were employed for deprescribing for patients nearing the end of life who reside in LTC (Paque, Elseviers, et al., 2019). The authors concluded that, although overall medication usage remained high, patients for whom deprescribing occurred saw a reduction in the use of potentially inappropriate medications (Paque, Elseviers, et al., 2019).

Schenker et al. (2019) developed a secondary analysis of medication data from an RTC on the discontinuation of statin medications. The authors of this study focused on the correlation between polypharmacy, symptoms, and quality of life for patients with life-limiting illnesses (Schenker et al., 2019). The result of the analysis showed that, for patients who are nearing the end of life, polypharmacy contributes to significant symptom burden and reduced quality of life (Schenker et al., 2019). They concluded that there must be a focus on the symptoms caused by medications and a collaboration between health care providers and patients to reduce polypharmacy and improve quality of life (Schenker et al., 2019).

The final five studies that met the criteria for inclusion in this literature review are the lowest level of evidence-based on expert opinion or consensus. Conklin, Farrell, and Suleman (2019) wrote about the challenges and benefits of using guidelines to conduct deprescribing. Based on the Bruyere Evidence-Based Deprescribing Guideline Symposium convened in March 2018, the authors outlined the proceedings of the symposium (Conklin et al., 2019). In addition to articulating the barriers and facilitators identified by participants, they described ideas for future implementation that address the attitudes, concerns, and benefits of using guidelines to inform the practice of deprescribing medications (Conklin et al., 2019).

Garfinkel, Ilhan, and Bahat (2015) wrote a lengthy expert opinion paper on the benefits of reducing medication for the oldest, most frail patients with limited life expectancy. They used research to support their passionate call for providers to systematically review and reduce medications for this vulnerable population (Garfinkel et al., 2015). They concluded that more research is needed to develop appropriate deprescribing tools for patients nearing the end of life (Garfinkel et al., 2015).

McGrath, Hajjar, Kumar, Hwang, and Salzman (2017) used case studies and a 4-step process to encourage deprescribing as a means for the reduction of polypharmacy. The authors identified practice goals, including avoidance of inappropriate medications for elderly patients to reduce ADEs, discontinuation of drugs whose risk ratio outweighs the benefits, and utilizing Beers and STOPP/START criteria as guidelines for deprescribing (McGrath et al., 2017). The authors assert that a reduction of polypharmacy improves the quality of life and requires patient participation for success (McGrath et al., 2017).

The International Group for Reducing Inappropriate Medication Use & Polypharmacy (IGRIMUP) published a position paper with recommendations for the reduction of polypharmacy in July 2018 (Mangin et al., 2018). The group identified polypharmacy as an urgent health care issue and calls upon a global effort to make fundamental changes to health care systems to provide better care to patients with complex illness and multiple comorbidities (Mangin et al., 2018). Although the Beers criteria and STOPP/START tools are not validated, the peer group endorsed the use of these computerized tools to aid with systematic deprescribing (Mangin et al., 2018). Mangin and colleagues (2018) concluded that a patient-centered approach is the most effective way to achieve a reduction in inappropriate medication use and polypharmacy (IMUP), which they term an "epidemic of iatrogenic morbidity and mortality" (p. 583).

Finally, the emphasis on safe medication prescribing practices extends beyond the borders of our state, or even our nation. The World Health Organization (WHO) (n.d.) has issued a patient safety challenge to address avoidable medication errors and mitigate the risk of ADEs for people around the world. Known as *Medication without Harm*, the WHO campaign calls for healthcare professionals around the world to take actions that will reduce the risk of harm from

medication errors and promote safe prescribing and consumption of appropriate medications for all citizens, regardless of their place of residence (WHO, n.d.). Embedded in this challenge is a strategic framework for addressing polypharmacy as one of the three key action areas (WHO, n.d.). The goal of this challenge is to reduce the harmful effects of avoidable medication errors and ADEs by 50% in the next five years (WHO, n.d.).

Limitations of Literature Review Process

Useful tools to assist primary providers with reducing inappropriate, unnecessary, or harmful medications for patients at the end of life are just beginning to emerge in the literature. Multiple disciplines have contributed to the body of knowledge regarding the benefits of deprescribing for patients nearing the end of life, including nursing, medicine, and pharmacology. Still, there remains a lack of consensus on the appropriate methods to address polypharmacy in the frail, elderly residents of LTC (Palagyi et al., 2016). There is a need for guidelines to assist with the complex decision-making required to deprescribe medications for patients with multiple comorbidities who are nearing the end of life (Curtin, Dukelow, et al., 2019; Thompson et al., 2019).

Until recently, tools for deprescribing focused on the reduction of medications for a single disease process rather than complex, multimorbid conditions. Criteria developed for a comprehensive medication review, including the Beers and STOPPFrail criteria, have not been validated using randomized controlled trials (RCTs) (Thompson et al., 2019). Thus far, no one has published a longitudinal study demonstrating the long-term effectiveness of deprescribing on patient outcomes (Farrell, Pottie, et al., 2016). Few studies quantify the financial benefit of deprescribing for the patient and facilities. Still, the cost-benefit of preventing one ADEs and the avoidance of physical and emotional pain for the patient contribute to the overall advantage of

systematic deprescribing. Finally, many of the studies included in this literature review were conducted internationally without validation regarding the applicability of the results to the United States health care system.

Discussion

Conclusion of findings. Patients under the care of hospice services who reside in LTC facilities are vulnerable to polypharmacy, typically defined as taking five or more medications (Jokanovic et al., 2015). Polypharmacy correlates with a reduced quality of life for these patients, increased morbidity related to adverse drug events (ADEs), decreased functional status, increased hospitalization, and premature death (Jokanovic et al., 2015). Deprescribing is a systematic method used to identify and eliminate unnecessary, inappropriate, or harmful medications to improve patient outcomes (Page et al., 2016). Although research on deprescribing for complex, multimorbid patients at the end of life is still emerging, there is a substantial body of evidence that deprescribing does not cause harm and leads to risk reduction and improved functioning for patients residing in LTC (Kua et al., 2019). Providers and staff must take the time to engage patients and their family members to educate them on the risks and benefits of cessation of individual medications and obtain consensus for medication reduction from patients and their surrogate decision-makers (Dees et al., 2018).

The goal of this DNP project was to share with facility providers and pharmacists the most current body of knowledge regarding appropriate medication deprescribing for patients under hospice care who reside in LTC. These providers hold prescriptive authority over hospice patients who live in their facility, and the pharmacist performs regular medication reviews, making them integral to the task of deprescribing. The project fostered collaboration between the participating agencies and bolstered support for adopting a systematic method of medication

reduction based on the latest studies and guidelines. Through promoting of interagency and interprofessional collaboration, this DNP project provided support for the systematic review of medications for all hospice patients residing in LTC, improved quality of life for the patients, increased regulatory compliance for the facility, and reduced costs related to polypharmacy for both agencies.

Advantages and disadvantages of findings. The benefits to the reduction of polypharmacy for LTC residents nearing the end of life are abundant in the literature. Studies show that deprescribing unnecessary and inappropriate medications lead to the mitigation of risks related to ADEs and improved quality of life (Kua et al., 2019). Elimination of unnecessary medicines reduces falls, improves cognition, improves overall functioning, and promotes a sense of well-being for the patient (McNeil et al., 2016; Schenker et al., 2019). Other advantages include decreased costs for the LTC facility, as their staff will be responsible for dispensing fewer medications. Studies support a reduction in ADEs related to deprescribing of inappropriate or unnecessary medications, which will save money and increase compliance with regulatory mandates (Garfinkel et al., 2015).

For the hospice agency, deprescribing reduces the overall cost of medications that the agency provides for the patient in collaboration with the LTC facility's pharmacy vendor. There is also an incentive to reduce the total number of drugs used by hospice patients to meet the hospice agency's targeted goal for reduction of medications per capita and create leverage for overall cost reductions with the hospice contracted pharmacy provider. Equally as important, there is an opportunity to develop interagency and interprofessional collaboration and strengthen community partnerships.

The disadvantage to this chosen intervention is the possibility that providers will not see the benefit in attending the educational session, or that they may be resistant to changing their prescriptive practices. The providers and pharmacist at the LTC facility are very busy professionals whose time is valuable. The author's challenge was to convey the importance of this intervention to facility providers and to engage the physician, nurse practitioner, and pharmacist so that they embraced the value of deprescribing and chose to incorporate this new task in their daily routine. The measure of success for this project was a reduction in the number of inappropriate, unnecessary, or harmful medications prescribed to each hospice patient residing in the LTC facility.

Utilization of findings in practice change. There is a growing body of literature that supports the concept of deprescribing for patients under hospice care who reside in LTC facilities. The benefits of reducing polypharmacy and eliminating unnecessary and inappropriate medications are improved quality of life, reduced adverse drug-related events, and improved mobility and functioning (Garfinkel et al., 2015). The planned intervention was an educational session for the facility physician, nurse practitioner, and pharmacist regarding deprescribing for hospice patients residing in LTC. The author conducted an educational session at the LTC facility site in southwestern NC. The author and LTC project lead/administrator collaborated to choose a date for the project intervention based on the availability of the providers and the pharmacist.

A pre- and post-session survey to collect project-specific data from participants, including the likelihood that the participant will deprescribe medications for hospice patients under their prescriptive authority as a result of the educational session, was included in the project plan. The survey explored the willingness of participants to deprescribe specific

categories of medications that may be harmful, inappropriate, or unnecessary for hospice patients. A reference guide containing resources, including tools and guidelines for effective deprescribing, was provided to each participant at the end of the educational session.

Throughout the project implementation phase, the author made regular visits to the facility to provide support and foster communication between the collaborating agencies, until the world-wide pandemic, COVID-19, impacted the project. After the LTC facility implemented restrictions to visitation due to COVID-19, the project author contacted the participants via online platforms, conference calls, electronic mail, and cell phone texts. The project author collected data on the number and type of medications prescribed before and after the intervention using the hospice electronic medical record (EMR). Once data was analyzed, the author presented the results to project participants at both participating agencies via online meeting platforms, including Microsoft Teams and Zoom.

Summary

Patient satisfaction and quality of life are the main emphases of this quality improvement (QI) project; however, containment of healthcare costs is an essential consideration. A reduction in the number of unnecessary and inappropriate medications taken by patients nearing the end of life who reside in LTC reduces falls, improves cognition, and improves functionality. Each fall prevented, or hospitalization avoided as a result of reduced polypharmacy yields cost savings for the facility and hospice organization. There is also the benefit of reduced human suffering for the patient. Additional considerations include savings on labor when facility staff dispense fewer medications and a reduction in the gross cost of medicines for hospice.

The IHI Triple Aim seeks to improve the health of a specific population and the population in general, reduce healthcare costs, and improve satisfaction for individuals who are

consumers of healthcare (IHI, 2019b). This DNP project meets each arm of the Triple Aim by reducing the number of unnecessary medications taken by hospice patients who reside in LTC. Medication reduction improves the quality of life, reduces the risk for adverse drug events, and reducing health care costs through the elimination of unnecessary medication costs and avoiding expenses related to ADEs. The reduction of unnecessary medications in older adults with disabilities is one of the Healthy People 2020 measures (HHS, 2019). One goal of Healthy People 2020 is a 10% reduction in unnecessary medications in this patient population, which coincides with the anticipated outcomes for this DNP project.

Chapter Three: Theory and Concept Model for Evidence-based Practice

Deprescribing to reduce polypharmacy for patients nearing the end of life who reside in long-term care facilities requires careful consideration to minimize negative consequences. Effective communication regarding the risks and benefits of deprescribing must occur to reach a consensus among the prescriber and the patient or surrogate decision-maker and achieve an improved quality of life for the patient (Palagyi et al., 2016). Theoretical frameworks and evidence-based practice models form the foundation for effective communication to achieve lasting change. Everett M. Rogers (1995) developed a conceptual framework known as diffusion of innovations that uses the principles of behavioral science to guide effective change within organizations. Kurt Lewin is a psychologist whose evidence-based theory of planned change also guides the principles necessary to motivate individuals and organizations to undertake the effort needed to move from the status quo through change to create a new normal that is both positive and enduring (Oberleitner, 2019).

Concept Analysis

The literature defines deprescribing as a systematic approach to medication reduction that eliminates unnecessary, harmful, or inappropriate medications to achieve improved patient outcomes (Page et al., 2016; Palagyi et al., 2016). The concept of deprescribing has emerged in response to the ever-increasing evidence of the adverse outcomes associated with polypharmacy (Paque, Elseviers, et al., 2019). Polypharmacy, the antecedent to deprescribing, is generally defined as taking five or more medications or taking any medication that is ineffective, inappropriate, or unnecessary (McGrath et al., 2017). Polypharmacy contributes to reduced quality of life and increased risk for ADEs, particularly for patients who are nearing the end of life (McNeil et al., 2016).

Deprescribing has several key attributes that define the concept, including patient-centered care, patient safety, perceived quality of life, and complexity of care. At the center of deprescribing is the idea of patient-centered care. Garfinkel et al. (2015) found that open communication with patients regarding the risk and benefits of ongoing medication use was at the core of effective deprescribing. This patient-centered approach, which embraces the individual's goals of care, fosters shared decision-making and promotes the perception of improved quality of life among patients with a limited life expectancy who reside in long-term care (Palagyi et al., 2016). Multiple comorbidities and complex health issues lead to polypharmacy and a higher risk of ADEs in the selected patient population (Kua et al., 2019). As patients near the end of life, reducing polypharmacy that contributes to ADEs through systematic deprescribing enhances patient safety and improves the quality of life (Paque, Elseviers, et al., 2019).

The attributes of deprescribing also define some of the challenges and barriers to achieving medication reduction, particularly for patients who reside in long-term care and are nearing the end of life. Paque, Vander Stichele, et al. (2019) identified barriers to deprescribing for this specific patient population on three levels, including organizational, professional, and patient/family-related barriers. Effective deprescribing for patients with complex health issues requires time and resources, embracing an interdisciplinary, patient-centered approach to evaluation and decision-making (Palagyi et al., 2016). Patients and surrogate decision-makers are often reluctant to stop medications prescribed by trusted providers and may view deprescribing as giving up hope. Current providers must devote time to effectively communicate the risks and benefits of deprescribing to promote patient safety and improved quality of life (Palagyi et al., 2016).

Empirical referents for the concept of deprescribing include an understanding of the individual patient's goals of care, systematic medication reviews, effective communication among providers and patients, and a willingness to stop any unnecessary medications. Essential to the process of effective deprescribing is an interdisciplinary review of medication lists for each patient. The ideal team includes nursing staff, pharmacists, and providers (McGrath et al., 2017). Communication between the provider and patient or surrogate decision-maker is essential to understanding the goals of care, patient preferences, and openness to deprescribing (Conklin et al., 2019). Shared decision-making is central to the concept of deprescribing and must include discussions of the risks and benefits of deprescribing specific medications to overcome barriers to medication reduction

Theoretical Framework

Naming the Theory. Everett M. Rogers' (1995) theory, diffusion of innovations, provides the conceptual framework for this project. Rogers, a behavioral scientist, first published his theory on dissemination and infusion of innovative ideas into various social systems in 1962 (Rogers, 1995). Through his ongoing work and an ever-increasing body of research by fellow behavioral scientists on innovation diffusion, Rogers has refined his theory to focus on communication as the catalyst for information exchange that leads to changes within various cultures. Known as the innovation-decision process, Rogers' framework for his diffusion theory provides a five-step process that defines the movement from awareness of an idea to the incorporation that idea into the daily workings of an individual or organization (Rogers, 1995).

The five steps in the innovation-decision process of diffusion theory include knowledge or awareness of an innovative concept, persuasion which defines one's attitude toward the new idea, and a decision regarding whether to embrace or reject the change (Rogers, 1995). Once the

new concept is accepted, the final two steps of the process, implementation and confirmation, begin, and the idea is incorporated and evaluated for ongoing use (Rogers, 1995). Rogers acknowledges that the movement from awareness to the incorporation of new ideas is a process over time, which he calls the innovation-decision period. The timeframe for incorporating new ideas, termed the rate of adoption, varies depending on the complexity of the issues and the culture of the organization. Organizations or individuals that favor the early adoption of new ideas demonstrate a rapid diffusion of innovative concepts. Those with a higher number of late adopters may require more time and effort to communicate the benefits of innovation and to convince decision-makers that the change is beneficial and that the new idea is worth adopting (Rogers, 1995) (see Appendix C).

