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Improving Medication Adherence in the Older Adult Population Through the Utilization of Home Delivery and Single Dose Packaging Programs

Item Type	Capstone Project (Campus Only)
Authors	Anderson, Julia
DOI	https://doi.org/10.7275/28613930
Download date	2024-11-02 04:35:17
Item License	http://creativecommons.org/licenses/by-nc-nd/3.0/
Link to Item	https://hdl.handle.net/20.500.14394/38023

DNP Project Final Write Up

Improving Medication Adherence in the Older Adult Population Through the Utilization of
Home Delivery and Single Dose Packaging Programs

Julia Anderson

University of Massachusetts Amherst College of Nursing

DNP Project Chair: Pamela Aselton PhD, FNP- BC

Mentor: Mary-Anne Grafton

Date of Submission: April 12, 2022

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Abstract

Background: Older adults often suffer from comorbid conditions, impaired mobility, and lack of transportation, all of which can impact medication adherence.

Purpose: This project sought to analyze the impacts of dose sorted home delivered medication use on health outcomes in older adults and promote its use at a local senior center.

Methods: The DNP student intended to assist older adults in enrolling in pharmacy services that offer home delivery, however no participants enrolled. This project shifted focus to gathering feedback from older adults on hesitancy to utilize online pharmacies as well as professional opinions of pharmacists and nurse practitioners on potential barriers to online pharmacy use. This qualitative data was gathered via in-person interviews and common themes were reviewed with the project chair.

Results: Pharmacists and nurse practitioners identified that medication adherence is impaired in this population, but thought that many patients either do not recognize the problem or do not see impaired adherence as problematic. Mail order pharmacy services may be beneficial for this population, but many older adults prefer in-person interaction and would be hesitant to rely on these services. The older adults who were interviewed said they liked visiting their pharmacy and did not want to change. Providers also have little knowledge of or experience with these services and therefore do not recommend them to patients.

Conclusions: Impaired medication compliance is a problem for older adults, providers, and the healthcare system. Mail order pharmacy services may alleviate this, but older adults and providers are hesitant to use them. Future projects may benefit from addressing the reasons for hesitancy to utilize these services.

Keywords: adherence, mail order pharmacy, older adults

Improving Medication Adherence in the Older Adult Population Through the Utilization of Home Delivery and Single Dose Packaging Programs

Introduction

This project sought to examine the current evidence on the correlation between home delivery prescription services and medication adherence in older adults and implement a quality improvement project to increase adherence. A pandemic during the enrollment period and general lack of interest hindered participation in this project. As a result, this project gathered qualitative data from potential participants, pharmacists, and nurse practitioners about potential barriers to online pharmacy use.

Background

Nonadherence is broadly defined to include failure to initiate therapy, not taking the medication as prescribed, and discontinuing the medication before therapy is completed. Medication nonadherence is associated with higher morbidity, mortality, and hospitalizations, yet a third of Americans do not take their medications as prescribed (Bartlett Ellis et al., 2020). This problem negatively impacts both the patient and the health care system. Poor medication compliance is a leading cause of preventable healthcare spending, contributing \$290 billion a year in avoidable costs (Bartlett Ellis et al., 2020).

Older adults are particularly prone to poor medication adherence, which often leads to impaired treatment success for many chronic diseases (Uchmanowicz et al., 2018). Up to 50% of older adults are estimated to have impaired adherence. As a group that often suffers from multiple comorbidities, older adults are at risk for negative health outcomes when medication adherence is impaired (Marcum et al., 2017).

While many factors affect medication adherence, studies have shown that inconvenience in obtaining medications from a pharmacy decreases the likelihood of compliance (Bartlett Ellis et al., 2020). Home delivery of medications may alleviate the inconvenience. Though patients may be concerned about cost, a study of five different insurance plans showed that, in general, out of pocket cost is lower for home delivered medications than pick-up from retail pharmacies (Clark et al., 2009). Home delivery of medications may be a cost-effective way to improve adherence by addressing inconveniences of medication procurement.

Problem Statement

Risk of chronic disease associated health consequences related to impaired medication adherence among adults aged 65 and over is indicated by increased Emergency Department visits and hospitalizations (Gillespie et al., 2020) and results from inconvenient medication packaging and delivery and impaired cognition and vision (Cross et al., 2020).

Gap Analysis

Medication non-compliance is common in the older adult population. In a study of Medicare beneficiaries, 19% of prescriptions were still not filled within a month and one out of every four prescriptions were not filled within a week (Franklin et al., 2018). In one study of older adults, 40% had poor medication compliance. Of those patients, 73% reported that their non-compliance was due to poor memory. The second most common reason for non-compliance was that patients ran out of the medication (Rodgers et al., 2017).

While cognitive impairment is difficult to modify, it is possible to improve the clarity and ease of medication delivery. Older adults would likely benefit from improved medication delivery systems. The project site, a community senior center, would benefit from a program that improves medication delivery and simplifies patient use. Current practice for outpatient care is to

send prescriptions to the patient's retail pharmacy of choice. The patient must then find transportation to the pharmacy with each new prescription and refill. They are solely responsible for remembering to request refills. The patient is also responsible for removing the correct doses of medications from pill bottles and organizing them in a way in which they remember to take the correct dose at the correct time. For patients with transportation, cognitive, mobility, or dexterity impairments or difficulties, this may hinder their ability to take medications as prescribed.

Review of Literature

Literature reviews were conducted in both PubMed of the National Library of Medicine and Cumulative Index of Nursing and Allied Health Literature (CINAHL). Search terms included: online pharmacy OR e-pharmacy OR medication delivery OR specialized packaging OR prepackaged OR prescription delivery OR mail order AND compliance OR adherence AND elderly OR older adult OR geriatric OR senior. The category regarding medication delivery was intentionally broadened to include all possible variations of the terms used to describe the home delivery of medication as opposed to traditional in-person pharmacy services. Adherence and compliance were both included as they are often used interchangeably. The population of interest was included in the search terms to exclude younger adults and children as they are outside the scope of this review.