Application to practice change. The five-step innovation-decision process that defines Rogers' framework for the diffusion of ideas guided the development and implementation of this DNP project on deprescribing for hospice patients residing in LTC. The providers and pharmacists who participated in the educational session were familiar with the concept of deprescribing. The author's task was to provide enough information during the intervention to compel the project participants to rethink their prescribing practices and focus on appropriate medication reduction for patients under hospice care. Effective communication was essential to leading these busy professionals through the steps necessary to view the commitment to review medications and systematically deprescribe as a valuable use of their time. Providing tools to streamline the implementation of the deprescribing process assisted in minimizing the time needed to perform this new task.

After the educational session, the facility pharmacist and hospice nurse practitioner conducted periodic medication reviews and communicated deprescribing recommendations to

the facility providers. Next, the author collected data on the number of medications prescribed to hospice patients in the LTC facility, to assess the physician and nurse practitioner's deprescribing practices and offer feedback and support regarding appropriate medication reduction. This process supported Roger's steps of implementation and confirmation. The goal was to confirm the value of their decision to incorporate deprescribing into their routine.

Barriers identified by the author were addressed in the second step of the process, using persuasion to convince providers to adopt the practice of deprescribing. Throughout this process, the DNP student addressed concerns that prevented project participants from moving forward with new prescribing practices. Frequent follow up allowed for ongoing communication to support those who were early adopters of the project and address the concerns of later adopters who require additional persuasion to embrace the value of deprescribing. This systematic approach to introducing change provided structure for the process and allowed for effective communication to optimize the opportunity for successful project outcomes.

Evidence-Based Practice Change Theory

Naming the Change Model. Change for many people creates uncertainty and disequilibrium, often meeting with resistance and skepticism, even among those who may benefit most. Kurt Lewin, a German psychologist, proposed a systematic method of planned change in 1951 (Oberleitner, 2019). Lewin's planned change theory suggests that impulsive or chaotic change breeds a sense of uncertainty, anxiety, and loss of control among workers, but that a systematic process can lead to improved functioning with minimal disruption (Oberleitner, 2019). Lewin's change model states that there must be a recognition of the need for change, momentum to push toward a new way of operating, and stabilization of the new process for

transition to be successful. He terms this three-step process unfreezing, movement, and refreezing (Oberleitner, 2019).

Included in Lewin's theory for successful change are the concepts of field and forces (Oberleitner, 2019). Fields are systems of any type, and Lewin notes that a change in one part of the system necessitates an assessment of the whole system to determine the overall effect of that change (Oberleitner, 2019). Forces, as used in the theory of planned change, include both driving and restraining forces (Oberleitner, 2019). Oberleitner (2019) characterized driving forces as having strength, focus, and movement toward change. In contrast, restraining forces are anything or anyone that seeks to maintain the status quo and impede change (Oberleitner, 2019).

In Lewin's model, driving forces must overcome restraining obstacles to achieve the first step of unfreezing the status quo (Oberleitner, 2019). Movement occurs during the second phase, which is the adoption of the new process. The final step of refreezing occurs when a new equilibrium that includes the change is reached (Oberleitner, 2019). Lewin's model acknowledges that emotions of discomfort, anxiety, and loss of control often accompany change and that a planned approach minimizes and overcomes emotional barriers to change (Oberleitner, 2019). By assuming that there will be resistance to change, Lewin's theory promotes the identification of system-specific obstacles to implementing new concepts, allowing change agents to address those issues as a part of the change process (Oberleitner, 2019).

Application to practice change.

Lewin's planned change theory provided a useful model for this DNP project. First, the author identified the need for a change in prescribing practices for patients who reside in long-term care and are nearing the end of life. It was imperative that prescribers and pharmacists who care for those patients also see the need to address the issue of polypharmacy. Once they agreed

with the need for change, unfreezing of current prescribing practices could occur. Next, there must be a movement toward change. The catalyst for this movement was the implementation of the project intervention, an educational session provided for the facility physician, nurse practitioner, and pharmacist on the body of research supporting deprescribing and the use of evidence-based tools to assist providers in appropriate deprescribing (see Appendix D).

To effectively implement the desired change in prescribing practice, the author evaluated the steps of unfreezing, movement, and refreezing using the plan-do-study-act (PDSA) cycle (IHI, 2019a). PDSA provides a framework for quick evaluation of quality improvement efforts to identify the progress of the change, adjust the process to address barriers and gaps, and reevaluate for effectiveness in meeting the stated goal (see Appendix E). The PDSA cycle was used biweekly during the implementation period to evaluate the effectiveness of the educational session and subsequent medication reviews, as evidenced by a change in the number of inappropriate or unnecessary medications in seven specific medication categories prescribed to hospice patients in LTC.

The plan in the PDSA cycle reflects an evaluation of the change, which, in this project, was a periodic review of data to determine the number and type of medications prescribed to each hospice patient residing in the LTC project facility. Do was the actual data mining that occurred six times during the project implementation phase. The author obtained data from each patient's hospice electronic medical record (EHR) using the individual patient's medication list found in the hospice EHR. The term study refers to the assessment of the findings based on the desired change (reduction of inappropriate, unnecessary, or harmful medications) and the development of further interventions to address shortfalls in the plan. The final step in the PDSA

cycle was to act with additional communication and education for the LTC pharmacist and providers to address identified barriers and unmet goals.

Addressing barriers to change at regular intervals maximizes the opportunities for change (driving forces) and minimizes the resistance to altering prescribing practices (resisting forces). Finally, refreezing is confirmed using analysis of data regarding prescribing practices for hospice patients residing in long term care. The author reported data outcomes to the project participants and provided ongoing support for the maintenance of appropriate changes in prescribing practices. Lewin's theory of planned change compliments Rogers' theory of diffusion of innovation, and the PDSA cycle is a useful framework to assure the successful implementation of this DNP project and ultimately affect a positive outcome for patients.

Summary

Change, while inevitable, can be challenging to initiate and often takes a catalyst to overcome barriers and resistance effectively. Even when a change is beneficial, as with deprescribing of unnecessary or harmful medications, there may be resistance. Using processes developed by multiple disciplines provides a foundation for effective change. Behavioral scientist Everett Rogers developed the theory of diffusion of innovations, which is the foundation for this DNP quality improvement project. Rogers' theory provides a framework for effective change using a five-step process to move from awareness of innovation through a decision to adopt a new idea and ultimately implement and incorporate the change into the existing processes. Lewin, a psychologist, also studied methods of effective change and developed his three-step guideline for planned change, including unfreezing, movement, and refreezing.

The intervention for this DNP project was to educate the LTC facility providers and pharmacists regarding the benefits of deprescribing for patients who are nearing the end of life

while residing in LTC. The goal of the project intervention was to promote a change in prescribing practices that resulted in a reduction of unnecessary, inappropriate, or harmful medications for this patient population. The term deprescribing refers to a systematic review of medications to eliminate any drugs that are no longer appropriate, useful, or desirable. The antecedent to deprescribing, polypharmacy, is defined as taking five or more medications. The benefits of deprescribing are many, but the goal of improved safety and quality of life for hospice patients who reside in LTC is the desired outcome. Rogers' theoretical framework and Lewin's evidence-based guidelines for planned change, together with the PDSA cycle as a tool for evaluation of the effectiveness of the interventions, assisted project participants with decision-making for appropriate deprescribing in this unique patient population.

Chapter Four: Pre-implementation Plan

Successful outcomes for any project are dependent upon thorough planning, and this DNP project was no exception. Planning for implementation of the DNP project included five major areas beginning with clear identification of the project purpose. Next, project management encompassed assessing for organizational readiness for change and identification of team members, along with their expected contributions to the success of the project. Additional elements of pre-implementation planning included risk management, clarifying the process used to obtain organizational approval to conduct the project at the chosen site, and identifying the role of information technology in the project. A cost-benefit analysis was the third area of the project management, followed by the implementation of the process required to obtain Institutional Review Board (IRB) approval. The fifth and final category for the pre-implementation plan was the evaluation process, including the determination of demographic and project-specific data to be collected during the project and the desired outcomes. Discussion of the evaluation tools, data analysis, and data management completed the pre-implementation planning phase.

Project Purpose

The purpose of this DNP project was to provide education regarding the benefits of deprescribing unnecessary, inappropriate, and harmful medications for hospice patients residing in LTC to the providers and pharmacists employed at the project facility. The educational session presented current research supporting deprescribing and offered tools that could be used by the pharmacist and providers to streamline the process of decision-making for deprescribing. The effectiveness of the project was evaluated by analyzing data on both the number and class of

medications discontinued for hospice patients who reside in the LTC facility during the implementation timeline.

Project Management

Organizational readiness for change. The hospice organization with whom patients are enrolled has the responsibility to provide optimal care to those patients regardless of their place of residence. The development of this DNP project occurred in response to challenges encountered by the author in reducing inappropriate and unnecessary medications for hospice patients residing in LTC. The hospice organization and their contracted pharmacy vendor were enthusiastic about the project, which has the potential to reduce costs associated with unnecessary medications as well as improve the quality of life for patients under their care. For the hospice organization, there were no barriers related to the project, and members of the organization were ready for the anticipated change resulting from the planned collaborative session. The administrator of the LTC facility, where the hospice patients reside, immediately gave her unqualified support for the project. The initial barrier identified was that the providers and pharmacists were unaware of the project, and their willingness to participate was unknown. Before the implementation of the educational session, the facility administrator/project lead contacted each participant to discuss the planned educational meeting and begin building anticipation of the project implementation.

Interprofessional collaboration. Included in the project team were the facility physician and nurse practitioner. They were vital members, as they are the ones with prescriptive authority over the hospice patients who reside in the LTC facility. Ultimately, they were the decision-makers and, as such, were responsible for writing orders for discontinuation of medications that were deemed inappropriate, unnecessary, or harmful to the target patient population. The

pharmacist, who conducts monthly medication reviews for all patients who reside in the facility, was another key member of the project. The pharmacist assisted in identifying potentially inappropriate medications for the hospice patients living in the facility and recommended discontinuation of target medications to the providers. This collaboration streamlined the deprescribing process and increased the likelihood that the providers would have the time and motivation to deprescribe as appropriate.

Risk management assessment. The ability to manage the inherent risks associated with the project were analyzed using the strength, weakness, opportunities, and threats (SWOT) model (see Appendix F). One internal strength of the project was the author's experience and expertise in managing medications for hospice patients. The author earned certification as an advanced certified hospice and palliative nurse (ACHPN) and has five years' experience managing medications for patients nearing the end of life. An additional strength was the growing body of evidence supporting the discontinuation of inappropriate, harmful, or unnecessary drugs for hospice patients, particularly those who reside in LTC. The availability of tools, both electronic and written, that assist in decision-making for deprescribing medications for patients with complex illness at the end of life was another strength of this project. These tools provide a framework for decision-making so that the deprescribing process is as efficient and manageable as possible for busy providers. Accessibility and availability of data to assess the outcomes was another strength of the project.

Weaknesses include the limited time for implementation and data analysis, limitations of available research on deprescribing for patients with multiple comorbidities and complex illness, and the time-consuming nature of the deprescribing process. The implementation of the initial collaborative educational session was a one-time event; however, the process for incorporating

deprescribing into daily practice took several months to solidify. Data collected at regular intervals during the implementation of the project did not fully reflect the change process and outcomes. Unfortunately, most tools created to assist with deprescribing decision-making focus on a single disease model. They do not reflect the complexity of the health status for most LTC patients nearing the end of life. Finally, deprescribing adds another time-consuming task to the practice of busy providers. Finding ways to streamline the process was essential to influencing providers to incorporate this critical task into their daily practice.

External factors that influenced the project included both opportunities and threats. Opportunities included the financial benefits for the LTC facility when there are fewer medications to dispense, thus eliminating unnecessary tasks and reducing costs of care. The inclusion of the facility pharmacist provided an opportunity for increasing the chance of success of the project, as she assisted in identifying medications for potential deprescribing, making the process more efficient for the providers. There was a benefit of improved patient satisfaction, which reflects well on both the hospice organization and the LTC facility in which the hospice patient resides. Reduced pharmacy costs for individual hospice patients and the potential for reduction of pharmacy contractual costs for the hospice organization were an added benefit of this project. Finally, and most importantly, was the reduction of potential ADEs and improved quality of life for hospice patients residing in LTC.

Threats to the project included the willingness of providers to incorporate an additional task, deprescribing, into their busy practice. The physician and nurse practitioner employed by the LTC facility were under no obligation to embrace the practice of deprescribing. This process can be time-consuming, and providers may be reluctant to take on additional responsibilities that will contribute to their already heavy workload. The collaborative educational session with

providers and the pharmacist employed by the LTC facility was central to the success of the project. Additional threats included securing permission to conduct the project educational session at the LTC facility, which required the facility administrator to be named as project lead and complete a QI module before submitting a request for the LTC facility's internal IRB approval.

Organizational approval process. The author developed the DNP project in response to the issue of polypharmacy encountered in the course of her work as a hospice nurse practitioner. The data regarding the average number of medications prescribed to each patient in the author's hospice organization was well above the national average for similar organizations serviced by their contracted pharmacy provider. In discussing this data with an executive leader of the organization, it became clear that the population of hospice patients residing in LTC was the only group for whom hospice providers did not influence prescriptive practices. Together, the executive leader and the author developed a plan for addressing this deficit and presented it jointly to the Chief Executive Officer (CEO) of the hospice organization. The project proposal included a cost-benefit analysis as well as data that supported improved quality of life for hospice patients residing in LTC when unnecessary, inappropriate, and harmful medications are deprescribed. The CEO agreed to be the project champion and gave final approval for conducting the project through the hospice organization (see Appendix G).

Information technology. Technology has become an integral part of healthcare and is essential to providing optimal care, retaining documentation of that care, and analyzing the effectiveness of the care provided to patients. This project utilized several technologies for the development and analysis of outcomes, including NetSmart© EHR (Netsmart Technologies, Inc., 2019). Excel provided an effective platform to organize and analyze data and develop

meaningful graphics to visualize outcome results. PowerPoint was employed to create an educational presentation for the pharmacist and providers participating in the educational intervention for the project. The author recommended the use of an electronic application called MedStopper® (n.d.) to assist providers with the deprescribing decision-making process. MedStopper® (n.d.) is a non-validated, web-based tool developed through expert opinion that helps providers with decision-making regarding medication deprescribing.

Cost Analysis of Materials Needed for Project

The cost of the collaborative educational session was minimal. It included a bound handout and light snack for all participants at the meeting, and mileage to the hospice facility and LTC facility totaling just over $300 (see Appendix H). Financial benefits were quantifiable in terms of the potential cost savings for avoidance of ADEs related to polypharmacy and inappropriate prescribing. Avoidance of one fall provides significant cost-benefit for both the hospice and LTC organizations. Burns, Stevens, and Lee (2016) estimate the average cost of a non-fatal fall for an older adult in 2016 was $9,463. These costs increase with age and with complications such as hospitalization (Burns et al., 2016).

Reduction in unnecessary medications results in lower costs for the hospice organization and offers supportive data for renegotiation of contracted per diem pharmacy costs with the hospice pharmacy vendor. Cost savings for the LTC include a reduction of the workload for the bedside nurse who administers medications to the hospice patient, as well as avoidance of missed revenue days when the LTC facility must send residents to the hospital for evaluation and treatment of ADEs. Most importantly, there is an unquantifiable saving in the pain and suffering experienced by patients who suffer ADEs due to inappropriate, unnecessary, or harmful medications. The avoidance of just one fall more than accounts for the cost of the DNP project.

Plans for Institutional Review Board Approval

The author submitted details of the DNP project and obtained a waiver from East Carolina University (ECU) Institutional Review Board (IRB) based on the quality improvement structure of the project. The IRB issued the exemption after the author submitted ECU's quality improvement/program evaluation self-certification tool. The author gave a brief description of the project and answered eight yes/no questions about the structure and purpose of the project. The author then submitted the self-certification tool to the ECU IRB link provided by project faculty and received notification immediately that the IRB granted a waiver.

The hospice organization did not have an IRB board or other formal process for project approval. The CEO of the hospice organization granted permission for the project following an informal presentation. The benefits of the project reviewed during this meeting included reduction of overall pharmacy costs, improved patient satisfaction, and decreased risk of ADEs, resulting in further cost savings for both hospice and the LTC facility. The parent company of the LTC facility site for this QI project had an internal IRB board. The facility's organizational IRB required the site champion to complete a QI educational module and electronically submit a summary of the project and data collection tools developed by the author to the review board. The documents were provided by the LTC site champion/project lead to that organization's IRB, and the project was determined to be a QI project with an IRB waiver granted.

Plan for Project Evaluation

Demographics. The target audience for the educational sessions were facility providers, including the physician and nurse practitioner, and the facility pharmacist. The LTC IRB required the author to remove demographic questions from the project data collection tool to comply with the LTC IRB definition of quality improvement versus research. Project-specific

data was collected to assess each participant's willingness to deprescribe medications for hospice patients under their care based on the information provided during the educational session (see Appendix I & Appendix J).

A variety of methods were employed to report data, depending on the question structure. Responses from each participant regarding the ideal number of prescribed medications and their willingness to deprescribe medications for hospice patients was compared before and after the educational presentation and reported as aggregate data and percentages. Comparative data for each participant's willingness to deprescribe specific categories of medications before and after the educational session was analyzed and reported using percentages. The author used a variety of formats, including bar graphs, pie charts, and line charts to demonstrate outcomes visually.

Outcome measurement. The desired outcome for the DNP project was a reduction of unnecessary, inappropriate, or harmful medications prescribed to hospice patients residing in the LTC facility. The author compared baseline data obtained from the hospice EHR at the start of the project to data collected intermittently and after the project implementation. The data included the number of medications prescribed in seven target categories to each hospice patient living at the project facility. Data were collected every two to three weeks to assess the progress of the deprescribing efforts and to address barriers to deprescribing with the facility pharmacist and providers. The author presented intermittent data monthly to project participants to offer feedback on deprescribing efforts and encourage ongoing incorporation of deprescribing practices. Success for the project outcome was defined as deprescribing at least one inappropriate medication, with an overall goal of a 10% reduction of unnecessary medications for the target patient population. Measurement of process outcomes was evaluated based on the ongoing use of

deprescribing methods by the facility providers for patients admitted to hospice services after the start of the DNP project.

Evaluation tool. The author developed an excel spreadsheet for organizing and analyzing data collected from the hospice EHR and hospice pharmacy provider. The author compared data in the spreadsheet to measure the effectiveness of the project intervention. By comparing the number of overall medications prescribed to each patient at the beginning and completion of the project, as well as at regular intervals throughout the project implementation, the author demonstrated the effectiveness of the project intervention. The number of medications prescribed to each patient in specific categories, including vitamins and supplements, statins and cholesterol-lowering medications, anticoagulants, cognitive-enhancing medications, antihypertensives, and diabetic medications, were recorded on each of the data collection dates. These categories reflected possible inappropriate, unnecessary, or harmful drugs prescribed to hospice patients and were compared at the start of the project implementation and monthly until the project conclusion (see Appendix J).

Data analysis. Using an Excel spreadsheet, the author tabulated and analyzed the results from the pre- and post-educational session data collection tool completed by the participants. Visual representations of the data collected from the project data collection tool were created in Excel, including pie charts and run charts. Outcome data were collected at the start of the project and then every two to three weeks. The author shared intermittent outcomes data at regular intervals with the facility providers and the pharmacist. Data were reported to both the hospice site champion and LTC facility administrator/project lead at the end of each month during the implementation period. Each data set was compared to prior reports and assessed for trends in the reduction of target medication categories and the overall number of medications.

There are no specific national, state, or local benchmarks for the ideal number of medications prescribed to hospice patients residing in LTC. Consequently, the project was deemed successful by the reduction of a single unnecessary, inappropriate, or harmful medication. The overall outcome goal of the project was a 10% reduction in the number of drugs prescribed to this patient population, which aligns with the goals of Healthy People 2020 (HHS, 2019).

Data management. The author completed coding of the DNP data collection, which was verified by a hospice colleague who was also a DNP student at ECU. Data collected during the DNP project remained deidentified and secure on the hospice server and the author's password-protected laptop. Hard copies of the survey tools and data collection spreadsheets provided back up in case of electronic failure. Surveys were uploaded electronically for storage, and hard copies kept secured in the author's locked office at hospice. The author shared data with the LTC facility and the hospice organization after the project implementation ended. Data will be kept for five years after project completion, after which electronic data will be erased, except for a single thumb drive, and hard copies will be shredded/destroyed.

Summary

The DNP project pre-implementation planning included articulating the project purpose, organizing steps of project management, analysis of costs and benefits of the project, planning for IRB approval, and planning for project evaluation after implementation. This DNP project focused on deprescribing inappropriate, unnecessary, or harmful medications for hospice patients who reside in LTC facilities. Each of the organizations involved in the project, hospice and the LTC facility, verbalized enthusiastic support of the project goals and intended outcomes. The author selected appropriate members of the interprofessional team and used a SWOT analysis to

identify strengths, weaknesses, opportunities, and threats to completion of the project. The author then outlined the necessary steps taken to gain IRB approval through both ECU and the LTC organization and completed a cost-benefit analysis. Next, the author discussed the plan for demographic and project-specific data collection and reporting and identified outcome measures. Finally, methods for data analysis and strategies for data management were clarified.

Chapter Five: Implementation Process

The foundation of this quality improvement project was careful planning leading up to the implementation phase. Implementation of this DNP project began with an educational session provided for the pharmacist and providers employed by the LTC facility. During this collaborative meeting, the DNP student informed participants about the growing body of research supporting deprescribing for hospice patients residing in LTC and introduced evidence-based guidelines available to assist with deprescribing decisions. The effectiveness of the educational intervention was evaluated based on data obtained from the hospice EHR and pharmacy vendor reports. The author analyzed data at regular intervals for the number of medications prescribed in the seven target drug categories to hospice patients living in LTC. Using the PDSA model and the data analysis, the author engaged project participants in ongoing discussions regarding appropriate deprescribing and incorporating this process into their daily practice.

Setting

The DNP project implementation involved two sites, including a for-profit LTC facility in NC owned by a large healthcare organization and an independent, non-profit, community-based hospice. The hospice organization has been a long-time community partner with the LTC to provide specialized care for patients with a prognosis of six months or less. Hospice patients who reside in LTC are the responsibility of the hospice agency but remain under the prescriptive authority of the facility providers. A hospice team is assigned to the patient and works collaboratively with LTC facility staff to provide care for their mutual patients.

Participants

The DNP project participants included a pharmacist, physician, and nurse practitioner, all of whom are employed by the LTC in which hospice patients reside. Also included was the facility pharmacist's supervisor, who is a PharmD. Although the target population is under the care of hospice, the prescriptive authority for these patients remains with the facility providers due to their place of residence. Project participants were included based on their role in evaluating medications and their ability to prescribe and deprescribe medications for patients in the LTC facility. The facility administrator was the project lead, assisting in coordinating the educational session and acting as a liaison between the author and project participants.

Additional participants included the CEO for the hospice organization, who was the site champion. The CEO provided project approval for the hospice organization and ongoing support of the project. The author worked collaboratively with a DNP leadership student whose doctoral QI project was parallel and complementary to this project. The colleague provided education regarding deprescribing for hospice patients in LTC to nurses employed by the same LTC facility. Offering training to both providers and nursing staff during the same implementation period allowed the author and her DNP student colleague to create an integrated and collaborative focus on deprescribing, maximizing the potential for successful outcomes.

Recruitment

Initial recruitment began when the author met with the LTC facility administrator to outline the project and obtain support and approval for using the facility as the DNP project site. The administrator received a brief written outline of the project, including a review of the benefits to both the facility and patients. There was a focus on partnership and collaboration between the hospice organization and the LTC facility, which would provide mutual benefits in cost savings,

reduction of ADEs, and, most importantly, provide for an improved quality of life for the hospice patient. The facility administrator was supportive of the project goals and embraced the vision for an educational session to share evidence-based guidelines with the facility providers and pharmacists.

Due to organizational requirements, the facility administrator was named as the project lead and completed a QI educational module provided by her employer. The administrator submitted a summary of the project, which the author provided, to the organization's internal IRB to determine the nature of the project- quality improvement versus research- and to obtain a waiver. Once the project lead received IRB approval for the project site from her organization, further plans for recruitment of the providers and pharmacists were made in collaboration with the facility administrator.

The project participants were chosen based on a convenience sample due to their role within the organization. The facility administrator was instrumental in offering insights regarding possible barriers to engaging the participants, particularly for the physician whom she described as "old school." The project lead characterized the nurse practitioner and pharmacist as being "open" and likely to be supportive of the goal of deprescribing medications no longer appropriate for patients nearing the end of life. Participants were concerned about incorporating extra work or a time-consuming process into their already busy practice.

Implementation Process

The project implementation phase began on day 1 in mid-January 2020 with a meeting between the author and hospice site champion to discuss the initial phase of implementation and data collection. Next, the author met with the LTC administrator to confirm provider and pharmacist schedules and determine an appropriate date for the collaborative educational session.

The author completed the first data collection using the hospice EMR before the educational session. Data included the number of medications prescribed to each hospice patient in the seven specific drug categories. During the first week of the DNP project implementation, the project lead contacted each project participant to confirm the date and time for the educational session. The author scheduled a single educational meeting for the project participants to minimize disruption to their workflow, maximize the opportunity to promote change in their prescribing practice for hospice patients and begin building a foundation for a trusting, collaborative partnership. The educational session took place within the first two weeks of project implementation.

After the educational session, the hospice nurse, facility pharmacist, and hospice nurse practitioner/DNP student met every two to three weeks to conduct medication reviews for each hospice patient. Data on the number and categories of medications prescribed to hospice patients residing in the project site LTC facility were collected and analyzed every two to three weeks with aggregate data shared with participants at the end of each month during the implementation phase. Using the PDSA model, the effectiveness of the educational sessions was evaluated based on the changes seen in the number and types of medications prescribed for the hospice patients residing in the project LTC facility. Barriers were identified and addressed at informal biweekly meetings with each provider and monthly with the pharmacist. Meetings were held monthly with the project lead/LTC facility administrator and the hospice organization site champion to discuss strategies for overcoming barriers identified and share incremental outcomes for the first month after implementation. Subsequent meetings with LTC staff were deferred or conducted virtually due to visitation restrictions enacted in response to the global pandemic, COVID-19. The cycle of data collection, feedback provided to the site champion and facility administrator, and

informal meetings with project participants to discuss successes and ongoing opportunities for additional deprescribing continued throughout the implementation period, with adjustments made to incorporate virtual platforms.

Plan Variation

Using the PDSA model, the author adjusted the project plan throughout the implementation phase based on barriers revealed in the analysis of periodic outcomes data. Regular communication with the physician, nurse practitioner, and pharmacist provided opportunities to discuss perceived and real challenges to implementation. Once periodic data was analyzed, successes were shared to reinforce appropriate deprescribing practices. The author intermittently reviewed deprescribing tools to assist participants with the deprescribing process. The facility pharmacist, hospice nurse, and DNP project author comprised the interdisciplinary team that met regularly every two to three weeks to review all medications for hospice patients residing in the LTC facility. The team reviewed medications for patients admitted to hospice after the initial implementation date at the next regularly scheduled medication review meeting. Based on the results of the PDSA process, the author facilitated discussions between the pharmacist and providers to identify the most effective means for communicating recommendations for deprescribing. Providers shared their preferences for receiving staff recommendations for deprescribing, which were integrated into the process as well.

The global pandemic, COVID-19, impacted this project. The project implementation occurred before the development of social restrictions and limited access to LTC facilities. Once those restrictions began, communication continued using telephone conferences, virtual meeting platforms like WebEx and Zoom, electronic mail correspondence, and cell phone texts. The

project author collected outcomes data using the hospice EHR from a remote location using the hospice virtual private network (VPN).

Summary

The planned implementation of the DNP project included an educational session with facility providers and the pharmacist to share evidence-based research on the benefits of deprescribing unnecessary and inappropriate medications for hospice patients residing in their facility. The author collected the initial data on medications prescribed in seven specific medication categories to this patient population before the implementation of the education session. After the educational intervention, data was collected regularly every two to three weeks until the conclusion of the implementation period. Informal periodic meetings were held with the providers and the pharmacist to discuss successful deprescribing practices and to address barriers to appropriate deprescribing for hospice patients residing in the LTC facility. The author met with the LTC facility administrator/project lead and the hospice site champion periodically during the implementation phase to discuss any barriers identified and to disseminate intermittent results of the PDSA cycle and project outcomes. Aggregate reporting of data to both the hospice site champion and project lead/facility administrator occurred at the end of each month during the implementation phase. After the implementation of social and organizational restrictions due to COVID-19, project participants continued to communicate using telephone conferences, virtual meeting platforms, electronic mail correspondence, and cell phone text messaging.

Chapter Six: Evaluation of the Practice Change Initiative

The effectiveness of a quality improvement project is measured by the degree to which it achieves its goals and desired outcomes. The objectives of this DNP project were three-fold: first, to educate providers and pharmacists regarding the growing body of evidence supporting the elimination of unnecessary, inappropriate, and harmful medications for patients who reside in LTC and are under hospice care. The second goal was to appreciate an actual reduction in the number of medicines prescribed to this patient population in seven specific medication categories shown to be inappropriate or harmful for patients nearing the end of life. The third goal was to improve the quality of life of hospice patients residing in LTC through the reduction of pill burden and avoidance of ADEs related to polypharmacy. Also, deprescribing unnecessary medications yields costs savings for both the LTC facility and hospice organization through the avoidance of ADEs that lead to hospitalizations and increased healthcare costs and the reduction of labor and supply costs related to fewer prescribed medications.

Participant Demographics

Project participants included a physician, a nurse practitioner, and two pharmacists, one of whom was assigned to the LTC facility, and the other was a supervisor. Project participants were employees of the LTC facility in which patients of the hospice organization reside. The facility administrator and project lead recruited participants, in collaboration with the DNP student, based on their role of provider and pharmacist. Although it was a small group in numbers, these critical members of the DNP project were responsible for making medication recommendations as well as prescribing and discontinuing medications for the targeted patient population. The original DNP project data collection tool contained demographic questions, but the DNP student removed those questions at the request of the facility's IRB. The physician is an MD, and the

nurse practitioner and pharmacists hold doctoral degrees in their respective disciplines. There were one male and three female participants who attended the project intervention/ educational presentation.

The two participating agencies for this DNP project included an independent, nonprofit hospice that serves patients at the end of life and a corporate-owned long-term care facility. The hospice agency has just over one hundred employees who provide care and support for, on average, one hundred and seventy patients and their families. These hospice patients reside in three rural and one suburban county in Southwestern North Carolina. Patients receive end of life care in a variety of settings including hospice inpatient units at one of two hospice houses, long-term care facilities, assisted living facilities, group homes and private residences within the service area. The LTC facility, owned by a large, multi-state healthcare organization, provides skilled nursing for patients with both rehabilitation and residential needs. These two agencies have a long-standing relationship of collaboratively providing care for patients with specialized nursing needs who are nearing the end of life.

At the start of the DNP project implementation phase, thirteen hospice patients were residing in the participating LTC facility. Additional patients joined the project at the time of their admission to hospice services. Data collection on the number of medications prescribed in the seven identified categories was suspended at the time that the patient left hospice services either through death, live discharge, or transfer from the LTC facility.

Intended Outcomes

Short-term goal. The project intervention provided a short-term goal of educating the LTC facility's pharmacist and providers on the benefits of deprescribing for patients under hospice care who reside in LTC. The educational session was developed based on a growing

body of evidence found in the literature that demonstrates improvement in the quality of life for patients with a reduced pill burden at the end of life. As part of the educational session, the participants were shown online tools that can be used to develop a systematic approach to deprescribing unnecessary, inappropriate, or harmful medications for hospice patients.

Intermediate goal. An intermediate outcome for this DNP project was the demonstration of a reduction in the number of medications prescribed to hospice patients residing in LTC. A multidisciplinary, interagency collaboration between the facility pharmacist, hospice RN and DNP student provided recommendations for facility prescribers regarding appropriate deprescribing of drugs for each hospice patient. The targeted medication categories reviewed included vitamins and supplements, statins and cholesterol-lowering medications, anticoagulants and antiplatelet medications, cognitive-enhancing drugs, antihypertensives, medications for the management of diabetes, and medications for the management of gastrointestinal reflux disease.

Long-term goal. The most significant outcome of this project was the long-term goal of improving the quality of life for patients under hospice care who reside in the LTC facility. Although the measurement of this outcome was beyond the scope of this project, achievement of this goal will become evident through a reduction in premature death, fewer ADEs, and the LTC facility hospice patient's perception of improved quality of life over time. Another benefit of this project for the participating agencies will be realized over time as well, with financial gains associated with reduced healthcare costs related to fewer ADEs and actual savings related to fewer medications to purchase and dispense. For the hospice organization, there is the potential for additional cost-savings with their contracted pharmacy provider related to a stronger negotiating position for lower contractual per diem rates as a result of a reduction in medication usage.

Findings

For the project intervention, a pre- and post-education tool was completed by each of the four participants. There were five questions included on each tool to elicit the participant's understanding of and attitudes toward medication reduction for hospice patients. Participants were asked to identify the ideal number of medications they would prescribe to hospice patients and the likelihood that the prescriber would discontinue medications for this patient population. The data collection tool included a question on the participant's willingness to deprescribe medications for hospice patients in seven specific categories and whether they currently use an evidence-based tool for deprescribing. The final question sought to quantify the prescriber's opinion regarding the number of medicines the prescriber would discontinue at one time (see Appendix I & Appendix J).