Results were limited to peer-reviewed articles published in English from 2010 to present. Only original research was included, meta-analyses and reviews of literature were excluded. Eight duplicates were also excluded. The search criteria yielded 26 articles in CINAHL and 70 articles in PubMed. Articles were further excluded if they discussed inpatient care (17), focused on the pharmacy's experience with medication delivery (49), or were studies conducted in

countries other than the United States (20). Ten studies analyzed the effect that home medication delivery had on patients in an outpatient setting and were selected for further review.

All of the selected articles sought to evaluate the impacts of mail order pharmacy services, though some focused on specific populations or varied in their purpose. Iyengar et al. (2013) specifically examined patients taking medications for diabetes, hypertension, and high cholesterol while Schmittziel et al.'s (2011) analysis focused on LDL-C control in new statin users and Schwab et al. (2019) and Sharma & Taylor (2012) tracked adherence in patients taking oral antidiabetic drugs. Pham et al. (2017) focused on HIV patients and tracked viral load to determine if mail order pharmacy services would improve medication compliance.

Another study analyzed the safety of mail order pharmacies. Schmittziel et al. (2013) looked for any negative health outcomes in mail order pharmacy users. Two studies analyzed the effects of new programs intended to improve adherence. Moore et al. (2016) studied a new pharmacy model that allowed for specialized medications to be delivered to the patient's home. Zillich et al. (2012) evaluated a program that combined telephone support, home delivery, and specialized single dose packaging. Though the stated purpose and population of interest varied between studies, all sought to evaluate the impacts of medication delivery.

Study Designs in Literature Review Articles

The nature of the topic prevented truly randomized control trials. Selection bias was unavoidable. Though a random sample of patients may have been offered inclusion in a mail order pharmacy program, those that agreed may have previously had different compliance levels than a matched control group. Furthermore, there was no way to conduct a blind study, as patients would be aware of whether they were in the control or intervention group. Nevertheless, many of the selected studies included thorough, in depth study designs. Studies were either

retrospective or cross-sectional. Four of the studies, Moore et al. (2016), Schmittziel et al (2011), Schwab et al. (2019), and Zillich et al. (2012) included matched cohorts in attempt to control for confounding variables. However, Moore et al. (2016) included a matched cohort for the pharmacies, not the individual patients, which does not address differences in patient demographics. Additionally, the Zillich et al. (2012) cohorts consisted of the intervention cohort, all those that enrolled in the program, and the control cohort, all those that declined. This creates inherent selection bias in which the groups cannot be reliably matched. The two studies that created truly matched cohorts, Schmittziel et al. (2011) and Schwab et al. (2019), were the strongest study designs reviewed.

Strength of Evidence

All studies were level three strength as they were non-experimental studies. Eight studies were rated as good quality. Literature reviews were thorough, results were consistent, and conclusions were detailed. However, the nature of the studies made control very difficult and none of the studies were randomized. The two studies with matched cohorts, Schmittziel et al. (2011) and Schwab et al. (2019), rated as high quality because though they were unable to randomize their samples, the results were reliably adjusted for confounding variables.

Samples in the selected studies were sufficient overall. Eight of the studies had sample sizes greater than 10,000. Patients were selected from insurance company, medical group, and retail pharmacy databases. Two studies had smaller sample sizes. Moore et al. (2016) studied 115 retail pharmacies and a matched control group of 115 pharmacies. Because the pharmacies were selected as the sample, and not individual patients, the sample size is smaller. However, the total number of patients evaluated is in line with the other studies. Pham et al. (2017) followed a small sample of 378 HIV patients, as the specificity of their study limited the number of

participants that met inclusion criteria. The limited sample, though small, allowed the researchers to analyze very specific markers of adherence, thus strengthening the study.

Literature Findings

Studies varied in their purpose, populations, and specific markers of adherence. The different study types, variety of adherence markers, and suggestions for further consideration or future areas of study all strengthened the formation of this project, its goals, and its methods.

Measures of Adherence

Of the studies selected, seven defined what they considered “good adherence”. All that defined good adherence agreed that it referred to the correct usage of medications 80% of the time. Many of the studies tracked adherence solely by number of prescriptions filled. Though a patient in possession of the medication is much more likely to be adherent than a patient who does not have the medication, and is therefore unable to take it, possession does not necessarily prove adherence. Several studies, Pham et al. (2017), Schwab et al. (2019), Schmittiel et al. (2011), and Zillich et al., (2012) expanded their analysis of adherence to include blood work to determine treatment efficacy, Emergency Department visits, and hospitalizations. These objective values strengthened the suggestion of adherence.

Though adherence was measured differently across studies, all ten found that mail order pharmacy use is associated with higher levels of adherence. Several studies went further to discuss other health benefits associated with mail order pharmacy use. Neil et al. (2018) studied recently discharged patients and found that mail order pharmacy patients were less likely to be readmitted to the hospital within 90 days than retail pharmacy patients. Pham et al. (2017) specifically studied viral loads in HIV patients and found that patients who used home delivery medication services had a higher likelihood of viral load suppression than patients who used

retail pharmacies. Schmittiel et al. (2013) found that patients who used mail order pharmacy services had fewer trips to the Emergency Department.

Schmittiel et al. (2011) examined LDL-C levels in patients with new statin prescriptions and found that 85% of patients who used mail order pharmacy services reached their target level, compared to 74.2% of retail pharmacy users. Though Schwab et al. (2019) found no difference in glycemic control between retail pharmacy users and mail order pharmacy users with an A1c of <7%, control in patients with an A1c of <8% was significantly better in mail order pharmacy users. Furthermore, mail order pharmacy users were less likely to visit the Emergency Department or be admitted to the hospital. Zillich et al. (2012) also found that mail order pharmacy use was associated with fewer hospitalizations.