The pre-educational tool revealed that 50% of the participants considered 1-5 medications prescribed to a hospice patient to be ideal. The remaining 50% believed the best number to be 6-10 medications. Each participant reported a willingness to deprescribe medications for hospice patients as either somewhat likely (50%) or very likely (50%). Before the educational session, all participants reported that they would deprescribe medications for gastroesophageal reflux disease (GERD), hypertension, and diabetes in their hospice patients, and 75% of participants would stop vitamins and supplements, cholesterol-lowering medications, anticoagulants or cognitive-enhancing medications. Half of the participants reported current use of evidence-based guidelines or tools for deprescribing. The final question of the pre-educational tool showed that each participant had a different idea on the number of medications that should be stopped at a time- with 25% of the participants choosing 1-2 medications, another 25% chose 3-4 drugs, 25%

would prefer to discontinue 5-6 medicines at one time, and finally, 25% of participants would deprescribe more than six medications at a time (see Figure 6.1).

Figure 6.1.

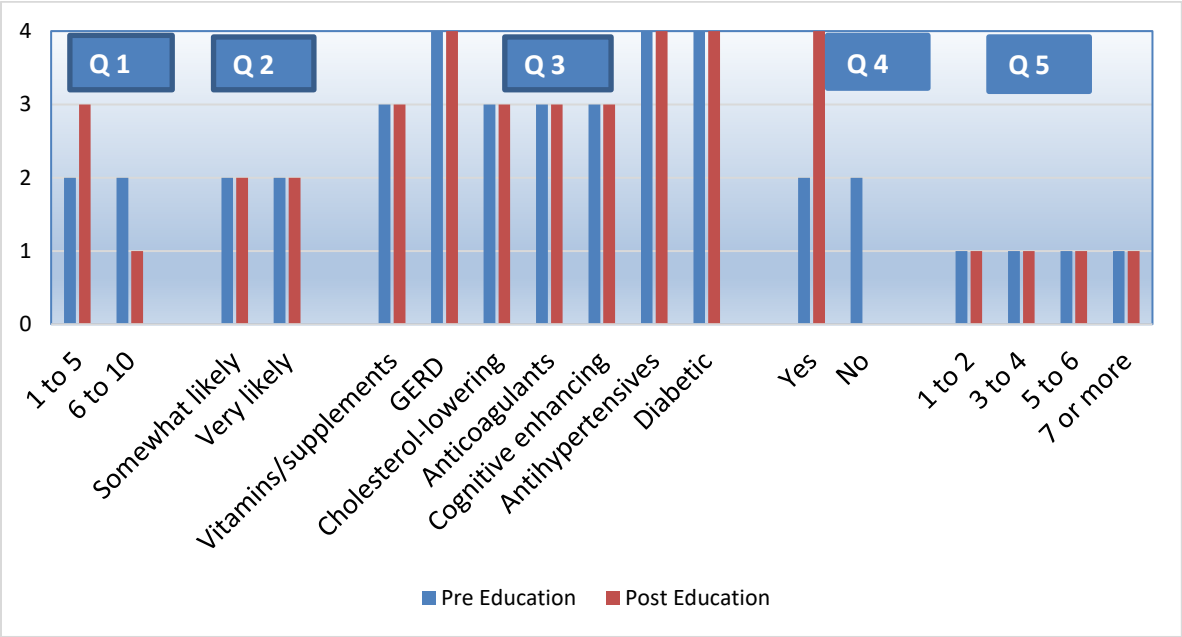

Figure 6.1. Data analysis for participant responses before and after the educational intervention on deprescribing. There were four participants, each of whom completed both a pre-education data collection tool and a post-education tool. The educational intervention demonstrated a change in participant opinions on the ideal number of medications prescribed to hospice patients residing in LTC and the use of an evidence-based tool for deprescribing decision-making. All other responses remained unchanged.

In comparison, the post-education data collection tool revealed a change in the participant's view of the ideal number of medications prescribed to hospice patients, with 75% reporting that number to be 1-5 medications, and 25% of participants reporting 6-10 medicines as the ideal number. There was no change in the likelihood of participants deprescribing, with all participants stating that they were either somewhat likely or very likely to deprescribe. The

participant's willingness to deprescribe medications in seven specific categories remained unchanged after the educational session, and 100% of participants indicated that the evidence-based tools and guidelines presented in the educational session would be helpful in the deprescribing process. Finally, participant's views on the appropriate number of medications to deprescribe at any one time remained unchanged from the pre-education survey (see Figure 6.1).

The DNP student collected outcomes data at the onset of the implementation period before the educational session, then at regular intervals every two to three weeks after that until the conclusion of the project implementation three and one-half months later. This data looked at the number of medications prescribed in each of the seven specified categories to each hospice patient residing in the LTC facility. Thirteen hospice patients were living in the LTC facility at the start of the project implementation. Throughout the project implementation, seven additional LTC residents came under hospice services. The DNP student collected data on a total of 20 patients; however, only seven of the patients remained in the project from implementation to conclusion (see Appendix K).

The DNP student analyzed data for each hospice patient looking at the number of medications per patient in each of the seven target categories and as an aggregate *M* of medicines prescribed per patient in all categories combined at the interval data collection points. There were six points of data collection- one initial, four intermediates, and the final data collection. The least number of medications prescribed to a patient in the seven combined categories at any point during project implementation was zero, and the highest number was seven. The mean (*M*) was 2.4 prescriptions in the target categories per hospice patient overall. The initial data collection point showed a *M* of 2.5 prescriptions per patient, with higher numbers seen at intermittent data collection points two and four, which correlated with new hospice admissions

or changes in patient condition. The peak *M* of any one of the data collection points was 2.8 prescriptions per patient. Data collected in the last month of the three- and one-half-month project implementation demonstrated the lowest number of targeted medications, with a *M* of 2.1 prescriptions per patient at the end of the project implementation (see Figure 6.2).

Figure 6.2.

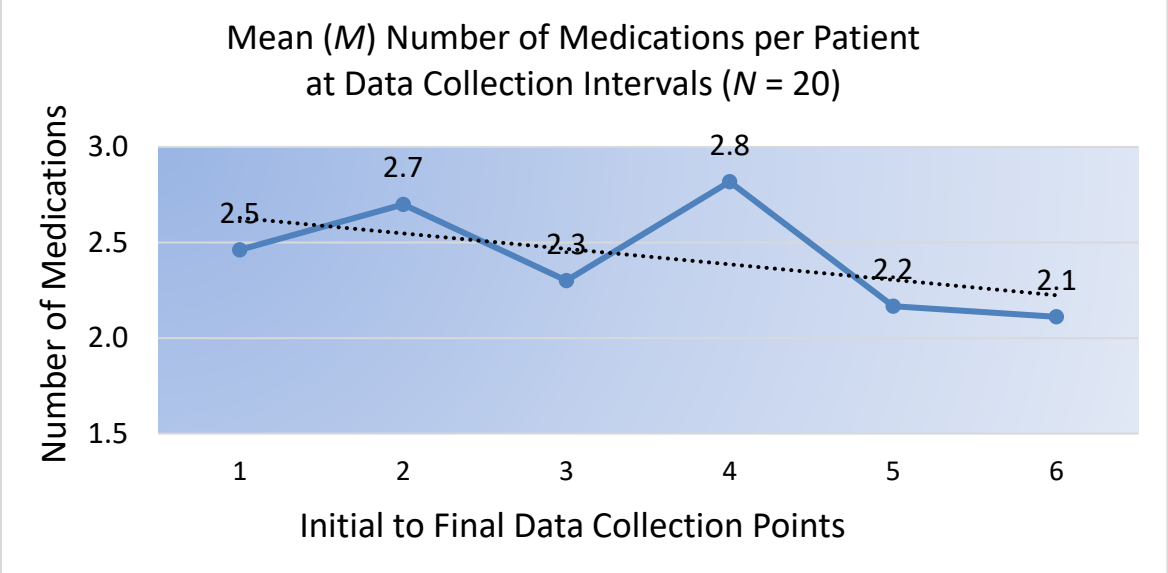

Figure 6.2. M number of medications prescribed per patient at each of the six data collection intervals. Spikes in the *M* number of prescriptions reflect the addition of new patients to the project, before medication review and deprescribing. Overall there was a 16% reduction of medications from pre-intervention data collection point 1 to the final data collection point 6. From the peak *M* at data collection point 4 to the lowest *M* at data collection point 6, there was a 25% reduction in the average number of medications prescribed in the seven target categories.

Finally, looking at individual medication usage, the data revealed that all but one patient demonstrated a net reduction or maintenance of the current number of medications in the seven target categories. Thirteen of the twenty LTC patients under hospice services during the project implementation had a neutral net gain or loss in the number of targeted medications, totaling

65% of the patients. Fifteen percent of the patients, for a total of three patients, had a net loss of one target medication. Two of the hospice patients residing in LTC, or 10% of the patients, had a net reduction of three prescriptions throughout their time in the project. One patient, or 5% of the total of patients whose medications were analyzed, had a net reduction of five medicines, while another 5% had an increase of two prescriptions (see Figure 6.3).

Figure 6.3.

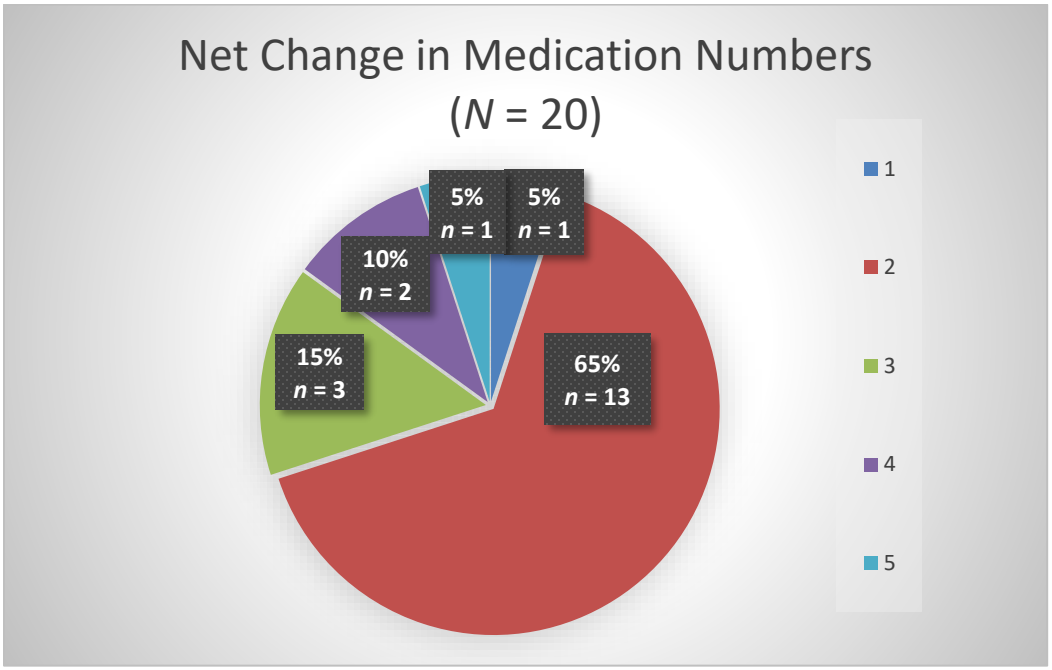

Figure 6.3. This pie graph shows the net change in the number of medications prescribed to each of the 20 hospice patient participants in the seven target categories. 1. Dark blue represents 5% of patients participating in the project (n = 1) who had a reduction of five medications. 2. Red shows that 65% of patients (n = 13) neither increased nor decreased the number of prescribed medicines during the project implementation. 3. Green represents a net reduction of 1 medication for 15% of patient participants (n = 3). 4. Purple shows that 10% of patients (n = 2) were taking two fewer medications at the end of the project implementation. 5. Light blue signifies 5% of the patient participants (n =1) who had a gain of two medications in the targeted categories.

Summary

The foundation of this project was the educational intervention provided to the facility pharmacists, physician, and nurse practitioner. The DNP student presented evidence-based research to support the benefit of deprescribing unnecessary, inappropriate, or harmful medications for hospice patients who live in LTC. The DNP student, together with the LTC facility pharmacist and hospice RN met regularly to review medications and make recommendations for deprescribing to the facility providers in the seven target medication categories. Data were collected at the onset of the project and every two to three weeks until the conclusion of the project implementation phase three and one-half months after implementation.

The short-term goal of the project, to educate the pharmacists and providers for hospice patients regarding the evidence supporting the appropriate deprescribing of unnecessary medications for patients nearing the end of life, was achieved through one collaborative educational session. The project participants achieved the intermediate goal of medication reduction through biweekly interdisciplinary medication reviews for each hospice patient living in the facility. Data support the efficacy of the project intervention through the overall reduction of the number of medications prescribed in the targeted categories for hospice patients residing in LTC. Finally, and most importantly, the long-term goal of improved quality of life for this patient population will be demonstrated over time, as will the financial benefits realized by both the LTC facility and hospice provider related to reduced costs from ADEs and unnecessary expenses.

Chapter Seven: Implications for Nursing Practice

The American Association of Colleges of Nursing (AACN) has developed competencies that define the criteria for the achievement of a doctoral degree in nursing. *The essentials of doctoral education for advanced practice nursing* (AACN, 2006), or *DNP Essentials*, outline eight categories of foundational outcomes for which all candidates for the Doctor of Nursing Practice (DNP) degree must exhibit mastery. Together with the successful completion of the academic components of the curriculum, the DNP project provides a tangible demonstration by the student of competency in each of the eight areas. This DNP project encompasses elements of each of the eight competencies contained in the *DNP Essentials.*

Practice Implications

Essential I: Scientific underpinnings for practice. The first *Essential* speaks to the foundations of science and nursing theory that drive advanced practice nursing (AACN, 2006). The scientific underpinnings of the DNP nurse's practice include the integration of knowledge from multiple disciplines to develop innovative ways to provide nursing care to people of all ages and health states (AACN, 2006). The DNP prepared nurse integrates new ideas into care models and evaluates the effectiveness of their outcomes (AACN, 2006).

There is a substantial body of research regarding the benefits of deprescribing for patients who are nearing the end of life, particularly for those residing in LTC facilities. Multiple disciplines contribute to this body of research, including nursing, medicine, pharmacy, and behavioral sciences. The integration of this knowledge and dissemination to a multidisciplinary team within the LTC facility was the foundation of this DNP project and the project intervention. The effectiveness of the project intervention was evident in the outcomes data, which showed a reduction in unnecessary, inappropriate, or harmful medications for this specific patient

population. Everett Rogers (1995) was a behavioral scientist whose theory of the diffusion of innovations was the foundation for this project. Together with Kurt Lewin's theory on planned change (Oberleitner, 2019), the theory of diffusion provided the framework for integrating a change in the prescriptive practices of the LTC facility's providers and the pharmacist.

Essential II: Organization and systems leadership for quality improvement and systems thinking. This core competency requires that the doctoral-prepared advanced practice nurse (APN) work within health systems and organizations to drive new models of care and practice improvements with a broader focus on community and population health (AACN, 2006). The DNP nurse leader demonstrates the integration of improved health outcomes and patient safety with a reduction in healthcare disparities through the synthesis of newly developed research to create change in organizational strategies and health care policies (AACN, 2006). Quality improvement is the mainstay of the DNP nurse's practice. It is the foundation of the APN's advocacy for health care improvements that impact all aspects of a healthcare system, including business and economics.

This project was a multidisciplinary, interagency quality improvement project designed to influence the prescribing practices of providers and pharmacists within the LTC facility. The patient population for this project, namely hospice patients living in LTC, is a vulnerable and complex group. This quality improvement project included a newly developed process for deprescribing and collaboration across multiple disciplines to affect policy and outcomes for both participating agencies. The DNP student demonstrated leadership in developing a quality improvement project that can be adapted and applied to other vulnerable populations.

Essential III: Clinical scholarship and analytical methods for EBP. According to the DNP Essentials (AACN, 2006), the ability to synthesize research and integrate knowledge into

practice is the third foundational competency of the graduate of a DNP program. The DNP nurse looks to the nurse-researcher for the cultivation of new knowledge within the nursing discipline, then translates that insight into evidence-based guidelines and practices (AACN, 2006). The doctoral-prepared nurse seeks to incorporate appropriate research from other disciplines that provide support for effective change and improved patient outcomes. Mastery of this *Essential* includes the ability to discern reliable research using analytics, develop quality improvement projects based on the evidence of credible research, evaluate outcomes through data analysis, and work collaboratively across multiple disciplines (AACN, 2006).

The literature search for this project revealed a large and growing body of research and new knowledge regarding the benefits of medication reduction for patients nearing the end of life, particularly those who reside in LTC. The project intervention and subsequent outcomes are a direct result of the author's ability to analyze the current research. Using interdisciplinary theories on change and dissemination of new ideas, the author created a successful quality improvement project that led to improved outcomes for the patients and the participating organizations.

Essential IV: Information systems/technology and patient care technology for the improvement and transformation of healthcare. This is the age of the information superhighway with information disseminated using a multitude of platforms. Protection of sensitive information, including personal health information (PHI), is the basis for the United States Department of Health and Human Services [HHS] (n.d.) policy on the Health Insurance Portability and Accountability Act of 1996 (HIPAA). The doctoral-prepared nurse must be proficient in the use of technology to provide patient care and promote improvement in healthcare across the delivery spectrum while maintaining patient confidentiality and safety

(AACN, 2006). The DNP nurse-leader must understand how to use technology to analyze and synthesize research and be innovative in the delivery of healthcare through a variety of technological modalities (AACN, 2006). The DNP nurse must demonstrate mastery of technology to perform data extraction from databases with accuracy and timeliness (AACN, 2006).

The use of information systems and technology was inherent in this project. The author used a variety of information to conduct a literature search. The project intervention was developed using technology and presented via PowerPoint to the project participants. Outcomes data were collected from the hospice electronic medical record and stored electronically using safeguards for the maintenance of patient privacy. Data were analyzed using technology for evaluation of the effectiveness of the project intervention and to reinforce newly developed prescribing practices. Finally, the DNP student disseminated outcomes to project participants and the two participating organizations using web-based platforms for virtual meetings.

Essential V: Healthcare policy for advocacy in healthcare. Policy formation at every level of healthcare, from international organizations and the federal government to health systems and community programs, provides a framework for the delivery of care (AACN, 2006). The DNP curriculum prepares the APN to be a leader in the assessment of policy effectiveness, the development of policy changes or new policies to meet the needs of the community, and the implementation of these policies (AACN, 2006). The DNP nurse leader is active in speaking out for social justice, advocating for equity and a reduction in disparities of healthcare delivery, and influencing the regulatory and financial policies that drive healthcare delivery (AACN, 2006). DNP graduates participate in policy formation at all levels and are proactive in providing a bridge between research and practice (AACN, 2006).

The DNP project on deprescribing of unnecessary, inappropriate, or harmful medications for hospice patients residing in LTC is an example of the synthesis of research into practice. Well-constructed quality improvement projects lead to policy changes that improve outcomes and the quality of life for this vulnerable population. This project meets goals and mandates set forth by the Federal Government in Healthy People 2020 to reduce the number of inappropriate medications used by the elderly and disabled (HHS, 2019). The DNP project drives a change in practice and demonstrates the need for policy change at both the local and organizational levels for hospice and the LTC facility. Outcomes data for this project show a significant reduction in the number of unnecessary medications through appropriate deprescribing, which translates to costs savings and promotes policy change at the federal level to mandate medication reviews by multidisciplinary teams for patients receiving the Medicare hospice benefit.

Essential VI: Interprofessional collaboration for improving patient and population health outcomes. Healthcare in the United States is a highly sophisticated, complex system that requires collaboration with professionals from many disciplines to achieve optimal patient outcomes. Training for the DNP prepared nurse includes effective communication that empowers the APN to provide input and leadership for multidisciplinary, interprofessional healthcare teams (AACN, 2006). Evidence-based guidelines and standards of practice provide the framework for interdisciplinary collaboration, and the DNP nurse leader applies those tools both as a participant and leader in healthcare delivery. The DNP curriculum prepares the APN to navigate complex health systems effectively and lead others to develop necessary changes to policy and practice (AACN, 2006).

Interdisciplinary collaboration is the foundation of this DNP project. The project intervention was an educational presentation for providers who had prescriptive authority over

the hospice patients residing in their LTC facility and the pharmacist who was responsible for regular medication reviews. The DNP student's ability to engage with project participants and effectively communicate the benefits of the project were foundational to the willingness of the providers to change prescribing practice patterns. The facility pharmacist was a key project participant, and regular multidisciplinary sessions were pivotal in achieving positive outcomes for deprescribing. It was also essential that the DNP student worked effectively with the administration of the LTC facility and senior leadership of the hospice organization. This DNP project a collaborative effort, with cooperation and coordination between the clinical DNP candidate and a DNP leadership student to achieve successful outcomes. The DNP student demonstrated effective leadership and communication skills while overcoming challenges found inherent in the project design and from external changes that affected the project plan.

Essential VII: Clinical prevention and population health for improving the nation's health. The curriculum for the DNP graduate includes training to provide leadership in the areas of health promotion and disease prevention for individuals, specific patient populations, and the general public (AACN, 2006). The integration of scientific knowledge of population health based on epidemiology, biostatistics, and the environment provides the DNP prepared nurse leader with the skills to address cultural diversity and healthcare disparities in a meaningful and effective manner (AACN, 2006). The DNP curriculum prepares the APN to approach health care from a global perspective that addresses the needs of the individual while improving the health of the general population or that of specific groups within society (AACN, 2006).

This project focused on improving the health of a specific patient population, namely hospice patients who reside in LTC facilities. The principals of health promotion and disease prevention are central to the concept of deprescribing. Yet, providers do not universally

incorporate medication reduction into their prescriptive practice in the United States. While the LTC facility used some of the elements of this quality improvement project before its implementation, the addition of an interdisciplinary team to review medications was pivotal in the successful outcomes of this project. The DNP project achieves the goal set out by the HHS (2019) in Healthy People 2020 to reduce unnecessary medications for elderly citizens with disabilities. The project also aligns with the IHI (2019b) triple aim for improving population health through lower healthcare costs, improved population outcomes, and increased patient satisfaction with their healthcare experiences. The DNP project met these population health goals using a model that can be duplicated and expanded to other care delivery environments and different sub-populations.

Essential VIII: Advanced nursing practice. The discovery of new information through research, together with the depth and complexity of nursing science and knowledge, demands diversification within the field of nursing at the terminal degree (AACN, 2006). While there are foundational skills imparted to all APNs at the doctoral level, the volume of knowledge needed to practice at this level precludes the DNP nurse leader from mastery over all aspects of the discipline (AACN, 2006). The DNP curriculum includes elements of education that are common to all nursing disciplines, regardless of the specific specialty practiced by the student (AACN, 2006). The doctoral curriculum equips APNs to perform comprehensive patient evaluations incorporating physical assessment for patients with complex illness and varying levels of wellness while considering social determinants of health and cultural diversity to develop appropriate plans of care (AACN, 2006). The DNP program equips the graduate to develop trusting partnerships with the patient and other healthcare professionals, optimizing patient outcomes and using the highest level of critical thinking and clinical judgment to provide

evidence-based care (AACN, 2006). The APN who achieves a doctoral degree serves as a mentor to nurses and healthcare professionals in other disciplines, provides education and guidance for the community, and influences policy at the local, statewide, and national level (AACN, 2006).

This project is a model for future quality improvement projects focused on medication reduction for patients residing in LTC while under hospice care. The outcomes data demonstrate the effective decrease of unnecessary medications, which leads to improved quality of life and reduced healthcare costs. There is an opportunity to expand the project model to include other sub-populations, including hospice patients living in different settings and the general population of LTC facilities. The interdisciplinary collaboration and effective communication established by this project serve to strengthen and streamline the delivery of healthcare for patients with complex illnesses. This model can be disseminated within the participating organizations and developed both statewide and throughout the nation.

Summary

The elements of the *DNP Essentials* serve as a common thread for all nurses achieving their terminal degree, regardless of the candidate's practice specialty. This DNP project provides a tangible demonstration of the student's mastery of the fundamental components of the *DNP Essentials*. This project is predicated on the use of evidence-based practice to guide quality improvement and thus influence policy change. The ever-evolving, complex healthcare system of today demands ongoing diligence and application of scientific principles and interdisciplinary collaboration. The project has met the criteria outlined in each of the eight core competencies. It serves as a model for future expansion of the principal of appropriate deprescribing for populations beyond hospice patients residing in LTC.

Chapter Eight: Final Conclusions

Education, communication, and collaboration were foundational elements of this DNP project. The project began with the education of LTC facility providers and pharmacists regarding the evidence supporting a systematic reduction of unnecessary, harmful, or inappropriate medications for patients who reside in LTC and are nearing the end of their life. Implementation of the project continued with the development of a multidisciplinary, interagency team consisting of the LTC facility pharmacist, the hospice NP/DNP student, and, later, the hospice RN who conducted regular medication reviews for hospice patients residing in LTC. This team provided recommendations for deprescribing unnecessary medications to the facility MD and NP who, if they agreed with the recommendations, would then discontinue medicines that were no longer appropriate. Data collection and analysis showed that this process was both practical and sustainable, even during the COVID-19 pandemic.

Significance of Findings

As a result of the project intervention and subsequent establishment of regular medication reviews for hospice patients residing in LTC, the outcome goal of a ten percent reduction in the number of inappropriate medications was met and exceeded. This goal aligned with that of the Healthy People 2020 goal for a ten percent decrease in prescriptions for elderly adults with disabilities (HHS, 2019). Hospice patients, particularly those who reside in LTC, comprise a vulnerable population with complex health needs. Research is clear that fewer medications prescribed to patients at the end of life has a direct correlation to an improved quality of life, reduction in premature deaths, and decreased ADEs. This project achieved a 16% reduction in the *M* number of medications prescribed to hospice patients when comparing the initial data set to the final data set. When comparing the peak *M* of 2.8 medications per patient to the lowest *M*

of 2.1 prescriptions, there was a 25% reduction in the number of medications per patient in the target medication categories.

The educational session, in which the evidence-based benefits of a systematic reduction of unnecessary medications were presented, provided an opportunity to collect data on the current prescribing practices and attitudes toward deprescribing for the facility MD, NP, and PharmD. This education was foundational in the development of a collaborative, interdisciplinary team who made and implemented deprescribing recommendations. The pre- and post-educational session data collection tool provided insight into the effectiveness of the education. Providers and the pharmacist demonstrated an increased willingness to deprescribe using an evidence-based tool after the interventional session. Also, there was a shift in the project participant's attitudes toward and understanding of the ideal number of medications prescribed to patients nearing the end of life.

Equally as important was the establishment of regular, multidisciplinary meetings to review medications and provide recommendations for discontinuation of unnecessary drugs. The inclusion of both facility and hospice employees offered a pathway for improved inter-agency communication and facilitated the dissemination of deprescribing recommendations to the facility providers. The outcomes data supported the effectiveness and importance of the medication review process. Since the conclusion of the project implementation, the facility pharmacist and hospice NP have continued to meet regularly to review medications for hospice patients and provide ongoing recommendations for deprescribing. The continuation of the medication reviews and subsequent recommendations for deprescribing demonstrates the sustainability of the process and the value in applying the same quality improvement process in other LTC facilities.

The education and empowerment of facility and hospice nursing staff, which was the DNP project undertaken by a DNP leadership candidate in collaboration with this quality improvement project, was a pivotal element in the success of this undertaking. The collaborative nature of both projects underscores the benefit of a multidisciplinary approach to medication reduction for the welfare of the patient and the organization. Future quality improvement projects in LTC facilities must include both a clinical and leadership element for optimal implementation and success.

Project Strengths and Weaknesses

Strengths. One of the greatest strengths of this DNP project was the passionate support of the LTC facility administrator. Because she believed in the value of deprescribing, she took on the role of the project lead. The corporation that owns the LTC facility required an employee of the organization to act as the lead and complete specific learning modules before the author could obtain project approval. Without the facility administrator's support, this project would not have been possible.

Another strength of the project was its simple yet effective structure. The project design required only one intervention/educational session, which could be presented virtually if needed. Following the intervention, the project moved to regular medication reviews, a task already required of the facility pharmacist, and one that she whole-heartedly embraced. Regular medication reviews allowed recommendations to be developed in the natural course of the pharmacist's workday without adding undue time burden or extra work for this very busy healthcare professional. The hospice nurse joined the medication review process as a result of a PDSA cycle that identified a need to have current information on the patient's health status when making recommendations for deprescribing. The task of medication reviews was a part of the

hospice nurse's regular workday as well. The COVID-19 pandemic hit after the education intervention was completed, and several medication reviews had been completed in person with the pharmacist and the hospice nurse and hospice NP. Once the pandemic limited access to the LTC facility, the DNP student met with both the facility pharmacist and the hospice RN virtually for medication review and development of deprescribing recommendations. The cost of this project was minimal, but the benefits for the patient, the LTC facility, and the hospice agency both in terms of quality of life and cost savings have not yet been quantified or fully appreciated.

Weaknesses. One challenge of this project was the difficulty in gaining initial approval due to strict corporate policies at the LTC project site. Another weakness of this project was its dependence upon the willingness of the facility administrator and providers to embrace the importance of deprescribing. Finally, a notable weakness was the difficulty in establishing effective communication with the MD provider at the facility. Both the NP and pharmacist were responsive to electronic mail and cell phone text as well as virtual visits, but the physician communicated only in person. Once the COVID-19 pandemic struck in the middle of the implementation of the project, the DNP student was prohibited from going onsite. Thus, communication with the physician stopped.

Project Limitations

Limitations to implementation and successful completion of this DNP project were minimal. As previously noted, the LTC facility chosen as the project site required an employee to function as the project lead. This created some difficulty in adhering to the pre-implementation project timeline. The cost was minimal and included some printing costs for handouts and a modest budget for snacks during the educational session. The most significant limitation was the limited scope of the project and subsequent inability to demonstrate both

financial benefits for the organizations and the improvement of quality of life for the patient as a result of deprescribing.

Project Benefits

The benefits of this project were many. The cost was minimal, the impact was high, and the time invested is part of the natural workflow for most of the participants. The process for medication review was efficient and streamlined. These simple interventions had a measurable impact on project outcomes. The development of an interdisciplinary and interagency team for medication review fostered improved collaboration and communication for the benefit of the agencies' mutual patients. The target goal of a 10% reduction of unnecessary medications was successfully met and exceeded, providing adherence to goals set out in Healthy People 2020. The process of medication review is sustainable beyond the short implementation period. Finally, the project is easily reproduced in other LTC facilities.

Practice Recommendations

The most exciting element of this quality improvement project is the potential to replicate it in each of the LTC facilities where hospice patients reside. The process of educating pharmacists and providers with prescriptive authority on the benefits of deprescribing is essential. Providers and pharmacists employed in LTC are experts in their field but may not have experience caring for patients at the end of life. This vulnerable patient population is complex with multi-morbid health issues and demands a careful examination of the risks and benefits of continuing previously prescribed medications. Also, the establishment of regular medication reviews and recommendations for the systematic reduction of unnecessary medications can be applied to vulnerable populations who are not yet under hospice care.

During the process of medication review, it became evident that the participation of the hospice RN was integral to the understanding of the patient's condition and making appropriate deprescribing recommendations. Therefore, the bedside hospice nurse should be included in the multidisciplinary review of medications. In addition, concurrent education of the facility nurses by the DNP leadership student on deprescribing contributed to the success of this project through improved communication with patients, families, and facility providers regarding the benefits of eliminating unnecessary medications for hospice patients residing in LTC. Inclusion of the facility nursing staff in education on deprescribing and empowerment to discuss recommendations for medication reduction with providers, patients, and families is essential.

This project was able to continue despite the disruption of the COVID-19 pandemic. Development of virtual presentations for educational sessions will assure that evidence-based practices on deprescribing can continue in the post-COVID healthcare climate. Establishment of communication preferences for project participants is also essential. The inclusion of employees from both hospice and the LTC facility, as well as a variety of healthcare disciplines for medication review sessions, assures that recommendations for deprescribing are comprehensive and individualized. Finally, periodic analysis and dissemination of outcome data regarding medication reduction will validate the success of the project implementation. Furthermore, ongoing data analysis will contribute to future evaluation of the financial benefits and improvement in the quality of life for the hospice patient residing in LTC.

Final Summary

Polypharmacy has been established as a risk factor for poor quality of life, increased ADEs, and increased suffering for patients nearing the end of life. Hospice patients residing in LTC are particularly vulnerable to the adverse effects of polypharmacy and inappropriate

medication use. The use of a systematic process for the elimination of unnecessary, inappropriate, or harmful medications for this patient population will reduce the risk of ADEs and improve quality of life. Providers for hospice patients in LTC may not have expertise in end of life care. They may not be aware of the growing body of literature that establishes the benefits of systematic medication reduction as patients near the end of life. The elimination of unnecessary medications benefits the patient through reduced pill burden, an improved sense of well-being, and avoidance of ADEs. Both hospice and the LTC facility benefit as well, through reduction in the cost of medications, reduced workload for the bedside nurse, and potential cost savings during contract negotiations with their pharmacy vendor as a result of fewer prescribed medications per patient.