Points of Further Consideration

Though all of the studies selected were applicable to this project, some provided several especially important points of consideration. Duru et al. (2010), Neil et al. (2018), and Pham et al. (2017) all suggested that mail order pharmacy services may be especially beneficial to patients who have mobility or transportation limitations. As the population of interest for this project was older adults, many of whom have mobility and transportation issues, this was particularly useful.

Two studies, Iyengar et al. (2013) and Sharma & Taylor (2012) only studied patients aged 64 and younger, limiting the applicability of these studies to this project. Schmittiel et al.'s (2013) study was especially applicable to this project, as results were presented for both patients younger than 65 and patients 65 and older. Furthermore, this study found that a potential risk of mail order pharmacy use is an increase in overlapping supply of contraindicated medications. This finding will require further research to determine its impact on safety.

While many of the studies discussed older adults and examined factors such as lack of transportation that can lead to decreased compliance in the older adult population, this review of the literature failed to locate a study that focused on the older adult population specifically. Furthermore, only one of the studies assessed the impact of single dose medication delivery, which was of particular interest in this project. As this medication delivery model is still fairly new, future research may further examine single dose packaging.

One study found that many patients still prefer to pick up some medications from retail pharmacies (Moore et al., 2016). The study found that patients may prefer a program that offers the flexibility of mail ordering while allowing for some prescriptions to be picked up in person. Several online pharmacies that lack brick and mortar stores were considered for this project. This finding impacted the final selection of services to be offered in this project.

Literature Support for Mail Order Pharmacy Use

This review of literature revealed several studies exploring the impacts of mail order pharmacy use. Though varying study designs, sampling techniques, and study purposes were used, all found that mail order pharmacy use was associated with better medication adherence. In addition to adherence, many of the studies also examined health outcomes. Their findings suggested that mail order pharmacy use is not only associated with better adherence, but also fewer Emergency Department visits and hospitalizations, better glycemic control in diabetic patients, lower viral loads in HIV patients, and better LDL-C control in new statin users (Schwab et al., 2019, Neil et al., 2018, Pham et al., 2017, Schmittdiel et al., 2013, Zillich et al., 2012, Schmittdiel et al., 2011).

Zillich et al. (2012) studied both home delivery of medications and dose specific packaging. The inclusion of matched cohorts and expanded study of markers of adherence

strengthen the evidence, though the study was weakened by selection bias. The evidence from this study suggests that home delivery of dose specific packaged medications is correlated with higher levels of adherence and, consequently, better health outcomes.

Theoretical Framework

This project focused on improving health outcomes for older adults. Many older adults would prefer to age in place and stay in their own homes as long as possible. This requires some autonomy, which can be hindered by chronic illness. Older patients with poorly managed chronic conditions are more difficult to care for at home (U.S. Department of Health and Human Services, 2017).

This project used Orem's Theory of Self-Care Deficits (Appendix A) as a framework. This theory focuses on intervening to help patients maintain autonomy and suggests that patients who maintain some independence, are better able to recover from illnesses ("The Pivotal Role of Orem's Self-Care Deficit Theory", 2020). Home delivery of dose specific medications allows the patient to maintain a higher level of independence in the procurement and administration of medications and helps improve health outcomes to allow the patient to better age in place.

This project was later adapted from its original form to utilize qualitative data. Qualitative data allowed this DNP student to describe why there may be hesitancy to utilize online pharmacy services. Castleberry and Nolen (2018) discuss the value of qualitative data in healthcare research. Their insight on thematic analysis guided the analysis of and conclusions drawn from the qualitative data gathered. Castleberry and Nolen's method of thematic analysis begins with compiling the data. They suggest that the researcher compile the data themselves so that they may become familiar with the content. Next, the data must be disassembled. During this step, the data is analyzed for similarities and differences. Next, the data is reassembled. Patterns

are noted and themes are formed. Finally, the data is interpreted. The themes are analyzed, and conclusions are drawn. Castleberry and Nolen contend that this practice produces more credible data. This method of thematic analysis will be used to interpret the results of this project.

Methods

This project was implemented at a local suburban senior center that commonly sees adults 65 and older. The DNP student sought to identify patients who may benefit from streamlined medication delivery, educate them on the process and benefits, and assist them in enrollment. Zillich et al. (2012) evaluated the benefits of such programs and found that hospitalization rates and emergency room visits were lower in patients who utilized these services.

Ultimately, patients were uninterested in enrolling in these services. In addition to the lack of interest there was a large reduction in the number of senior center activities offered and a decrease in the number of potential project participants coming to the site. Per senior center data, there were only 1,597 registered members in 2021 as compared to 5,588 in 2019. There was a reduction from 70 weekly programs, classes, and activities offered in 2019 to only 25 in 2021. Furthermore, many of those that did come to the center were hesitant to sit and speak with a stranger during a pandemic, regardless of mask use. As a result of disinterest and reduced senior center visitors, no participants enrolled.

Goals and Objectives

Due to a lack of interest in the program and a concurrent pandemic, this project did not ultimately meet its desired goal enrollment. As a result, the DNP student identified and worked towards achieving new goals. The primary goal of this project became determining why older adults are hesitant to enroll in these valuable services.

1. The first short term goal was to speak with ten older adults and determine their reasons for not wanting to enroll in this project.
2. The next short-term goal was to speak with five pharmacists and ask for their professional opinions regarding online pharmacy use and patient hesitancy in utilizing these services.
3. The third short term goal was to discuss online pharmacy use with three nurse practitioners and gather their professional opinions on potential benefits and drawbacks of these services.

Data Collection Procedure

As this project shifted focus due to enrollment difficulties, potential participants who were ultimately uninterested in enrolling were asked for their reasoning of why they did not want to enroll. Pharmacists and nurse practitioners were then asked for their professional opinions on online pharmacy hesitancy in the older adult population.

The pharmacists selected worked at retail pharmacies in the vicinity of the senior center and see a similar population. The three nurse practitioners chosen were providers who are known to the DNP student who all prescribe outpatient medications and see a large older adult population. Pediatricians and inpatient providers were not chosen as their professional experience would not be applicable to the scope of this project.

The DNP student gathered qualitative data from 13 potential participants who ultimately chose not to enroll. The following questions were asked:

1. "Do you take prescription medications?"
2. "Would you be interested in a service that is covered by insurance and will deliver you medications at no additional cost?"

3. “Why not?”.

These answers were then used to formulate questions for pharmacists and nurse practitioners. Emails were sent to 20 local pharmacists asking if they would be willing to be interviewed on the topic of older adults using online prescription services. After receiving no responses, the DNP student traveled to local pharmacies and was able to speak in person with three pharmacists. The pharmacists were asked the following questions:

1. “Do you see evidence of reduced medication compliance in the older adult population?”
2. “What does that look like to you?”
3. “What potential benefits do you see a dose specific home delivery service offering?”
4. “What drawbacks do you see?”
5. “Why do you think these services aren’t more widely utilized?”.

The pharmacists’ answers and the information obtained from the participants that ultimately chose not to enroll were analyzed to formulate a series of questions to be presented to three nurse practitioners. The questions were as follows:

1. “Do you notice evidence of reduced medication compliance in your older adult patients?”
2. “What does that evidence look like?”
3. “Do you ever recommend specific pharmacies for your patients?”
4. “Why or why not?”
5. “What reservations would you have sending older adults’ prescriptions to an online

pharmacy?”

The qualitative data was then reviewed for trends with a second reader reviewing the data and helping to organize themes.

Ethical Considerations and Protection of Human Subjects

The University of Massachusetts, Amherst (UMASS) Internal Review Board (IRB) approval was obtained prior to initiating the DNP Project. If participants had enrolled in pharmacy services, personal identifying data would have had to be collected, so participants would have been provided the HIPAA Authorization Form prepared by UMASS, as included in Appendix B. As no participants ultimately enrolled, no identifying information was collected. As this project shifted to gathering qualitative data, there was no anticipated risk for older adults, pharmacists, and nurse practitioners providing their opinions. Responders were identified only by a number stored in a file that only the DNP student has access to and no mention of work sites was included. Those who participated in the qualitative interviews were not recorded or identified in any way in written materials.

Timeline

This project began in September with an excerpt about the project in the senior center’s fall newsletter so that potential participants were aware of the project and knew to look for the DNP student in the lobby. Enrollment in the project was intended to begin as early as October if participants were identified and continued through November and December. Instead, qualitative data gathered during attempted enrollment was used to formulate questions to ask pharmacists and nurse practitioners.

In February, pharmacists and nurse practitioners were interviewed. Later in February, data was analyzed, and the results were written up in a project summary which will be presented

to the participating agency.

Results

Qualitative data was gathered from 13 older adults, three pharmacists, and three nurse practitioners and analyzed for themes with two readers- the DNP student and advisor agreeing on themes after looking at the written data. Themes of each group's responses were identified and common themes along with specific quotes were summarized in tables. The qualitative data from potential participants is summarized below in Table 1.

Table 1

Themes in Older Adult Hesitancy to Use Online Pharmacies

Theme Identified	Example Quotes
No perception of impaired medication compliance	<p>“Oh I take all of my pills”</p> <p>“I don't forget too often”</p> <p>“I don't think I need that, I only take three or four pills a day”</p>
Satisfaction with current pharmacy/pharmacist	<p>“She knows me, I really like her”</p> <p>“It's close to my house and has a drive through”</p>
Hesitancy to change	<p>“I've been going to my pharmacy for years, they have all my information”</p> <p>“I always know exactly how much it will cost”</p>
Enjoying social interaction of pharmacy visit	<p>“I like to talk to my pharmacist, sometimes I have questions”</p> <p>“Oh I like to go in and chat, I don't see many people anymore, it's nice to get out.</p>

The older adults that this DNP student spoke with were hesitant to utilize online pharmacies. A few people reported not taking many medications, but were unable to give an exact number. Several people reported no problems with compliance, or no perceived consequences from reported occasional non-compliance. Many were resistant to change, stating that they have a good relationship with their current pharmacist or that their pharmacy is in a convenient location. They liked that they were able to speak with the pharmacist whenever they picked up their medications.

This data was then used to formulate the following questions for pharmacists on their professional opinions of online pharmacies and medication compliance in the older adult population:

1. “Do you see evidence of reduced medication compliance in the older adult population?”
2. “What does that look like to you?”
3. “What potential benefits do you see a dose specific home delivery service offering?”
4. “What drawbacks do you see?”
5. “Why do you think these services aren’t more widely utilized?”.

Results of thematic analysis of the above questions are presented in Table 2.

Table 2

Themes in Pharmacist Professional Opinions Regarding Older Adult Medication Compliance and Online Pharmacy Use

Theme Identified	Example Quotes
Medication adherence is often impaired in	“They miss doses more frequently than the general population. It’s not uncommon to fill

this population	<p>a refill request five days after they should have run out”</p> <p>“Yes, I would say that is one of the more common populations with impaired compliance, though that could be due to the relatively large number of prescriptions that they receive”</p>
Many patients do not see impaired adherence as problematic	<p>“Many people have a rather lackadaisical approach to adhering to a medication regimen”</p> <p>“Maybe patients do not realize they have forgotten doses, they request refills when they run out and don’t know that they are a week behind”</p>
Home delivery and dose-specific packaging would be beneficial	<p>“We have a decent number of people that have to have other people bring them to the pharmacy because they can’t drive”</p> <p>“I would think that pre-packaged doses would simplify the process for the patient”</p>
Older adults are often resistant to change and may prefer in person versus online services	<p>“Good luck signing people up! I think they’d be skeptical”</p> <p>“They can have a lot of questions, so I would think that they would prefer in-person pharmacy services”</p> <p>“We’ve got some chatters! I think they appreciate the human interaction”</p>

The pharmacists that responded confirmed that the older adult population occasionally has impaired compliance. One pharmacist noted that though a lapse in refill requests may signify decreased compliance, the patient themselves often do not acknowledge it. Another pharmacist acknowledged that enrollment in this program would be difficult, as many of the patients that he sees have a lot of questions about their medications or seem to enjoy the human interaction. He believed that the patients that he sees would be hesitant to use online pharmacies.