Through the dissemination of evidence-based research on the benefits of deprescribing to facility providers, new prescriptive patterns can and will emerge for hospice patients. A single educational session, including facility providers and pharmacists, is sufficient to establish the foundation of deprescribing practices. Establishment of a multidisciplinary, interagency team for systematic medication review and communicating deprescribing recommendations to facility providers is essential to the successful reduction of unnecessary medications. Data should be collected periodically to demonstrate the effectiveness of the intervention. Each of these project elements can be accomplished through virtual visits, if needed, due to COVID-19. Also, the framework for this DNP project can be applied to vulnerable populations in other settings. For hospice patients who reside in LTC, quality of life, and reduction of the burden of polypharmacy are essential issues to address. Although the demonstration of improved quality of life for patients and cost savings for hospice and the LTC facility is beyond the scope of this project, research has shown that both are achieved through medication deprescribing to reduce

polypharmacy. The cost of this project was minimal, the impact of the outcomes was significant, and the benefit to the patients was priceless.

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Appendix A

Figure 1. PRISMA Flow Diagram for Literature Search

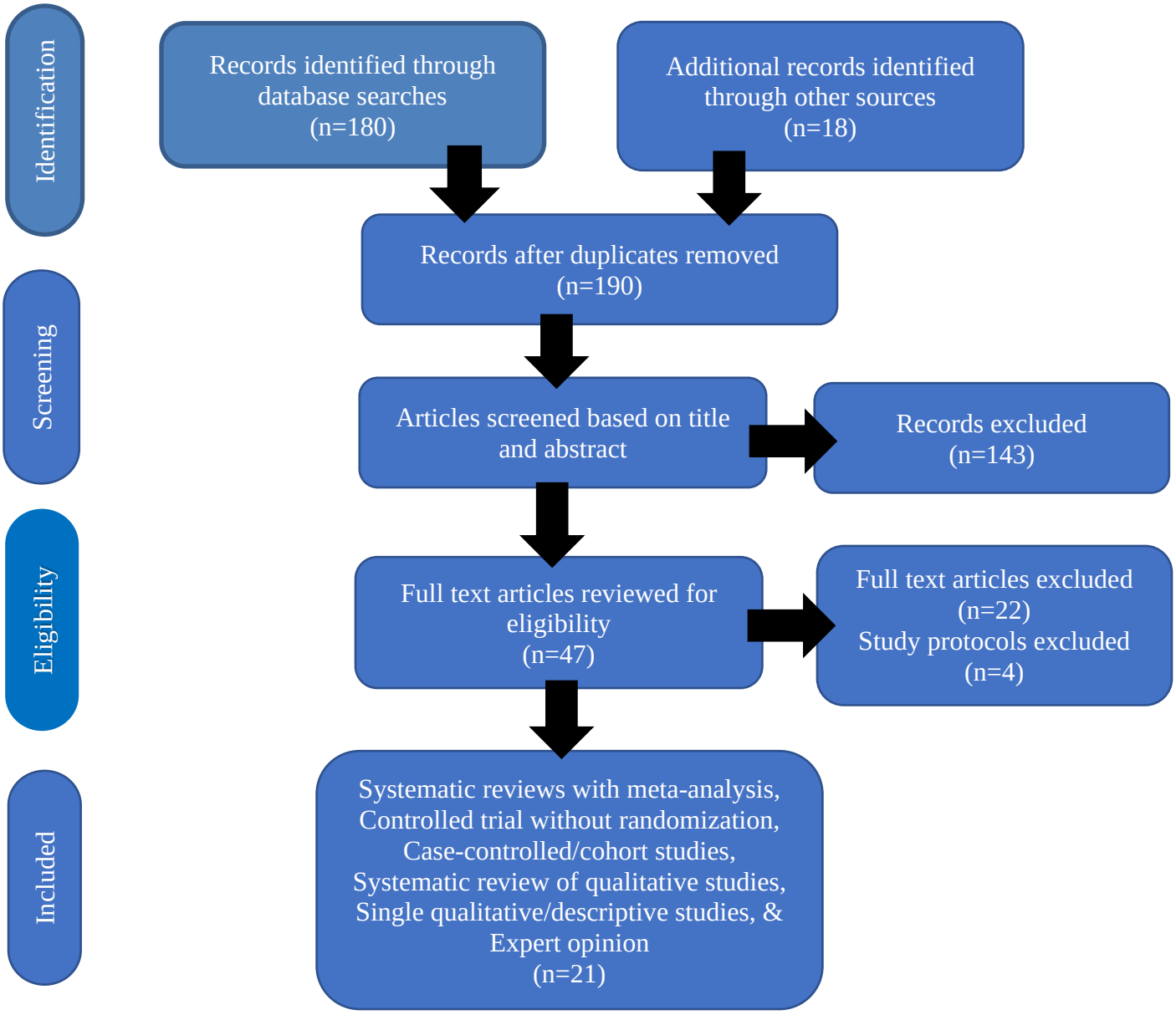

Figure 1. PRISMA flow diagram for selection of references in the literature search. The initial search yielded 4,279 articles and publications. With the inclusion of the MeSH terms medicine, nursing, pharmacy/therapeutics/pharmacology, anatomy/physiology, biology, public health, and sciences, as well as criteria for scholarly/peer review, English language, and 5-year recency limit, the number of useful articles declined to 180. The author found18 articles through other sources, with 8 duplicate articles. Using titles and abstracts to determine relevance to the project, the author eliminated 143 articles. For the remaining 47 pieces, the author reviewed the full text for content related to generalized deprescribing, long-term care setting, and end of life status, excluding a total of twenty-six articles. Twenty-one articles met the criteria for inclusion in the literature review.

Appendix B

Table 1

Literature Review Matrix

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Kua, C.-H., Mak, V. S. L., & Lee, S. W. H. (2018). Health outcomes of deprescribing interventions among older residents in nursing homes: A systematic review and meta-analysis. Journal of the American Medical Directors Association, 20(3), 372.e11. doi:10.1016/j.jamda.2018.10.026	Level I	Meta-analysis of randomized controlled trials (RCTs) conducted in LTC facilities with patients aged >59 showed deprescribing reduced the overall number of unnecessary medications by 59%. Using medication reviews to guide deprescribing reduced falls by 24% and mortality by 26%.	Deprescribing based on a structured medication review was shown to have significant benefits for older residents of LTC including reduced falls and premature death. More RCTs are needed assess effect of deprescribing specific medications and in populations with specific diagnoses and to assess impact on QOL, activities of daily living (ADLs) and cost savings.	Robust meta-analysis which is the highest level of evidence. 41 RCTs with over 18,000 LTC residents aged 60 or older were studied. This was not specific to end of life/hospice, but showed strong evidence that elimination of unnecessary medications reduces ADEs and leads to a reduction in healthcare costs. This is the foundation of the DNP project.
Page, A. T., Potter, K., Clifford, R. & Etherton-Beer, C. (2016). Deprescribing in older people. Maturitas, 91, 115-134. doi:10.1016/j.maturitas.2016.06.006.	Level I	Evidence of medication effects in older adults poorly studied (30-35% of study subjects >age 65. 98% of older adults have at least two chronic conditions. Frail older adults have highest risk for adverse drug events (ADEs). 75% of older adults take 5 or more medications daily. Deprescribing is effective intervention for polypharmacy/inappropriate medication use.	Frequent medication review is necessary to ensure appropriate medication prescribing for older adults. Medications that are well tolerated may not be appropriate as people age. Medication reviews that align with patient goals of care lead to elimination of inappropriate/unnecessary medications. More high quality studies are needed to confirm current evidence that deprescribing is safe and "clinically relevant" for older adults (p. 131).	This study offered the highest level of evidence and supports the benefits of medication reduction for older adults. The conclusion is a strong recommendation for systematic medication review for hospice patients in long-term care (LTC) and appropriate deprescribing- the very essence of this DNP project.
Farrell, B., Richardson, L., Raman-Wilms, L., de Launay, D., Alsabbagh, M. W., & Conklin, J. (2018). Self-efficacy for deprescribing: A survey for health care professionals using evidence-based deprescribing guidelines. Research in Social and Administrative Pharmacy, 14(1), 18-25. doi:10.1016/j.sapharm.2017.01.003	Level III	Development and use of a survey to explore the relationship between use of evidence-based deprescribing guidelines and deprescribing of specific drugs in long-term care.	Use of evidence-based guidelines increases prescribers' self-confidence in creating and implementing plans for deprescribing specific medications.	The results of this study support the intervention being proposed to pharmacists and precribers in LTC facilities, namely use of an evidence-based guideline to assist in appropriate medication reduction for hospice patients in LTC.

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Curtin, D., Dukelow, T., James, K., O'Donnell, D., O'Mahony, D., & Gallagher, P. (2019). Deprescribing in multi-morbid older people with polypharmacy: Agreement between STOPPFrail explicit criteria and gold standard deprescribing using 100 standardized clinical cases. European Journal of Clinical Pharmacology, 75(3), 427-432. doi:10.1007/s00228-018-2598-y	Level IV	This case-control study used comparative markers to statistically correlate the Screening Tool of Older Persons' Prescriptions in Frail adults (STOPPFrail) tool for deprescribing inappropriate/ unnecessary medications at end of life to standardized cases. The STOPPFrail tool was found to have a positive predictive value of 89.3%, a strong correlation with the benchmark cases.	The STOPPFrail tool was found to be an objective decision-making tool that eliminates barriers to deprescribing for older patients with advanced disease. The authors suggest that the tool can be used in place of a pharmacy medication review for patients with complex morbidity to identify medications that are appropriate for deprescribing.	The STOPPFrail tool is emerging as a likely choice for inclusion in the toolkit binder that will be developed for the DNP project educational sessions for providers and pharmacists. This study is very relevant to the project due to its strong support of a decision-making tool that removes barriers to deprescribing. Limitations of the study include the use of theoretical case studies rather than actual patient charts.
van der Meer, H. G., Taxis, K., & Pont, L. G. (2018). Changes in prescribing symptomatic and preventive medications in the last year of life in older nursing home residents. Frontiers in Pharmacology, 8, 990. doi:10.3389/fphar.2017.00990	Level IV	Retrospective multicenter cohort study conducted using pharmacy data for patients 65 and older residing in LTC. Interventions included annual pharmacy review of medications.	A lower number of preventative medications were prescribed at end of life (EOL) for elderly LTC patients in this study. The authors surmise that this may be due to an increased awareness of the futility of statin medications in light of terminal illness or very advanced age. There were fewer statins noted among study participants.	This retrospective study suggests that awareness of the futility of preventative medications at EOL can lead to decreased pill burden due to deprescribing. This speaks to the need to advocate for an interdisciplinary system to review and reduce unnecessary medications in hospice patients who reside in LTC- which is the focus of this Quality Improvement DNP project.
Farrell, B., Pottie, K., Rojas-Fernandez, C. H., Bjerre, L. M., Thompson, W., & Welch, V. (2016). Methodology for developing deprescribing guidelines: Using evidence and GRADE to guide recommendations for deprescribing. PLoS One, 11(8), e0161248. doi:10.1371/journal.pone.0161248	Level V	Systematic review of qualitative literature to support development of an evidence based practice (EBP) guideline for deprescribing. Using an 8-step process, 3 guidelines were developed for specific drug classes including Proton Pump Inhibitors (PPIs), benzodiazepines, and antipsychotics.	A systematic approach of development of guidelines for deprescribing ensures adherence to EBP. Specific drug classes were chosen based on risk/benefit profile. Algorithm tools were developed for each guideline to assist in the deprescribing process.	Deprescribing is a complex undertaking, particularly for LTC residents at end of life. Development of EBP guidelines for deprescribing specific medication classes supports the goal of this DNP project, which is to provide education to providers and pharmacists regarding polypharmacy at the end of life. Systematic guidelines assist practitioners with the elimination of unnecessary or harmful medications. Strengths include use of structured feedback during the development of guidelines. Limitations include lack of direct patient input in the deprescribing process.
Jokanovic, N., Tan, E. C. K., Dooley, M. J., Kirkpatrick, C. M., Bell, J. S. (2015). Prevalence and factors associated with polypharmacy in long-term care facilities: A systematic review. Journal of the American Medical Directors Association, 16(6), 535.e12. doi:10.1016/j.jamda.2015.03.003	Level V	This qualitative systematic review revealed that 91% of residents in LTC take 5 or more medications and 65% take 10 or more. Using statistical analyses, polypharmacy was correlated to multiple comorbidities, symptoms of pain and dyspnea and recent hospitalization, cognitive decline, decreased function, number of prescribers and length of stay in LTC.	This systematic review demonstrates that older residents of LTC with multiple comorbidities are more likely to have polypharmacy and are at higher risk for adverse drug events (ADEs).	This study informs the DNP project as it demonstrates a high correlation between older patients residing in LTC and polypharmacy. Additional risk factors are recent hospitalizations, functional disabilities, cognitive impairment and multiple comorbidity. Strengths of the systematic review include well-designed studies with clear inclusion criteria and the focus on frail, advanced aged residents of LTC.

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Paque, K., Stichele, R. V., Elseviers, M., Pardon, K., Dilles, T., Deliens, L., & Christiaens, T. (2019). Barriers and enablers to deprescribing in people with a life-limiting disease: A systematic review. Palliative Medicine, 33(1), 37-48. doi:10.1177/0269216318801124	Level V	Systematic review of descriptive studies on enablers and barriers to medication deprescriping for paitent's at the end of life. Three barriers/enlabers were identified- organizational, professional and patient/family.	Five studies identified low organizational support and poor staffing as two significant barriers to medication deprescribing. Other barriers included poor communication skills, physician preferences to continue preventative medications and unclear patient goals of care.	This systematic review was specific to older adults at the end of life and highlighted specific barriers and enablers to deprescrpibing. Some of the barriers can be overcome and are important considerations for this project. Physician preference was noted as a barrier and the educational presentation for the DNP project will share evidence based practice (EBP)and guidelines to deprescribing to assist LTC providers and pharmacists in appropriate medication reduction choices.
Poudel, A., Yates, P., Rowett, D., & Nissen, L. M. (2017). Use of preventive medication in patients with limited life expectancy: A systematic review. Journal of Pain and Symptom Management, 53(6), 1110.e1. doi:10.1016/j.jpainsymman.2016.12.350	Level V	This qualitative systematic review looks at current evidence regarding use of preventative medications including statins, aspirin, antihypertensives, and osteoprosis meds in patients with limited life expectancy (LLE). 15 studies met the criteria including 3 in LTC.	Patients with limited prognosis continue to receive medications for preventative or chronic conditions that may be of limited benefit. Rigorous studies are needed to develop guidelines specific to reduction of preventative medications for patients who are nearing the end of life.	This review further supports the aim of the DNP project- to offer providers and pharmacists evidence based guidelines and specific medication categories to consider stopping for patients who have LLE.
Thompson, W., Lundby, C., Graabæk, T., Nielsen, D. S., Ryg, J., Søndergaard, J., & Pottegård, A. (2019). Tools for deprescribing in frail older persons and those with limited life expectancy: A systematic review. Journal of the American Geriatrics Society, 67(1), 172-180. doi:10.1111/jgs.15616	Level V	Systematic review of qualatative studies assessing the use of deprescribing tools to guide appropriate medication reduction for older adults nearing EOL. 15 tools were identified, but further research is needed to demonstrate a correlation between deprescribing, reduction in number of medications and improved outcomes.	The availability of tools to guide the deprescribing process was the focus of this systematic review. 15 tools were included with a variety of approaches to deprescribing. Tools focused on specific medications, comprehensive medication lists and frameworks for deprescribing.	This study will help to inform my DNP project through the selection of a tool for use with deprescribing of inappropriate medications. Only four of the tools have been tested in clinical practice and correlations to improved outcomes and perceived QOL cannot be made without further RCTs. The strength of this study was the patient population that was used including frail, elderly patients at EOL.
Todd, A., Husband, A., Andrew, I., Pearson, S.-A., Lindsey, L., & Holmes, H. (2017). Inappropriate prescribing of preventative medication in patients with life-limiting illness: A systematic review. BMJ Supportive & Palliative Care, 7(2), 113-121. doi:10.1136/bmjspcare-2015-000941	Level V	The focus of this qualitative systematic review was the ongoing prescribing of preventative medications to patients nearing end of life. The Screening Tool of Older Persons' potentially inappropriate Prescriptions (STOPP) was utilized along with the Beer's criteria and the Unnecessary Drug Use Measure to assess for medication appropriateness specifically focused on statins, antihypertensives, and diabetic medications.	The use of a systematic approach can assist practitioners to more easily assess for appropriateness of medication use in patients approaching the end of life. There are several resources including STOPP criteria, Beer's list, and Medication Appropriateness Index/Unnecessary Drug Use Measure to assist in deprescribing decision making. EBP, supported by current research and literature review, supports the discontinuation of unnecessary, inappropriate and potentially harmful medicaitons in order to reduce ADEs and improve patient QOL.	This research provides for tools to consider including in the DNP project for use by facility providers and pharmacists. Eliminating unnecessary/preventative medications is one of the expected outcomes of the project. Strengths of this study include a robust review of the literature with a unique focus on inappropriate preventative medication prescribing for patients at EOL. Limitations include the lack of a clear definition of preventative medications.