All of the pharmacists spoken to believed that online pharmacy services would be beneficial for many older adults, as transportation is frequently an issue, and few in-store services offer dose specific packaging. Based on the professional opinions from the pharmacists and the information gathered from the older adults at the senior center, the following questions were formulated to ask nurse practitioners about their older adult patients and medication compliance:

1. “Do you notice evidence of reduced medication compliance in your older adult patients?”
2. “What does that evidence look like?”
3. “Do you ever recommend specific pharmacies for your patients?”
4. “Why or why not?”
5. “What reservations would you have sending older adults’ prescriptions to an online pharmacy?”

Feedback from the three nurse practitioners that were interviewed is presented in Table 3.

Table 3

Themes in Nurse Practitioner Professional Opinions Regarding Older Adult Medication Compliance and Online Pharmacy Use

Theme Identified	Example Quotes
Medication adherence is often impaired in this population	<p>“I get some refill requests well after they should have run out”</p> <p>“Some of them are pretty honest about forgetting to take medications”</p> <p>“Some people are on so many medications, I can’t imagine compliance is 100%”</p> <p>“I have a few that take all of their</p>

	prescriptions as needed. They only take them when they feel like they need them”
Online pharmacies aren’t typically considered	<p>“I don’t think I’ve ever recommended a pharmacy based on anything but distance and convenience”</p> <p>“I have a few people that do mail order, but they initiated it”</p> <p>“I just ask which pharmacy they use. I don’t recommend any specifically. Everyone already has a pharmacy that they like”</p>
Online pharmacies may require additional effort for the patient or provider	<p>“People would probably need help signing up, I don’t have time to do that at the end of an appointment. Maybe the MA could help?”</p> <p>“I wouldn’t even know how to prescribe to Amazon”</p> <p>“Are there extra hoops to jump through?”</p>

The nurse practitioners that this DNP student spoke with acknowledged decreased compliance in their older adult populations. They seemed to notice delayed refill requests from these patients. One nurse practitioner stated that several of her patients do not have a routine for medication use and only open certain pill bottles when they aren't feeling well. All of the nurse practitioners spoken with had questions about the ease of use for online pharmacies, both for the patient and the practitioner. None of the nurse practitioners had encouraged patients to use online pharmacies before. They all stated that they prescribe to the patient’s preferred pharmacy and only offer suggestions based on distance or reported GoodRX pricing.

Discussion

Though this project did not meet its intended goals, valuable information was obtained that may be useful to the success of future projects. The first important point is that older adults are hesitant to utilize these online services. This was anticipated, but what was not expected was

the amount of hesitancy encountered. One of the studies referenced for this project, Moore et al. (2016) spoke to the hesitancy of older adults to utilize solely internet-based services. Their study found that more than 54% of patients preferred to pick up prescriptions in store. The project attempted to overcome that barrier by including CVS Simple Dose, which would also allow the patient to utilize brick and mortar CVS stores. Older adults also often want all of their prescriptions at the same pharmacy so programs that also have retail locations, such as CVS with the option to pick up prescriptions are preferred.

This project may have been more successful in meeting its original goals if this point had been more thoroughly considered and if the reasons for in-store preference had been investigated. Future projects would be better served by anticipating this hesitancy and being prepared to combat certain points. For older adults who don't see their noncompliance as problematic, preparation to reference studies discussing the consequences of noncompliance may be of benefit.

For older adults who enjoy speaking with their pharmacist, stressing the availability of pharmacists via phone seven days a week may encourage more participants. For those who enjoy the human interaction of going to the pharmacy, this DNP student's hope is that as we emerge from this pandemic, these older adults will be able to safely interact with people in more settings and that their trip to the pharmacy will not be their sole source of human interaction.

Three factors would support older patients in using mail order services. First, many private insurance plans cover these programs. Additionally, several programs are covered by Medicare Part D. Medicaid also covers some of these programs (PillPack, n.d.). Second, providers are motivated to improve medication adherence and have likely already spoken with their patients about the importance of adhering to a medication regimen, further facilitating the

project. Providers spend a significant amount of time diagnosing disorders, selecting medications, and adjusting doses. However, if the patient does not take the medication as ordered, those efforts may be in vain. If a patient's blood pressure continues to be elevated, the provider may increase the dose. The dose may have been correct, but the patient may have been forgetting to take it. Finally, the project introduced a program that simplifies prescriptions for patients. For most of the programs, shipping is free (PillPack, n.d.).

In speaking with older adults and nurse practitioners, this DNP student also gained valuable information that we can use as providers. None of the nurse practitioners spoken to were familiar with enrolling patients in these services. None knew how to prescribe to Amazon Pill Pack or CVS Simple Dose and had never prescribed medications using either service. This theme was corroborated when speaking to older adults who had never heard of these services. Two of the nurse practitioners interviewed expressed concern about the time required to familiarize themselves with these services. With full patient schedules and rigid appointment slots, they were unsure if there would be time for them to learn how to prescribe to online pharmacies. The time required to enroll patients in these services would further reduce the time spent assessing and educating the patient on their health. Short webinars on these services may be beneficial for providers to quickly learn how to use these services, explain the programs to patients, and assist with enrollment.

As providers, we want to ensure the best possible health of our patients. Orem's Theory of Self-Care Deficit focuses on intervening to help patients maintain autonomy and suggests that patients who maintain some independence, are better able to recover from illnesses ("The Pivotal Role of Orem's Self-Care Deficit Theory", 2020). Prescribing medications and ensuring that they are taken properly improves autonomy and health. With data showing that online pharmacy

services improve compliance, providers should educate themselves on these services and be prepared to speak with patients about them. The provider is a trusted source for the patient. A recommendation for these services from the provider maybe more meaningful than the recommendation of this DNP student in the senior center lobby.