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Dees, M. K., Geijteman, E. C. T., Dekkers, W. J. M., Huisman, B. A. A., Perez, R. S G M., van Zuylen, L., . . . van Leeuwen, E. (2018). Perspectives of patients, close relatives, nurses, and physicians on end-of-life medication management. Palliative and Supportive Care, 16(5), 580-589. doi:10.1017/S1478951517000761	Level VI	Multicenter Qualitative Study using interviews with patients, relative, nurses, specialists and general practitioners. Focus of the study was perspectives regarding management of medications for patients nearing the end of life.	Perspectives on medication mangement at end of life varies among providers, patients and family members. This study informs the practice of deprescribing through demonstration of the need for clear communication to eliminate unnecessary medications at the end of life.	The project plan is developed to facilitate proper medication selection for deprescribing. In addition, collaboration with the patient and family to identify goals of care and beliefs about appropriateness of medication reduction is foundational to evidence-based practice and will be encorporated in the tools and recommendations provided for assistance with deprescribing.
McNeil, M. J., Kamal, A. H., Kutner, J. S., Ritchie, C. S., & Abernethy, A. P. (2016). The burden of polypharmacy in patients near the end of life. Journal of Pain and Symptom Management, 51(2),178-183. doi:10.1016/j.jpainsymman.2015.09.003	Level VI	Observational secondary analysis of medications taken by patients with advanced illness. 47% of patients had a cancer diagnosis, mean age was 74 and average number of prescribed medications was 11.5 at time of enrollment and 10.7 at time of death/end of study. Less than 7% of study participants took less than 6 medications while 32.8% of participants took >14 medications during the study.	Patients (n=244) at the end of life took a significant number of medications for management of chronic diseases unrelated to their terminal diagnosis or preventative medications such as vitamins and minerals. There is a pressing need for the development of systematic method of medication reviews and discontinuation of unnecessary/preventative medications for patients at end of life.	This study supports the premise that patients nearing end of life remain on a significant number of medications unrelated to symptom management or their terminal disease process. Systematic reviews of medications with elimination of unnecessary/harmful/limited benefit medications will reduce the pill burden at end of life.
Palagyi, A., Keay, L., Harper, J., Potter, J., & Lindley, R. I. (2016). Barricades and brickwalls- a qualitative study exploring perceptions of medication use and deprescribing in long-term care. BMC Geriatrics 16(15). Retrieved from https://search-proquest-com.jproxy.lib.ecu.edu/docview/1773939386?pq-origsite=summon	Level VI	This single qualitative study looked at opinions regarding medication reduction from the perspective of the patient, family and health care providers using focus groups. Providers agreed to the concept of polypharmacy but were unmotivated to deprescribe, while patients and famlies were unaware of the the possible side effects associated with inappropriate preventative medication use. Nine focus groups were formed consisting of patients, staff, family members. Another group was formed with physicians and 4 pharmacists.	This study concludes that primary providers are central to successful medication reduction, with effective communication being at the core of its success. More education is needed both with prescribers, LTC facility staff, patients and their families. Pharmacists expressed that facility staff need further training to recognize, report and act upon ADEs when they occur.	This study will inform the DNP project through inclusion of study results in the educational session, particularly in relation to physician communication with the patient and their surrogate decision makers, regarding rationale for deprescribing. Strengths of this study include inclusion of patients and family in the focus groups. Limitations include the small geographic area in which this study was conducted in New South Wales, Australia.
Paque, K., Elseviers, M., Stichele, R. V., Pardon, K., Vinkeroye, C., Deliens, L., …Dilles, T. (2019). Balancing medication use in nursing home residents with life-limiting disease. European Journal of Clinical Pharmacology, 75, 969-977. doi:10.1007/s00228-019-02649-6	Level VI	This is a single International qualitative study focused on risks and benefits of the use of preventative medications for patients residing in LTC who are nearing the end of life. The most commonly deprescribed categories were lipid-lowering medications (29%), followed by benzodiazepines (28%), minerals (21%) and antipsychotics (17%).	This study used the Screening Tool of Older Persons' Prescriptions in Frail adults with a limited life expectancy (STOPPFrail) evaluation tool to assess for appropriate medications to deprescribe. Only 33% of patients had at least one inappropriate medication eliminated and the mean number of chronic medications increased over the 6-month course of the study.	This study showed that there was limited deprescribing through the course of the study and inappropriate medications remained as part of most patient's regimen. The STOPPFrail tool was used to evaluate medication lists but was not used to assist with deprescribing The message for this DNP project is to utilize a tool, such as the STOPPFrail, to assist with decision making and not just evaluations.

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Schenker et al. (2019). Secondary analysis of a RCT looking at the impact of polypharmacy on symptom burden and QOL for patients with life-limiting illness nearing the end of life.	Level VI	RCT that initially measured statin discontinuation was used for secondary analysis of the association between polypharmacy, symptom burden and QOL. Statistical correlations shown between high number of medications and higher symptom burden/lower QOL	Polypharmacy- defined as taking >4 medications or unnecessary medications, is particularly burdensome for elderly hospice patients, leading to low QOL and high symptom burden. 47% of patients included in this study were >74 years of age, and 35% were hospice patients. Patients who took the greatest number of medications had the most significant symptom burden and lowest quality of life.	There was clinical signficance with higher number of medications and worsening symptom burden. Study had a component of hospice patients and the elderly and supports the foundational premise of this project, that reduced medication burden will lead to improved QOL. This was a secondary analysis which did not allow for determination of causation between polypharmacy and high symptom burden/low QOL.
Conklin, J., Farrell, B., & Suleman, S. (2019). Implementing deprescribing guidelines into frontline practice: Barriers and facilitators. Research in Social and Administrative Pharmacy, 15(6), 796-800. doi:10.1016/j.sapharm.2018.08.012	Level VII	This article was written following the Bruyere Evidence-Based Deprescriging Guideline Symposium that convened in March, 2018. 107 participants engaged in an interactive discussions to identify factors which block or facilitate use of deprescribing guidelines in clinical practice.	For deprescribing to be successful, practitioners must include patients and their families in the decision-making process. This is a foundational component of evidence-based practice. In addition, there must be a culture change that supports systematic reducation of medications. Deprescribing must become an integral part of conversations and evaluations at every level from providers to patients and caregivers.	Expert opinion paper that undergirds the premise of this DNP project- to work collaboratively and systematically in partnership with providers, pharmacists, patients and families to reduce unnecessary medications, improve outcomes and enhance quality of life for hospice patients residing in LTC.
Garfinkel, D., Ilhan, B., & Bahat, G. (2015). Routine deprescribing of chronic medications to combat polypharmacy. Therapeutic Advances in Drug Safety, 6(6),212-233. doi:10.1177/2042098615613984	Level VII	Expert opinion article on the need to reduce inappropriate medication use (IMU) and polypharmacy for the most frail and medically complex patients. There were four areas of emphasis for care of very old age, complex comorbid, dementia, frail and limited life expenctancy (VOCODFLEX) patients.	Polypharmacy includes even one inappropriate or harmful medication. Reduction of polypharmacy contributes to decreased adverse drug events and improved quality of life for VOCODFLEX patients. Guidelines are emerging that effectively reduce IMU.	Supportive opinion that seeks to change the culture of multiple medication use and fosters critical assessment of medication regimens for the selected patient population for this DNP project.
McGrath, K., Hajjar, E. R., Kumar, C., Hwang, C., & Salzman, B. (2017). Deprescribing: A simple method for reducing polypharmacy. Journal of Family Practice, 66(7),436-445. Retrieved from http://link.galegroup.com.jproxy.lib.ecu.edu/apps/doc/A501078210/HRCA?u=ncliveecu&sid=HRCA&xid=edad1fd6	Level VII	Expert opinion with case studies highlighting the challenges of medicaiton reduction for multimorbid patients. A step-wise process is used to eliminate unnecessary, harmful or inappropriate medications. The desired outcome is a reduction in adverse drug events (ADEs) and improved functional capacity for patients with complex disease processes.	Effective discontinuation of medications requires a systematic process that includes the patient or surrogate decision maker. Case studies provide suggested dialogue. Medication classes are reviewed and critiqued for risk/benefit of deprescribing. Patient and provider barriers examined and addressed.	This is a helpful article to address concerns and offer models for overcoming barriers commonly encountered with deprescribing. It will inform the DNP project by offering anticipatory guidance in addressing barriers to describing that may be encountered with both patients and providers.

Article	Level of Evidence	Data/Evidence Findings	Conclusion or Summary	Use of Evidence in EBP Project Plan
Mangin, D., Bahat, G., Golomb, B. A., Mallery, L. H., Moorhouse, P., Onder, G., . . . Garfinkel, D. (2018). International group for reducing inappropriate medication use & polypharmacy (IGRIMUP): Position statement and 10 recommendations for action. Drugs & Aging, 35(7), 575-587. doi:10.1007/s40266-018-0554-2	Level VII	International expert opinion statement offering action items bsaed on current guidelines as well as indentifying gaps in research for polypharmacy and medication reduction. This group consensus focused on the need for appropriate guidelines for deprescribing for patients with complex illness and multiple morbidities.	Polypharmacy contributes to increased morbidity and mortality, yet current guidelines are not derived from research based on patients with multiple comorbid conditions. Ten action points were developed to individualize guidelines for the most complex patients. In addition, 12 recommendations for research to address gaps in current knowledge were offered including tools for evidence-based guidelines (EBG for multimorbid patients.	The population that this DNP project targets are frail, debilitated and multimorbid patients who are nearing the end of life and reside in LTC. This statement highlights the challenges faced in applying current EBG developed for single-disease patients to patients with complex illness. An awareness that adjustments to accommodate multiple morbidities must be considered will contribute to the success of the project and ultimately reduction of unnecessary, inappropriate or harmful medications in the target population.
World Health Organization. (n.d.). The third WHO global patient safety challenge: Medication without harm. Retrieved from https://www.who.int/patientsafety/medication-safety/en/	Level VII	The World Health Organization (WHO) issued their third Global Patient Safety Challenge which focuses on reducing harm caused by medications. It is a call to reduce avoidable adverse effects from medications by 50% world-wide over 5 years. Offering a four-part strategic framework for implementation of action areas.	This Patient Safety Challenge was initiated in 2017 and comprehensively addresses aspects of polypharmacy that place all people at risk for harm. The WHO campaign targets patients, healthcare providers, pharmaceutical companies and health systems and calls for a fundamental culture change that will reduce ADEs and manage risks of polypharmacy.	The WHO's global Patient Safety Challenge calling for reduction of polypharmacy to improve quality of life and mitigate risk of ADEs is reflective of the values inherent in this DNP project. Risk reduction, avoidance of harm, improvement in quality of life and shared decision-making are the focus of this project, which meets the goals of this initiative.

Note: Literature matrix showing the articles included in the literature search with level of evidence, a brief synopsis of that evidence, a summary of findings, and value to this quality improvement project.

Appendix C

Figure 2. Roger's Theory of Diffusion of Innovation

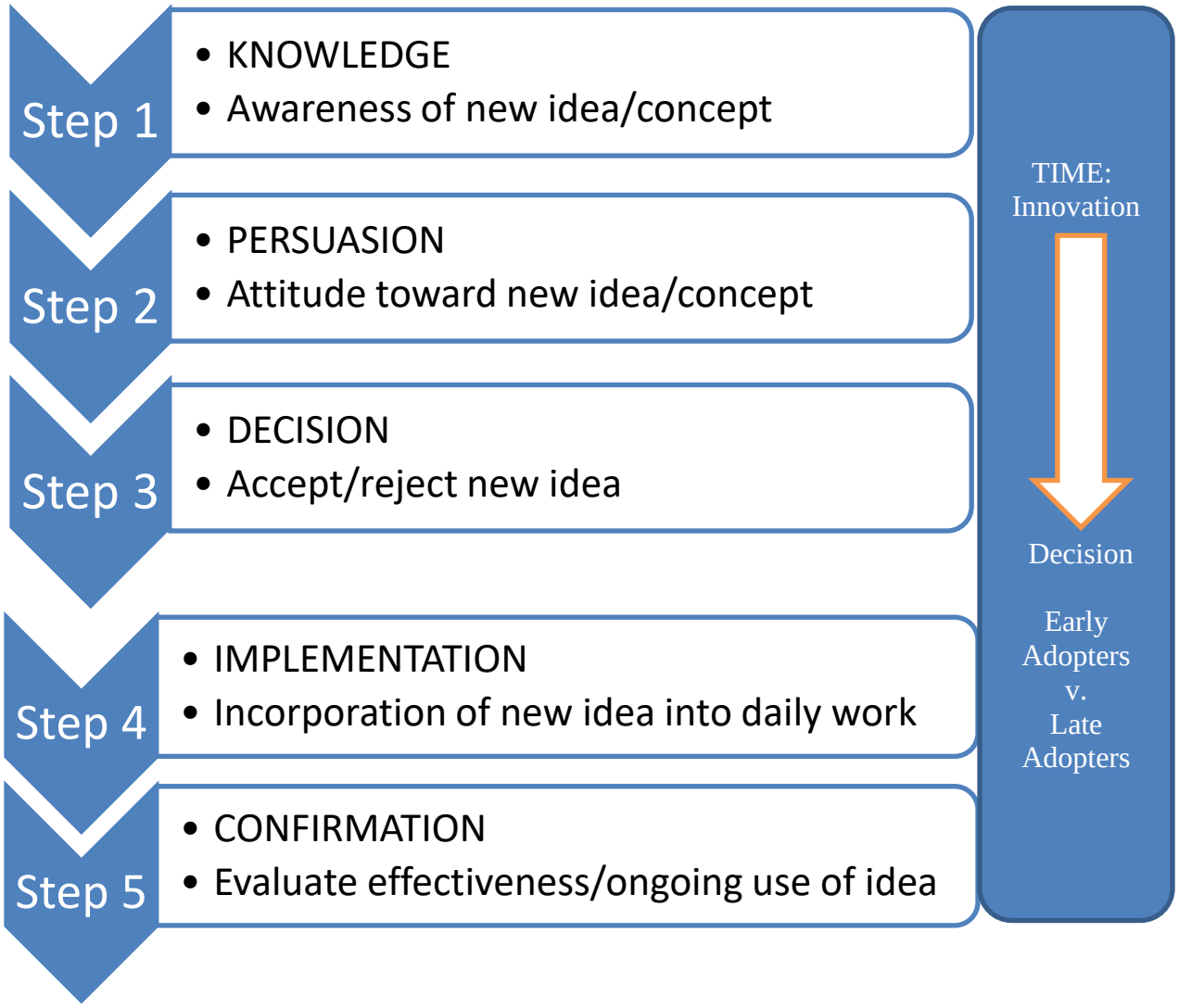

Figure 2. Roger's theory of diffusion of innovation includes a five-step innovation to diffusion process that occurs over time. The first step is awareness of a new idea, concept, or process. Next, through persuasion, attitudes change regarding the benefit of the new idea. The third step incorporates a decision to move forward with adopting the new idea or rejecting it. The fourth step is the implementation of the new process, idea, or concept. Early adopters are those that move quickly through the process and embrace the new idea with minimal effort. Late adopters take more time and energy to communicate the worth of adopting the new idea and incorporating it into their daily workflow. The final step involves confirmation of the benefit of adopting the new process or idea and ongoing evaluation of its worth and effectiveness.