Cost-Benefit Analysis

The benefits of the original project, were it to be successfully reproduced, outweigh the costs, as summarized in Appendix C. If a nurse at the senior center were to spend 10 minutes assisting with the enrollment of each of the 30 program participants, the cost of their time would amount to \$165. The total costs related to the reproduction of this project, including office supplies, would amount to \$186.99. The benefits include better patient outcomes and time and funding saved in preventable hospitalizations and emergency care. The benefits of these improved patient outcomes and reduced strain on the healthcare system outweigh the costs of the time and office supplies required for this project.

Conclusion

Medication non-adherence is estimated to affect up to 50% of the older adult population and leads to poor health outcomes (Bartlett Ellis et al., 2020; Marcum et al., 2017). Several factors contribute to non-adherence, but an easily addressed issue is the simplicity and clarity of medication delivery. Impaired cognition and running out of medications are the top two reasons that older adult patients do not take medications as ordered (Rodgers et al., 2017).

Studies have shown that simplified programs that deliver medications in dose specific packaging are beneficial to patients with cognitive impairment or transportation issues (Zillich et al., 2012). This project sought to identify and enroll patients aged 65 and older in a dose specific medication delivery program to improve adherence. Markers of adherence were intended to be

gathered before and after implementation to determine the project's success. Unfortunately, older adult hesitancy and the pandemic made the originally planned project impossible to complete.

At the time of implementation, the offerings for senior center activities had been cut by 64% and registered members had dropped by 71%. In addition to decreased traffic, this DNP student was unable to gather a large enough sample size to sit and discuss pharmacy use, as many were hesitant to speak with a stranger during the pandemic. Those few who did stop to discuss were ultimately unwilling to enroll. Their reasoning for hesitation was analyzed and discussed with both pharmacists and nurse practitioners, which produced useful information for both future projects and practicing providers.

Future projects would be better served by anticipating older adult hesitation and preparing to overcome common reasons for this hesitation. This project may serve as an analysis of this hesitation. Future projects may also use the professional opinions obtained from pharmacists and nurse practitioners. A successful project may instead focus on nurse practitioners' prescribing habits instead of enrolling older adults.

Improved medication adherence benefits everyone. Providers who previously spent a significant amount of time making dose adjustments for non-adherent patients can use that time for more appointment slots, leading to more billable hours. Private insurance companies and government funded insurance entities save on avoidable costs, as poor medication adherence wastes an estimated \$290 billion a year in healthcare spending (Bartlett Ellis et al., 2020). Patients with better adherence are able to maintain their health longer, spend less time in the hospital, suffer fewer consequences of chronic illnesses, and age more safely in place (Iyengar et al., 2013; Neil et al., 2018; Schmittiel et al., 2013).

References

- Bartlett Ellis, R. J., Hertz, D., Callahan, P., & Ruppap, T. M. (2020). Self-reported nonadherence associated with pharmacy and home medication management inconvenience factors in a US adult population. *Patient Preference and Adherence*, 14, 529–539.
<https://doi.org/10.2147/PPA.S223408>
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds? *Currents in Pharmacy Teaching and Learning*, 10(6), 807–815.
<https://doi.org/10.1016/j.cptl.2018.03.019>
- Clark, B. E., Siracuse, M. V., & Garis, R. I. (2009). A comparison of mail-service and retail community pharmacy claims in 5 prescription benefit plans. *Research in Social & Administrative Pharmacy*, 5(2), 133–142. <https://doi-org.silk.library.umass.edu/10.1016/j.sapharm.2008.06.002>
- Cross, A. J., Elliott, R. A., Petrie, K., Kuruvilla, L., & George, J. (2020). Interventions for improving medication-taking ability and adherence in older adults prescribed multiple medications. *Cochrane Database of Systematic Reviews*.
<https://doi.org/10.1002/14651858.cd012419.pub2>
- Duru, O. K., Schmittiel, J. A., Dyer, W. T., Parker, M. M., Uratsu, C. S., Chan, J., & Karter, A. J. (2010). Mail-order pharmacy use and adherence to diabetes-related medications. *The American Journal of Managed Care*, 16(1), 33–40.
- Franklin, J. M., Mahesri, M., Krumme, A. A., Barberio, J., Fischer, M. A., Brill, G., Mckay, C., Black, H., & Choudhry, N. K. (2018). Time to filling of new prescriptions for chronic disease medications among a cohort of elderly patients in the USA. *Journal of General Internal Medicine*, 33(11), 1877-1884. doi:10.1007/s11606-018-4592-6

- Gillespie, C. W., Morin, P. E., Tucker, J. M., & Purvis, L. (2020). Medication adherence, health care utilization, and spending among privately insured adults with chronic conditions in the United States, 2010-2016. *The American Journal of Medicine*, 133(6).
<https://doi.org/10.1016/j.amjmed.2019.12.021>
- Iyengar R, Henderson R, Visaria J, Glave Frazee S. (2013). Dispensing channel and medication adherence: evidence across 3 therapy classes. *The American Journal of Managed Care*, 10, 798-804.
- Marcum, Z. A., Hanlon, J. T., & Murray, M. D. (2017). Improving medication adherence and health outcomes in older adults: an evidence-based review of randomized controlled trials. *Drugs & Aging*, 34(3), 191–201. <https://doi.org/10.1007/s40266-016-0433-7>
- Moore, J. M., Matlin, O. S., Lotvin, A. M., Brennan, T. A., Falkenrath, R., Kymes, S., Singh, S. C., Kyrychenko, P., & Shrank, W. H. (2016). The adherence impact of a program offering specialty pharmacy services to patients using retail pharmacies. *Journal of the American Pharmacists Association*, 56(1), 47–53.
<https://doi.org/10.1016/j.japh.2015.11.003>
- Morisky D. E., Ang A., Krousel-Wood M., Ward H. J. (2008). Predictive validity of a medication adherence measure in an outpatient setting. *Journal of Clinical Hypertension*. 10(5), 348–354. <https://doi.org/10.1111/j.1751-7176.2008.07572.x>
- Neil, W. P., Shiokari, C. E., Burchette, R. J., Stapleton, D., & Ovbiagele, B. (2018). Mail order pharmacy use and adherence to secondary prevention drugs among stroke patients. *Journal of the Neurological Sciences*, 390, 117–120. <https://doi.org/silk.library.umass.edu/10.1016/j.jns.2018.04.001>

- Pham, N., Lewis, S., & Avery, A. (2017). Impact of pharmacy proximity and delivery services on HIV viral suppression among low income urban patients. *AIDS and Behavior*, 22(3), 1025–1029. <https://doi.org/10.1007/s10461-017-1823-5>
- PillPack. (n.d.). *Plans We Work With*. <https://help.pillpack.com/hc/en-us/articles/360002112467-Plans-we-work-with>.
- Rodgers, J. E., Thudium, E. M., Beyhaghi, H., Sueta, C. A., Alburikan, K. A., Kucharska-Newton, A. M., Chang, P., Stearns, S. C. (2017). Predictors of medication adherence in the elderly: The role of mental health. *Medical Care Research and Review*, 75(6), 746-761. doi:10.1177/1077558717696992
- Schmittdiel, J. A., Karter, A. J., Dyer, W. T., Chan, J., & Duru, O. K. (2013). Safety and effectiveness of mail order pharmacy use in diabetes. *The American Journal of Managed Care*, 19(11), 882–887.
- Schmittdiel, J. A., Karter, A. J., Dyer, W., Parker, M., Uratsu, C., Chan, J., & Duru, O. K. (2011). The comparative effectiveness of mail order pharmacy use vs. local pharmacy use on LDL-C control in new statin users. *Journal of General Internal Medicine*, 26(12), 1396–1402. <https://doi-org.silk.library.umass.edu/10.1007/s11606-011-1805-7>
- Schwab, P., Racsa, P., Rascati, K., Mourer, M., Meah, Y., & Worley, K. (2019). A retrospective database study comparing diabetes-related medication adherence and health outcomes for mail-order versus community pharmacy. *Journal of Managed Care & Specialty Pharmacy*, 25(3), 332–340. <https://doi.org/10.18553/jmcp.2019.25.3.332>
- Sharma, K. P., & Taylor, T. N. (2012). Pharmacy effect on adherence to antidiabetic medications. *Medical Care*, 50(8), 685–691. <https://doi-org.silk.library.umass.edu/10.1097/MLR.0b013e318249d800>

The Pivotal Role of Orem's Self-Care Deficit Theory. (2020, May 11).

<https://online.regiscollege.edu/blog/the-pivotal-role-of-orems-self-care-deficit-theory/>.

Uchmanowicz, B., Chudiak, A., Uchmanowicz, I., Rosińczuk, J., & Froelicher, E. S. (2018).

Factors influencing adherence to treatment in older adults with hypertension. *Clinical Interventions in Aging*, 13, 2425–2441. <https://doi.org/10.2147/CIA.S182881>

U.S. Department of Health and Human Services. (2017, May 1). *Aging in Place: Growing Older*

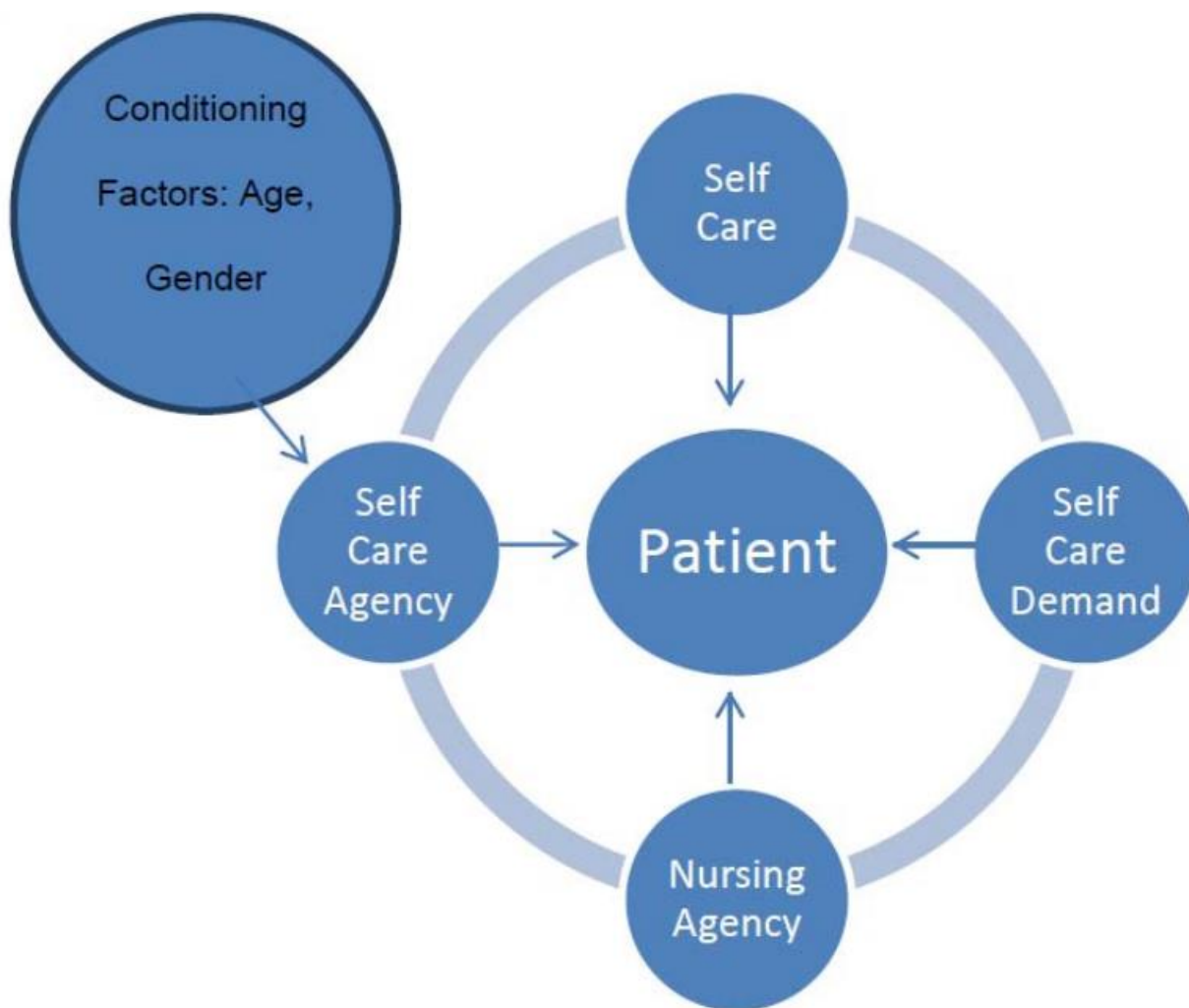
at Home. National Institute on Aging. <https://www.nia.nih.gov/health/aging-place-growing-older-home#support>.