Appendix D

Figure 3. Lewin's Planned Change Theory

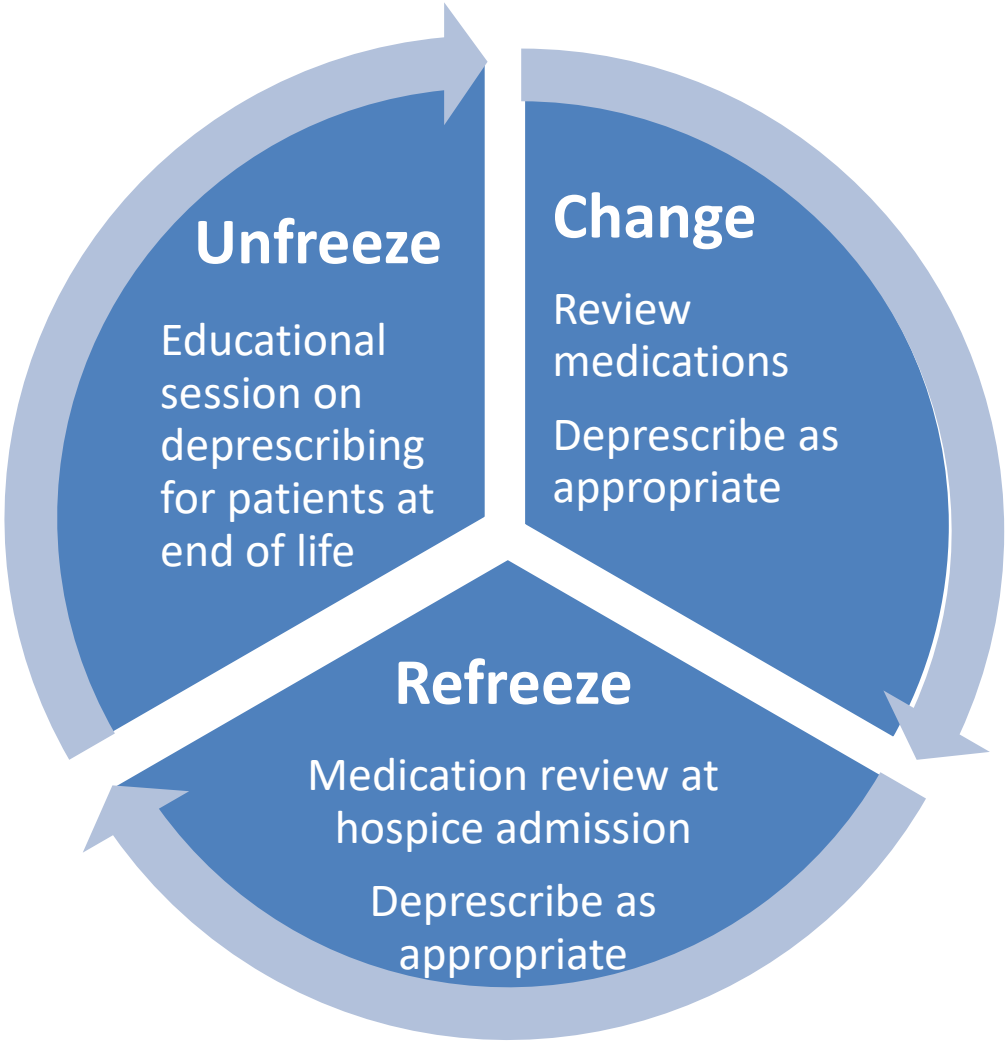

Figure 3. Lewin's planned change theory reflects a three-step process for systematic change. The first step is to unfreeze the status quo. For this DNP project, the first step was to create an awareness of the need to change prescribing practices for hospice patients residing in LTC through an educational session with providers and the pharmacist. The second step was to implement the planned change. Deprescribing tools and an electronic application were provided for project participants to assist with decision-making for appropriate deprescribing. The author communicated monthly with the providers and met biweekly with the pharmacist to address barriers to deprescribing, thus promoting acceptance and incorporation of the planned change into daily prescribing practice. The final step is to refreeze. This step occurs when the anticipated change, which was deprescribing of unnecessary, inappropriate, or harmful medications, becomes a part of the daily prescribing practices of the providers and is applied to all subsequent patients who are admitted to hospice while residing in LTC.

Appendix E

Figure 4. Plan-Do-Study-Act (PDSA) Cycle for Quality Improvement

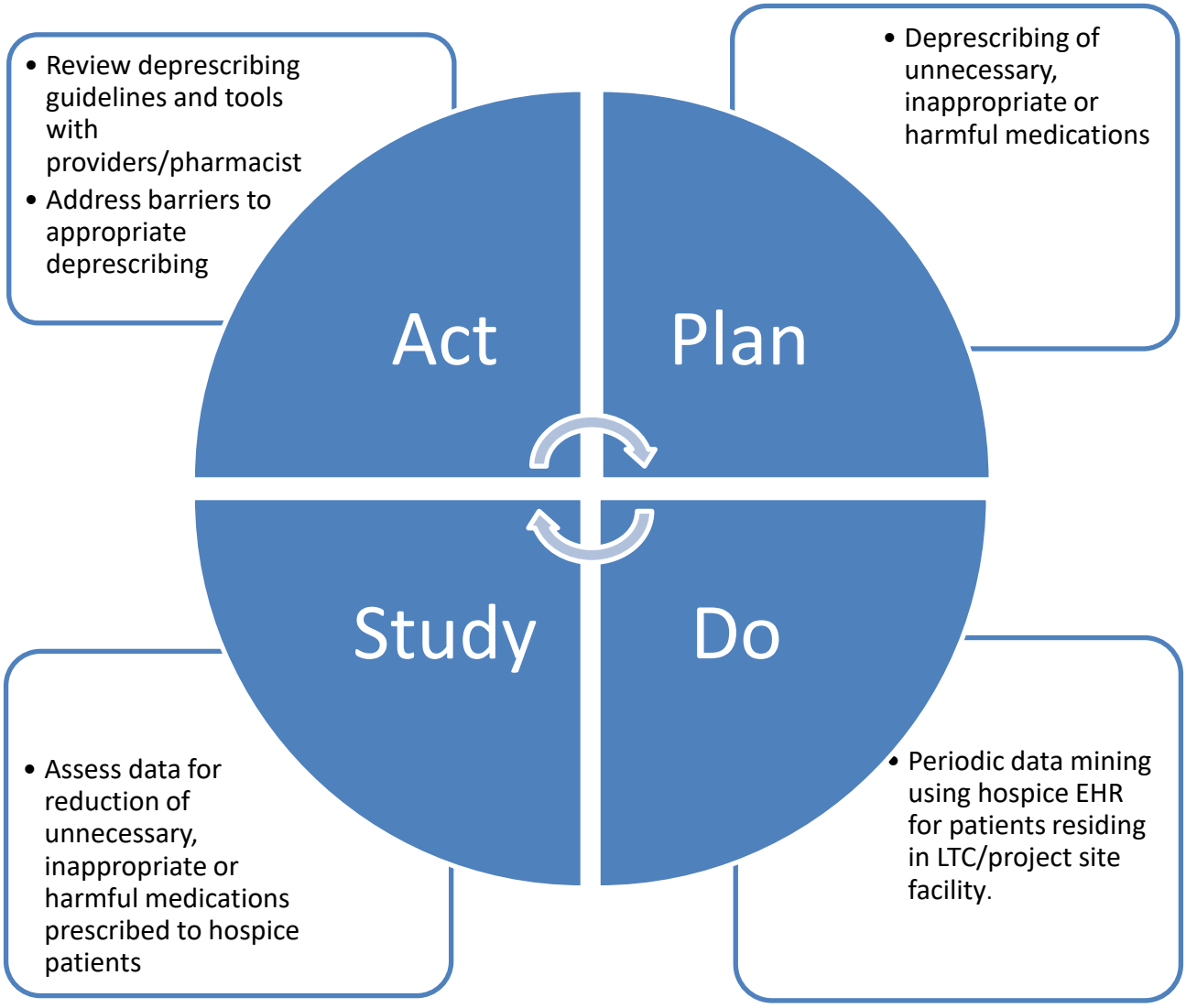

Figure 4. Plan-Do-Study-Act (PDSA) cycle for quality improvement was completed every two to three weeks during the DNP project implementation phase. This framework for assessing change guided the continuous quality improvement process and addressed barriers to change. The plan was the desired outcome for the project- deprescribing of unnecessary, inappropriate, or harmful medications for hospice patients residing in LTC. The second phase, do, involved collecting outcomes data on the number of target medications prescribed to each patient at six data collection intervals. The study phase involved an analysis of the data to determine the effectiveness of the educational intervention to achieve appropriate deprescribing for this unique patient population. The final step in each PDSA cycle was to act on the evaluation of the data by reviewing deprescribing guidelines and tools with the pharmacist and providers employed by the LTC facility. Once the author addressed barriers to deprescribing, a new PDSA cycle began.

Appendix F,

Figure 5. SWOT Analysis

Figure 5. The SWOT analysis of the DNP project reflected internal strengths and weaknesses as well as external opportunities and threats to the success of the project. Strengths included the expertise of the author/presenter, a substantial body of evidence supporting the practice of deprescribing for this patient population, and the availability of tools to assist in the decision-making process of deprescribing. Open access to data for analysis of outcome measures was an additional strength. Internal weaknesses included the time-consuming nature of the task of deprescribing and time constraints for the completion of the project and data analysis. The limited number of deprescribing tools for patients with complex illnesses and multiple comorbidities was an additional weakness. External opportunities included financial benefits to the hospice organization and the LTC facility in which the hospice patients reside. Pharmacists employed by the LTC facility provided expertise in recommending medications for deprescribing. Threats included the willingness of providers to incorporate another task into their busy practice and a reluctance to participate in the project education and follow up.

Appendix G

Figure 6. Hospice Letter of Approval

Date: July 16, 2019

To East Carolina University College of Nursing:

We at [ ] have reviewed Theresa (Terri) Isaacs' DNP Project Proposal "Medication deprescribing at the end of life in the long-term care population." Ms. Isaacs has organizational support and approval to conduct her Doctor of Nursing Practice student project within our institution. Our organization's liaison, or project champion, for the project is Myra McGinnis, CEO.

We understand that the timeframe for this project is from the date of this letter through August 1, 2020. Implementation at the project site will occur January 2020 through April 2020, unless otherwise negotiated. We understand that for Ms. Isaacs to achieve completion of the DNP program, dissemination of the project is required by the University and will include a public presentation related to the project and submission to the ECU digital repository, The ScholarShip. In addition, we understand that ECU College of Nursing encourages students completing exemplary scholarship to develop a manuscript for publication, but that is not a requirement. Our organization understands and agrees that the student will not use our organization's name in the formal project paper or any subsequent posters, presentations, or publications.

Our organization has deemed this project as a program or process development project. Our organization is aware that this project will be processed first through our organizational approval process and then through the ECI College of Nursing process, which may include a formal review through University and Medical Center Institutional Review Board of East Carolina University (UMCIRB), if needed. Our organization does not have an Institutional Review Board (IRB). We are aware that in the absence of an organizational IRB, the project will be submitted through the ECI College of Nursing review process which may include UMCIRB review if needed.

Thank you,

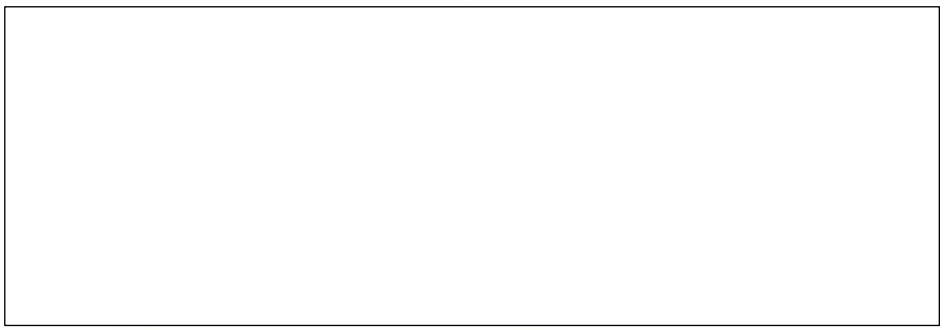

Figure 6. Letter of approval to conduct DNP project with the hospice organization.

Appendix H

Table 2.

DNP Project Budget

Item	Quantity	Unit Cost	Total
Educational presentations			
Handout- bound	20	$12.24	$244.80
Snacks for 12 participants			
Fruit Tray	2	$16.04	$32.08
Cookie Tray	1	$18.04	$18.04
Mileage	13.2	$0.58	$ 7.66
Total			$302.58

Note. The budget for the DNP project included a bound handout for each participant at the educational session, as well as additional reference folders for the final project outcomes presentation to each facility and East Carolina University. The food budget was for light snacks offered during the educational session. Total mileage for the project was initially budgeted with nine trips at 1 mile each from home to hospice and eight trips from home to the LTC facility at 1.4 miles each. The budget was revised after the COVID-19 pandemic led to restricted access to the LTC facility. The number of trips from home to hospice remained the same, but the author only made three trips from home to the LTC facility at 1.4 miles each.

Appendix I

Figure 7.

DNP Project Participant Pre-Education Data Collection Tool:
Medication Deprescribing at End of Life in the Long-Term Care Population

1. Before participating in a collaborative educational session on deprescribing, what do you consider to be the ideal number of medications prescribed for a hospice patient?
0 [ ] 1-5 [ ] 6- 10 [ ] 11-15 [ ] > 15 [ ]

2. Prior to participating in a collaborative educational session, how likely are you to deprescribe medications for patients who are currently under hospice care in your facility?
Very unlikely [ ] Somewhat unlikely [ ] Neither likely/unlikely [ ] Somewhat likely [ ] Very likely [ ]

3. Please indicate the categories of medications you would currently consider deprescribing for Hospice patients:
Vitamins/supplements [ ]
GERD medications [ ]
Statins/cholesterol medications [ ]
Anticoagulants [ ]
Cognitive enhancing medications [ ]
Antihypertensives [ ]
Diabetic medications [ ]

4. Do you currently utilize any tools or evidence-based guidelines for deprescribing?
Yes [ ] No [ ]

5. Before participating in this educational session, how many medications would you be willing to deprescribe at the same time?
0 [ ] 1-2 [ ] 3- 4 [ ] 5-6 [ ] > 6 [ ]

Figure 7. DNP project participants completed the pre-education data collection tool before the start of the educational session. This tool helped to promote awareness of a need for change and to assess provider/pharmacist readiness for changing prescribing practice.

Appendix J

Figure 8.

DNP Project Participant Post-Education Data Collection Tool:
Medication Deprescribing at End of Life in the Long-Term Care Population

1. As a result of your participation in this collaborative educational session on deprescribing, what do you consider to be the ideal number of medications prescribed for a hospice patient?
0 [ ] 1-5 [ ] 6- 10 [ ] 11-15 [ ] > 15 [ ]

2. After participating in this collaborative educational session, how likely are you to deprescribe medications for patients who are currently under hospice care in your facility?
Very unlikely [ ] Somewhat unlikely [ ] Neither likely/unlikely [ ] Somewhat likely [ ] Very likely [ ]

3. Please indicate the categories of medications you would consider deprescribing for Hospice patients based on the existing body of knowledge and best practice guidelines presented in this educational session:
Vitamins/supplements [ ]
GERD medications [ ]
Statins/cholesterol medications [ ]
Anticoagulants [ ]
Cognitive enhancing medications [ ]
Antihypertensives [ ]
Diabetic medications [ ]

4. Do you feel the tools and guidelines for deprescribing presented today will be helpful in assisting you to reduce inappropriate or unnecessary medications for hospice patients under your care?
Yes [ ] No [ ]

5. After participating in this educational session, how many medications would you be willing to deprescribe at the same time?
0 [ ] 1-2 [ ] 3- 4 [ ] 5-6 [ ] > 6 [ ]

Figure 8. DNP project participants completed the post-education data collection tool at the conclusion of the educational session. This tool evaluated the effectiveness of the educational session to raise awareness of the importance of deprescribing for hospice patients and provider/pharmacist willingness to engage in the process of medication reduction through deprescribing.

Appendix K

Table 3.

Evaluation Tool for Outcomes Measurement

Final Outcomes Data 4/20/2020								
Patient #	Vitamins/Supplements	Statins/cholesterol lowering	Anticoagulants	Cognitive Enhancing	Antihypertensives	Diabetic Medications	GI Reflux	Total
1					1		1	2
2	D/C 2/3/2020							0
3	D/C 1/19/2020							0
4					1			1
5								0
6	D/C 3/4/2020							0
7	D/C 1/18/2020							0
8	D/C 2/2/2020							0
9	1		1		1			3
10							1	1
11					2		1	3
12	D/C 4/13/2020							0
13			1					1
14	D/C 3/28/2020							0
15	1		1		3		1	6
16			1				1	2
17	D/C 3/31/2020							0
18	D/C 4/7/2020							0
19	D/C 4/18/2020							0
20	D/C 4/20/2020							0

Note. Excel spreadsheet developed to analyze outcome data and evaluate the success of the DNP project. Data were collected at the start of the project, at four intermediate points during implementation, and the conclusion of the project implementation phase. Data were analyzed to track the progress of deprescribing efforts throughout the project implementation. Outcomes data showed the changes in the number and types of medications prescribed/deprescribed for hospice patients residing in LTC in seven specific medication categories.