Zillich, A. J., Jaynes, H. A., Snyder, M. E., Harrison, J., Hudmon, K. S., de Moor, C., & French,

D. D. (2012). Evaluation of specialized medication packaging combined with medication therapy management: adherence, outcomes, and costs among Medicaid patients. *Medical Care*, 50(6), 485–493. <https://doi.org/10.1097/MLR.0b013e3182549d48>

Appendix A

Orem's Theory of Self Care Deficit Model



Irshad, A.B.H. (2018) Application of Orem Self Care Deficit Theory on Psychiatric Patient. *Annals of Nursing and Practice* 5(1): 1093

Appendix B

UMASS HIPAA Release Consent Form

AUTHORIZATION TO DISCLOSE PROTECTED HEALTH INFORMATION FOR RESEARCH PURPOSES

The privacy law, Health Insurance Portability & Accountability Act (HIPAA), protects my individual identifiable health information (Protected Health Information, or PHI). The privacy law requires me to sign an authorization (or agreement) in order for researchers to be able to use or disclose my protected health information for research purposes in the study entitled:

Protocol # and Title: _____

I authorize _____ (Name of the clinic/hospital/physician) to disclose my protected health information to:

- _____ (name all who will have access to this information including research staff) researchers at UMass Amherst)
- Federal and State authorities that oversee research

Protected Health Information (PHI) that may be disclosed includes:

- All health care information in my medical record
- Health care information in my medical record relating to the following treatment or condition:
- Health care information in my medical record for the date(s): .
- Other (e.g., x rays, bills), specify date(s): _

My protected health information will be disclosed as listed above for the following reasons:

- To study the _____

I do not have to sign this Authorization. If I decide not to sign the Authorization:

- It will not affect my treatment, payment or enrollment in any health plans, or affect my eligibility for benefits.
- I will not be allowed to participate in the research study.

This authorization ends:

On (date): _____

When the following event occurs: _____

In 90 days from the date signed (if disclosure is to a financial institution or an employer of the patient for purposes other than payment)

If I sign the Authorization, I understand that:

- I have the right to withdraw, or revoke the Authorization.
- If I revoke the Authorization, I will notify the researcher of my decision
- If I revoke this Authorization, I must have to inform the researchers (**email/letter/in-person**) by (date, if applicable) _____
- If I change my mind and withdraw the Authorization, I **will/will not** be allowed to continue to participate in the study.
- Any disclosure carries the potential for re-disclosure. Once my protected health information is disclosed, it may no longer be protected by the HIPAA privacy rule.
- The entities receiving my protected health information will use it as described in the Consent Document for this study.
- I will receive a signed copy of this authorization for my personal records.

If I have questions about the research study, I should contact _____ (*researcher's contact information*).

If I have any questions or concerns about my privacy rights, I should contact the Human Research Protection Office at UMass Amherst via email at humansubjects@ora.umass.edu or by calling at 413-545-3428

I HAVE READ AND UNDERSTAND THE ABOVE STATEMENTS AND AUTHORIZE THE DISCLOSURE OF THE INFORMATION REQUESTED ABOVE

Signature of Subject	Date
Subject Name (Printed)	

Use boxes below if parent or legal representative is signing for research subject

Subject's Legal Representative Signature	Relationship	Date
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Print Name of Legal Representative

Please explain Representative Relationship to Subject and include a description of Representative's Authority to act on behalf of Subject:

Person obtaining HIPAA Authorization	Date

Appendix C

Cost Benefit Table

Costs for enrolling 30 patients	1 ream of paper: \$5.00	Black ink to print patient consent forms and handouts: \$16.99	10 minutes per patient of agency assistance (at \$33/hr) in enrolling 30 patients: \$165	Total Cost: \$186.99
Benefits	Reduction in the \$290 billion a year wasted on avoidable costs related to poor medication adherence (Bartlett Ellis et al., 2020).	Non-monetary benefit of better patient outcomes related to better medication adherence	Total Benefit: Reduced preventable healthcare spending and better patient outcomes	

Appendix D

Anticipated Project Timeline

Task	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Write up project introduction to go out in senior center's fall newsletter	X							
Lobby meetings to identify potential participants		X	X	X				
Patient enrollment in program		X	X	X				
Follow up meetings to identify markers of program success					X	X	X	
Analysis of results								X
Results presented to agency and project write-up completed								X

Appendix E

Modified Project Timeline

Task	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Introduction to project coordinator and project's aims published in project site's fall newsletter	X							
Lobby meetings to identify potential participants		X	X	X				
Compilation and review of qualitative data gathered at senior center					X	X		
Formulation of questions and conversations with pharmacists to gather professional opinions						X		
Formulation of questions and conversations with nurse practitioners to gather professional opinions						X		
Analysis of results						X	X	X
Results presented to project site and project write-up completed								X